

UNIVERSITY OF DELHI

Bachelor of Arts (Programme) Economics Courses

(Effective from Academic Year 2019-20)



Revised Syllabus as approved by

Academic Council

Date:

No:

Executive Council

Date:

No:

CONTENTS

Discipline Core Courses

Principles of Microeconomics I (PD11)	1
Principles of Microeconomics II (PD21)	2
Principles of Macroeconomics I (PD31)	4
Principles of Macroeconomics II (PD41)	5

Discipline Elective Courses

Environmental Economics (PDE51)	7
Money and Banking (PDE52)	8
Economic Development & Policy in India I (PDE53)	9
Public Finance (PDE61)	11
Economic Development & Policy in India II (PDE62)	12
Economic History of India (PDE63)	14

Generic Elective Courses

Principles of Microeconomics (PGE51)	16
Issues in Economic Development (PGE52)	17
Principles of Macroeconomics (PGE61)	18
The Indian Economy (PGE62)	20

Skill Enhancement Courses

Understanding Economic Survey and Union Budget (PS31)	22
Research Methodology (PS41)	23
Data Analysis (PS51)	24

Discipline Core Courses

Principles of Microeconomics I (PD11)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course intends to expose the students to the basic principles in Microeconomics and their applications. The course will illustrate how microeconomic concepts can be applied to analyze real-life economic situations.

Course Learning Outcomes

The students learn some basic principles of microeconomics and interactions of supply and demand, characteristics of perfect competition, efficiency and welfare.

Unit 1

Introduction

Problem of scarcity and choice: scarcity, choice and opportunity cost; production possibility frontier; economic systems.

Demand and supply: law of demand, determinants of demand, shifts of demand versus movements along a demand curve, market demand, law of supply, determinants of supply, shifts of supply versus movements along a supply curve, market supply, market equilibrium.

Applications of demand and supply: price rationing, price floors, consumer surplus, producer surplus.

Elasticity: price elasticity of demand, calculating elasticity, determinants of price elasticity, other elasticities

Unit 2

Consumer Theory

Budget constraint, concept of utility, diminishing marginal utility, Diamond-water paradox, income and substitution effects; consumer choice: indifference curves, derivation of demand curve from indifference curve and budget constraint.

Unit 3

Production and Costs

Production: behaviour of profit maximising firms, production process, production functions, law of variable proportions, choice of technology, isoquant and isocost lines, cost minimizing equilibrium condition

Costs: costs in the short run, costs in the long run, revenue and profit maximization, minimizing losses, short run industry supply curve, economies and diseconomies of scale, long run adjustments

Unit 4

Perfect Competition

Assumptions: theory of a firm under perfect competition, demand and revenue; equilibrium of the firm in the short run and long run; long run industry supply curve: increasing, decreasing and constant cost industries.

Welfare: allocative efficiency under perfect competition.

References

1. Bernheim, B., Whinston, M. (2009). *Microeconomics*. Tata McGraw-Hill.
2. Case, K., Fair, R. (2007). *Principles of economics, 8th ed.* Pearson Education.
3. Mankiw, N. (2007). *Economics: Principles and applications, 4th ed.* South Western.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Supply, demand, elasticity, consumer behaviour, firm behaviour, perfect competition, efficiency, welfare

Principles of Microeconomics II (PD21)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This is a sequel to Principles of Microeconomics–I covered in the first semester. The objective of the course is to introduce the students to different forms of market imperfections and market failures, input demand, factor incomes and international trade.

Course Learning Outcomes

This course helps the students to understand different forms of market imperfections and market failures observed in real life situations. The students learn about the environment where the standard market mechanism fails to generate the desirable outcomes. They develop a sense of how the production is distributed among the different factors of production and the demand for inputs. Some preliminary concepts of international trade are also covered in this course.

Unit 1

Market Structures

Theory of a Monopoly Firm

Concept of imperfect competition; short run and long run price and output decisions of a monopoly firm; concept of a supply curve under monopoly; comparison of perfect competition and monopoly, social cost of monopoly, price discrimination; remedies for monopoly: Antitrust laws, natural monopoly

Imperfect Competition

Monopolistic competition: Assumptions, SR and LR price and output determinations under monopolistic competition, economic efficiency and resource allocation; oligopoly: assumptions, oligopoly models, game theory, contestable markets, role of government

Unit 2

Consumer and Producer Theory

Consumer and Producer Theory in Action

Externalities, marginal cost pricing, internalising externalities, public goods; imperfect information: adverse selection, moral hazard, social choice, government inefficiency

Markets and Market Failure

Market adjustment to changes in demand, efficiency of perfect competition; sources of market failure: imperfect markets, public goods, externalities, imperfect information; evaluating the market mechanism

Unit 3

Income Distribution and Factor pricing

Input markets: demand for inputs; labour markets, land markets, profit maximisation condition in input markets, input demand curves, distribution of Income.

Unit 4

International Trade

Absolute advantage, comparative advantage, terms of trade, sources of comparative advantage, trade barriers, free trade/ protectionism.

References

1. Bernheim, B., Whinston, M. (2009). *Microeconomics*. Tata McGraw-Hill.
2. Case, K., Fair, R. (2007). *Principles of economics, 8th ed.* Pearson Education.
3. Mankiw, N. (2007). *Economics: Principles and applications, 4th ed.* South Western.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Imperfect competition, market failures, input demand, comparative advantage, international trade

Principles of Macroeconomics I (PD31)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course introduces students to the basic concepts in Macroeconomics. Macroeconomics deals with the aggregate economy. In this course the students are introduced to the definition, measurement of the macroeconomic variables like GDP, consumption, savings, investment and balance of payments. The course also discusses various theories of determining GDP in the short run.

Course Learning Outcomes

This course is useful for understanding various real economic issues and evaluating policy outcomes.

Unit 1

Introduction: What is macroeconomics? Macroeconomic issues in an economy

Unit 2

National Income Accounting: Concepts of GDP and National Income; measurement of national income and related aggregates; nominal and real income; limitations of the GDP concept

Unit 3

Determination of GDP: Actual and potential GDP; aggregate expenditure; consumption function; investment function; equilibrium GDP; concepts of MPS, APS, MPC, APC; autonomous expenditure; Concept of multiplier.

Unit 4

National Income Determination in an Open Economy with Government; Fiscal Policy: impact of changes in government expenditure and taxes; net exports function; net exports and equilibrium national income.

Unit 5

Money in a Modern Economy: Concept of money in a modern economy; monetary aggregates; demand for money; quantity theory of money; liquidity preference and rate of interest; money supply and credit creation; monetary policy

References

1. Abel, A., Bernanke, B. (2016). *Macroeconomics, 9th ed.* Pearson Education.
2. Blanchard, O. (2018). *Macroeconomics, 7th ed.* Pearson Education.

3. Dornbusch, R., Fischer, S., Startz, R. (2018). *Macroeconomics, 12th ed.* McGraw-Hill.
4. Jones, C. (2016). *Macroeconomics, 4th ed.* W. W. Norton.
5. Mankiw, N. (2016). *Macroeconomics, 9th ed.* Worth Publishers.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

National income, consumption, investment, government expenditure, money

Principles of Macroeconomics II (PD41)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This is a sequel to Principles of Macroeconomics I. It analyses various theories of determination of National Income in greater detail. It also introduces students to concept of inflation, its relationship with unemployment and some basic concepts in an open economy.

Course Learning Outcomes

This course provides students with an analytical framework to understand the basic functioning of the macroeconomy. It also allows them to critically examine and comment on effectiveness of various policies.

Unit 1

IS-LM Analysis

Derivations of the IS and LM functions; IS-LM and aggregate demand; shifts in the AD curve

Unit 2

GDP and Price Level in Short Run and Long Run

Aggregate demand and aggregate supply; multiplier analysis with AD curve and changes in price levels; aggregate supply in the SR and LR

Unit 3

Inflation and Unemployment: Concept of inflation; determinants of inflation; relationship between inflation and unemployment: Phillips Curve in short run and long run

Unit 4

Balance of Payments and Exchange Rate: Balance of payments: current account and capital account; market for foreign exchange; determination of exchange rate

References

1. Abel, A., Bernanke, B. (2016). *Macroeconomics, 9th ed.* Pearson Education.
2. Blanchard, O. (2018). *Macroeconomics, 7th ed.* Pearson Education.
3. Dornbusch, R., Fischer, S., Startz, R. (2018). *Macroeconomics, 12th ed.* McGraw-Hill.
4. Jones, C. (2016). *Macroeconomics, 4th ed.* W. W. Norton.
5. Mankiw, N. (2016). *Macroeconomics, 9th ed.* Worth Publishers.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

IS-LM model, GDP, aggregate demand, aggregate supply, inflation, unemployment, BOP, exchange rates

Discipline Elective Courses

Environmental Economics (PDE51)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course introduces students to concepts, methods and policy options in managing the environment using tools of economic analysis. Since several environmental problems are caused by economic activity (for instance, carbon emissions, over-harvesting of renewable resources and air and water pollution as a by-product of industrial activity), this course examines different approaches to adjusting behaviour through economic institutions such as markets and incentives as well as through regulation, etc. It also addresses the economic implications of environmental policies through practical applications of methods for valuation of environmental goods and services and quantification of environmental damages. Conversely, the impact of economic growth on the environment is also addressed under the rubric of sustainable development. Environmental problems and issues from the Indian and international context (especially global warming) are used to illustrate the concepts and methods presented in the course

Course Learning Outcomes

The module aims to introduce students to the main concepts in environmental economics, equip students with a thorough analytical grasp of environmental policy theory, starting with externalities, and familiarise students with the main issues in environmental valuation. At the end of the module the students should be able to demonstrate their understanding of the economic concepts of environmental policy, use diagrammatic analysis to demonstrate and compare the economic welfare effects of various environmental policy options, and demonstrate their understanding of the usefulness and problems related to environmental valuation

Unit 1

Introduction: key environmental issues and problems; an economic way of thinking about these problems; basic concepts from economics; Pareto optimality and market failure in the presence of externalities; property rights and other approaches

Unit 2

The Design and Implementation of Environmental Policy: Overview; Pigouvian taxes and effluent fees; tradable permits; implementation of environmental policies in India and international experience; transboundary environmental problems; economics of climate change

Unit 3

Environmental valuation methods and applications: valuation of non-market goods and services - theory and practice; measurement methods; cost-benefit analysis of environmental policies and regulations

Unit 4

Sustainable development: concepts; measurement; perspectives from Indian experience

References

1. Arrow, K. et al. (2004). Are we consuming too much? *Journal of Economic Perspectives*, 18(3): 147-172.
2. Intergovernmental Panel on Climate Change. (2014). Fifth Assessment Report.
3. Kolstad, C. (2010). *Intermediate environmental economics, 2nd ed.* Oxford University Press.
4. Perman, R., Ma, Y., Common, M., Maddison, D., McGilvray, J. (2011). *Natural resource and environmental economics, 4th ed.* Pearson Education.
5. Solow, R. (1998). *An almost practical step toward sustainability.* Rff Press.
6. Stavins, R. (ed.) (2012). *Economics of the environment: Selected readings, 6th ed.* W. W. Norton.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Pareto optimality, market failure, externalities, tradable permits

Money and Banking (PDE52)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course exposes students to the theory and functioning of the monetary and financial sectors of the economy. It highlights the organization, structure and role of financial markets and institutions. It also discusses interest rates, monetary management and instruments of monetary control. Financial and banking sector reforms and monetary policy with special reference to India are also covered.

Course Learning Outcomes

It allows students to analyse financial market outcomes and evaluate policies.

Unit 1

Money: Concept, functions, measurement; theories of money supply determination

Unit 2

Financial Institutions, Markets, Instruments and Financial Innovations: Role of financial markets and institutions; problem of asymmetric information – adverse selection and moral hazard; financial crises

Money and capital markets: organization, structure and reforms in India; role of financial derivatives and other innovations

Unit 3

Interest Rates: Determination; sources of interest rate differentials; theories of term structure of interest rates; interest rates in India

Unit 4

Banking System: Balance sheet and portfolio management

Indian banking system: Changing role and structure; banking sector reforms

Unit 5

Central Banking and Monetary Policy: Functions, balance sheet; goals, targets, indicators and instruments of monetary control; monetary management in an open economy; current monetary policy of India

References

1. Bhole, L., Mahukud, J. (2017). *Financial institutions and markets*, 6th ed. Tata McGraw-Hill.
2. Fabozzi, F., Modigliani, F., Jones, F., Ferri, M. (2010). *Foundations of financial markets and institutions*, 4th ed. Pearson Education.
3. Khan, M. (2015). *Indian financial system*, 9th ed. Tata McGraw-Hill.
4. Mishkin, F., Eakins, S. (2017). *Financial markets and institutions*, 8th ed. Pearson.
5. Various latest issues of RBI Bulletins, Annual Reports, Reports on Currency and Finance, Reports of the Working Group, IMF Staff Papers.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Money, financial institutions, financial innovations, interest rates, banking, monetary policy

Economic Development & Policy in India I (PDE53)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course reviews major trends in aggregate economic indicators in India and places these against the backdrop of major policy debates in India in the post-independence period.

Course Learning Outcomes

This course will help students understand the key issues related to the Indian economy. It will broaden their horizons and enable them to analyze current economic policy thus improving their chances of getting employed, and be more effective, in positions of responsibility and decision making.

The course also serves as the base for further study of sector specific policy discussion that is pursued in the course in the next semester.

Given the topical nature of the course, the readings will be updated every year.

Unit 1

Issues in growth, development, and sustainability

Unit 2

Factors in development: capital formation (physical and human); technology; institutions. .

Unit 3

Population and economic development: demographic trends; urbanisation

Unit 4

Employment: occupational structure in the organised and unorganised sectors; open-, under- and disguised- unemployment (rural and urban); employment schemes and their impact

Unit 5

Indian development experience: critical evaluation of growth, inequality, poverty and competitiveness, pre- and post- reform eras

References

Given the current nature of the course, the readings will be updated every year. Selected chapters will be prescribed from:

1. Agrawal, P. (ed.) (2018). *Sustaining high growth in India*. Cambridge University Press.
2. Balakrishnan, P. (2007). The recovery of India: Economic growth in the Nehru era. *Economic and Political Weekly*, 42(45-46), 52-66.
3. Bloom, D. (2012). Population dynamics in India and implications for economic growth. In C. Ghate (ed.): *The Oxford handbook of the Indian economy*. Oxford University Press.
4. Case, K., Fair, R. (2007). *Principles of economics, 8th ed.* Chapter 31. Pearson Education.
5. Dreze, J., Sen, A. (2013). *India: An uncertain glory*. Allen Lane.
6. Kapila, U. (2009). *Economic development and policy in India*. Academic Foundation.
7. Kapila, U. (2015). *Indian economy since independence, 26th ed.* Academic Foundation.

8. Mehrotra, S. (2015). *Realising the demographic dividend: Policies to achieve inclusive growth in India*. Cambridge University Press.
9. Ministry of Finance. *Economic survey* (latest).
10. Ministry of Finance. *Finance commission report* (latest).
11. Mohan, R. (2014). Pressing the Indian growth accelerator: Policy imperatives. *IMF papers*.
12. Todaro, M., Smith, S. (2011). *Economic development, 11th ed*. Pearson.
13. United Nations Development Programme. (2010). *Human development report 2010*. Palgrave Macmillan.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Indian economic development, government policy

Public Finance (PDE61)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course is a non-technical overview of government finances with special reference to India. The course does not require any prior knowledge of economics. It will look into the efficiency and equity aspects of taxation of the centre, states and the local governments and the issues of fiscal federalism and decentralisation in India. The course will be useful for students aiming towards careers in the government sector, policy analysis, business and journalism

Course Learning Outcomes

The module aims to introduce students to the main concepts in public finance, equip students with a thorough analytical grasp of government taxes: direct and indirect taxes, and familiarise students with the main issues in government expenditure. At the end of the module the students should be able to demonstrate their understanding of the economic concepts of public finances, use diagrammatic analysis to demonstrate and compare the economic welfare effects of various government policy options, and demonstrate their understanding of the usefulness and problems related to government revenues and expenditures

Unit 1

Theory: Overview of Fiscal Functions, Tools of Normative Analysis, Pareto Efficiency, Equity and the Social Welfare; Market Failure, Public Good and Externalities; Elementary Theories of Product and Factor Taxation (Excess Burden and Incidence)

Unit 2

Issues from Indian Public Finance: Working of Monetary and Fiscal Policies; Current Issues of India's Tax System; Analysis of Budget and Deficits; Fiscal Federalism in India; State and Local Finances

References

1. Alam, S. (2016). GST and the states: sharing tax administrations. *Economic and Political Weekly*, 51(31).
2. Cullis, J., Jones, P. (1998). *Public finance and public choice*, 2nd ed. Oxford University Press.
3. Das, S. (2017). Some concepts regarding the goods and services tax. *Economic and Political Weekly*, 52(9).
4. Government of India. (2017). *GST - Concept and status - as on 3rd June, 2017*. Central Board of Excise and Customs, Department of Revenue, Ministry of Finance.
5. Hindriks, J., Myles, G. (2013). *Intermediate public economics*, 2nd ed. MIT Press.
6. Rao, M. (2005). Changing contours of federal fiscal arrangements in India. In A. Bagchi (ed.): *Readings in public finance*. Oxford University Press.
7. Rao, M., Kumar, S. (2017). Envisioning tax policy for accelerated development in India. *Working Paper No. 190, National Institute of Public Finance and Policy*.
8. Reddy, Y. (2015). Fourteenth finance commission: Continuity, change and way forward. *Economic and Political Weekly*, 50(21), 27-36.
9. Stiglitz, J. (2009). *Economics of the public sector*, 3rd ed. W. W. Norton.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Pareto efficiency, market failure, public good, externality, fiscal policy

Economic Development & Policy in India II (PDE62)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

The course seeks to equip students with sector-specific knowledge and skills to analyse key economic issues and policy documents. It will also enable them to relate theoretical frameworks of macroeconomics and microeconomics to the Indian context.

Course Learning Outcomes

Students will have capability to understand government policies and will enable informed participation in economic decision making, thus improving their employment prospects and career advancement.

Unit 1

Macroeconomic policies and their impact: fiscal policy; financial and monetary policies.

Unit 2

Agriculture: policies and performance; production and productivity; credit; labour markets and pricing; land reforms; regional variations.

Unit 3

Industry: policies and performance; production trends; small scale industries; public sector; foreign investment, labour regulation

Unit 4

Services and trade: trends and performance, trade and investment policy

References

Given the nature of the course, readings will be updated every year.

1. Anant, T. (2006). Institutional reforms for agriculture growth. In N. Majumdar, U. Kapila (eds.): *Indian agriculture in the new millennium: Changing perceptions and development policy*, Vol. 2. Academic Foundation.
2. Balakrishnan, P. (2014). The great reversal: A macro story. *Economic and Political Weekly*, 49 (21), 29-34.
3. Bhaduri, A. (2012). Productivity and production relations: The case of Indian agriculture. In A. Bhaduri (ed.): *Employment and development*. Oxford University Press.
4. Bhagwati, J., Panagariya, A. (2012). A multitude of labor laws and their reforms. In *India's tryst with destiny*. Collins Business.
5. Chanda, R. (2012). Services led growth. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
6. De, S. (2012). *Fiscal policy in India: Trends and trajectory*. Ministry of Finance Working Paper.
7. Dev, M. (2012). Agricultural development. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
8. Dev, S., Rao, N. (2010). Agricultural price policy, farm profitability and food security. *Economic and Political Weekly*, 45 (26-27), 174-181.
9. Dhar, B. (2015). India's new foreign trade policy. *Economic and Political Weekly*, 50(16), 14-16.
10. Ghatak, M. (2012). Land reforms. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
11. Gulati, A., Saini, S. (2017) 25 years of policy tinkering in agriculture. In R. Mohan (ed.): *India transformed: 25 years of economic reforms*. Penguin.
12. Kanagasabapathy, K., Tilak, V., Krishnaswamy, R. (2013). A rethink on India's foreign trade policy. *Economic and Political Weekly*, 48 (31), 137-139.

13. Kumar, N. (2015). FDI and portfolio investment flows and development: A perspective on Indian experience. In U. Kapila (ed.): *Indian economy since independence, 26th ed.* Academic Foundation.
14. Ministry of Finance. Clothes and shoes: Can India reclaim small scale manufacturing? *Economic Survey, 2016-17, 1.*
15. Nagaraj, R. (2017). Economic reforms and manufacturing sector growth. *Economic and Political Weekly*, 52(2), 61-68.
16. Nayak, P. (2012). Privatization. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
17. Panda, M. (2017). Macroeconomic scenario and policy options. In M. Dev (ed.): *India development report 2017*. Oxford University Press.
18. Vaidyanathan, A. (2012). Irrigation. In K. Basu, A. Maertens (eds): *New Oxford companion to economics in India*. Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Indian economic development, government policy

Economic History of India (PDE63)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course analyses key aspects of Indian economic development during the second half of British colonial rule. In doing so, it investigates the mechanisms that linked economic development in India to the compulsions of colonial rule.

Course Learning Outcomes

The course exposes students to the intricacies of India's economic, political and social developments both in the past and present times. It develops their analytical skills that will be useful in a variety of careers in academics, research, journalism, private sector and government.

Unit 1

Colonial India: background and introduction

Unit 2

Trends in national income, population, labour and occupational structure

Unit 3

Agriculture, agrarian structure and land relations

Unit 4

Railways and industry

Unit 5

Economy and state in the imperial context

References

1. Chatterjee, B. (1992). *Trade, tariffs and empire: Lancashire and British policy in India 1919-1939*. Epilogue. Oxford University Press.
2. Chaudhary, L., Gupta, B., Roy, T., Swami, A. (eds.) (2016). *A new economic history of colonial India*. Chapters 4, 7, 9. Routledge.
3. Guha, S. (1991). Mortality decline in early 20th century India. *Indian Economic and Social History Review*, 28(4), 371-87.
4. Habib, I. (2006). *Indian economy 1858-1914: A people's history of India*. Chapter 3. Tulika.
5. Klein, I. (1984). When rains fail: Famine relief and mortality in British India. *Indian Economic and Social History Review*, 21 (2), 185-214.
6. Morris, M. (1965). *Emergence of an industrial labour force in India*. Chapter 11. Oxford University Press.
7. Parthasarathi, P. (2009). Historical issues of deindustrialization in nineteenth century South India. In T. Roy, G. Riello (eds.): *How India clothed the world: The world of South Asian textiles, 1500-1850*. Brill.
8. Parthasarathy, P. (2011). *Why Europe grew rich and Asia did not: Global economic divergence, 1600-1850*. Chapters 2, 8. Cambridge University Press.
9. Roy, T. (2018). *A business history of India: Enterprise and the emergence of capitalism from 1700*. Chapters 4, 5. Cambridge University Press.
10. Roy, T. (2011). *The economic history of India 1857-1947, 3rd ed.* Chapters 3, 11. Orient Longman.
11. Subramanian, L. (2010). *History of India 1707-1857*. Chapter 4. Orient Blackswan.
12. Tomlinson, B. (1975). India and the British Empire 1880-1935. *The Indian Economic and Social History Review*, 12(14), 337-380.
13. Washbrook, D. (2012). The Indian economy and the British empire. In D. Peers, N. Gooptu (eds.): *India and the British empire*. Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Economic History of India

Generic Elective Courses

Principles of Microeconomics (PGE51)

Generic Elective (GE) Credit: 6

Course Objective

This course intends to expose the student to the basic principles in Microeconomics and their applications. The course will illustrate how microeconomic concepts can be applied to analyse real-life economic situations.

Course Learning Outcomes

The students learn some basic principles of microeconomics and interactions of supply and demand, characteristics of perfect competition, efficiency and welfare.

Unit 1

Introduction

Problem of scarcity and choice: scarcity, choice and opportunity cost; production possibility frontier; economic systems

Demand and supply: law of demand, determinants of demand, shifts of demand versus movements along a demand curve, market demand, law of supply, determinants of supply, shifts of supply versus movements along a supply curve, market supply, market equilibrium

Applications of demand and supply: price rationing, price floors, consumer surplus, producer surplus

Elasticity: price elasticity of demand, calculating elasticity, determinants of price elasticity, other elasticities

Unit 2

Consumer Theory

Budget constraint, concept of utility, diminishing marginal utility, diamond-water paradox, income and substitution effects; consumer choice: indifference curves, derivation of demand curve from indifference curve and budget constraint

Unit 3

Production and Costs

Production: behaviour of profit maximising firms, production process, production functions, law of variable proportions, choice of technology, isoquant and isocost lines, cost minimising equilibrium condition

Costs: costs in the short run, costs in the long run, revenue and profit maximisation, minimising losses, short run industry supply curve, economies and diseconomies of scale, long run adjustments

Unit 4

Perfect Competition

Assumptions: theory of a firm under perfect competition, demand and revenue; equilibrium of the firm in the short run and long run; long run industry supply curve: increasing, decreasing and constant cost industries

Welfare: allocative efficiency under perfect competition.

References

1. Bernheim, B., Whinston, M. (2009). *Microeconomics*. Tata McGraw-Hill.
2. Case, K., Fair, R. (2007). *Principles of economics, 8th ed.* Pearson Education.
3. Mankiw, N. (2007). *Economics: Principles and applications, 4th ed.* South Western.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Supply, demand, elasticity, consumer behaviour, firm behaviour, perfect competition, efficiency, welfare

Issues in Economic Development (PGE52)

Generic Elective (GE) Credit: 6

Course Objective

This course exposes students to some of the key ideas and concepts in the areas of economic growth, human development and globalisation.

Course Learning Outcomes

Students will develop a critical understanding of the contemporary issues in Indian economic development. Students will thus be better prepared to face the professional world and can use this knowledge base in a variety of jobs, including in the corporate, civil service and NGO sectors.

Unit 1

Development and underdevelopment

Unit 2

Development goals and indicators, poverty and inequality

Unit 3

Capabilities, human development and sustainable development

Unit 4

Globalisation and development

References

Given the nature of the course, readings will be updated every year.

1. Dasgupta, P. (2007). *Economics: A very short introduction*. Prologue, Chapters 1, 7. Oxford University Press.
2. Dutt, A. (2014). *Pathways to economic development*. Chapters 1, 6. Oxford University Press.
3. Nayyar, D. (2003). Globalization and development. In H. Chang (ed.): *Rethinking development economics*. Anthem Press.
4. Nayyar, D. (2013). *Catch up: Developing countries in the world economy*. Chapters 2, 4. Oxford University Press.
5. Omkarnath, G. (2013). *Economics: A primer for India*. Chapter 5. Orient Blackswan.
6. Prabhu, K. (2012). Human development index. In K. Basu, A. Maertens (ed.): *Oxford companion to economics in India*. Oxford University Press.
7. Rodrik, D. (2011). *The globalization paradox: Why global markets, states and democracy can't coexist*. Chapters 1, 7. Oxford University Press.
8. Sen, A. (2000). *Development as freedom*. Chapter 4. Oxford University Press.
9. Thun, E. (2011). The globalization of production. In J. Ravenhill (ed.): *Global political economy*. Oxford University Press.
10. Todaro, M., Smith, S. (2015). *Economic development, 12th ed*. Chapters 1, 2, 5. Pearson.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Growth, poverty, inequality, globalisation

Principles of Macroeconomics (PGE61)

Generic Elective (GE) Credit: 6

Course Objective

This course introduces students to the basic concepts in Macroeconomics. Macroeconomics deals with the aggregate economy. In this course the students are introduced to the definition, measurement of the macroeconomic variables like GDP, consumption, savings, investment and balance of payments. The course also discusses various theories of determining GDP in the short run.

Course Learning Outcomes

This course is useful for understanding various real economic issues and evaluating policy outcomes.

Unit 1

Introduction: What is macroeconomics? Macroeconomic issues in an economy

Unit 2

National income accounting: Concepts of GDP and National Income; measurement of national income and related aggregates; nominal and real income; limitations of the GDP concept

Unit 3

Determination of GDP: Actual and potential GDP; aggregate expenditure; consumption function; investment function; equilibrium GDP; concepts of MPS, APS, MPC, APC; autonomous expenditure; Concept of multiplier

Unit 4

National income determination in an open economy with government: Fiscal Policy: impact of changes in government expenditure and taxes; net exports function; net exports and equilibrium national income.

Unit 5

Money in a Modern Economy: Concept of money in a modern economy; monetary aggregates; demand for money; quantity theory of money; liquidity preference and rate of interest; money supply and credit creation; monetary policy

References

1. Abel, A., Bernanke, B. (2016). *Macroeconomics, 9th ed.* Pearson Education.
2. Blanchard, O. (2018). *Macroeconomics, 7th ed.* Pearson Education.
3. Dornbusch, R., Fischer, S., Startz, R. (2018). *Macroeconomics, 12th ed.* McGraw-Hill.
4. D'Souza, E. (2009). *Macroeconomics.* Pearson Education.
5. Froyen, R. (2005). *Macroeconomics, 2nd ed.* Pearson Education.
6. Mankiw, N. (2016). *Macroeconomics, 9th ed.* Worth Publishers.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

National income, aggregate demand, aggregate supply, fiscal policy, monetary policy

The Indian Economy (PGE62)

Generic Elective (GE) Credit: 6

Course Objective

This course exposes students to some of the key ideas and concepts in the areas of growth and structural change, poverty, education, health, gender, industry, services and international trade.

Course Learning Outcomes

Students will develop a critical understanding of the contemporary issues in the Indian economy. Students will thus be better prepared to face the professional world and can use this knowledge base in a variety of jobs, including in the corporate, civil service, and NGO sectors.

Unit 1

Historical and general overview

Unit 2

Growth and structural change

Unit 3

The Indian economy in a comparative perspective

Unit 4

Key issues: poverty, inequality, education, health and gender

Unit 5

Agriculture, industry, services and international trade

References

Given the nature of this course, the reading list will be updated every year.

1. Agarwal, B. (2012). Gender inequality. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
2. Bardhan, P. (2010). *Awakening giants, feet of clay: Assessing the economic rise of China and India*. Chapter 2. Oxford University Press.
3. Chandra, B. (1992). The colonial legacy. In B. Jalan (ed.): *The Indian economy: Problems and prospects*. Penguin Books.
4. Chandra, R. (2012). Services led growth. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
5. Dev, M. (2012). Agricultural development. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
6. Dreze, J., Sen, A. (2013). *An uncertain glory: India and its contradictions*. Chapters 1, 2, 3, 5, 6, 7, 8. Princeton University Press.
7. Ghatak, M. (2012). Land reforms. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
8. Nagaraj, R. (2012). Industrial growth. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.

9. Nayak, P. (2012). Privatization. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
10. Omkarnath, G. (2013). *Economics: A primer for India*. Chapter 7. Orient Blackswan.
11. Pal, P. (2014). *India and international trade*. Chapter 6. Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Indian economic development, agriculture, services, industry, international trade

Skill Enhancement Courses

Understanding Economic Survey and Union Budget (PS31)

Skill Enhancement Elective Courses (SEC) Credit: 4

Course Objective

The course seeks to familiarise students with basic concepts related to the Economic Survey and Union Budget. It aims to equip students with sufficient knowledge and skills to analyse these documents.

Course Learning Outcomes

Students will have the capability to understand government policies and will be informed participants in economic decision-making.

Unit 1

Concepts:

- Fiscal policy, areas of government spending in India;
- Capital and revenue expenditure; plan and non-plan expenditures;
- Deficits (fiscal, primary, revenue), impact of fiscal deficits on the economy;
- Capital receipts, revenue receipts; tax and non-tax revenue; direct and indirect taxes; need for rationalization of tax structure; Goods and Services Tax (GST);
- Actual, revised and budget estimates;
- Zero-base budgeting;
- Gender budgeting;
- Fiscal devolution and centre-state financial relations

Unit 2

The economic survey

- Analysis of current and past policy emphasis

Unit 3

The union budget

- Need for the budget; understanding the process of budget making in India;
- Analysis of fiscal and revenue deficits;
- Analysis of sources of revenue and expected growth in revenue; tax simplification, improvement in administration, expansion of tax net and other measures to improve revenue receipts;
- Analysis of expenditure pattern and expected growth in expenditure; thrust areas of budget; sectors that have received higher/lower shares of expenditure, the reasons and consequences thereof; steps proposed to ensure effective spending

References

Given the nature of the course, readings will be updated every year.

1. Centre for Budget and Governance Accountability. Recent reports.
2. Chakraborty, P. (2015). Intergovernmental fiscal transfers in India: Emerging trends and realities. In P. Patnaik (ed.): *Macroeconomics*. Oxford University Press.
3. Ministry of Finance. Economic and social classification of the budget.
4. Ministry of Finance. Economic survey (latest).
5. Ministry of Finance. Finance commission report (latest).
6. Ministry of Finance. Union budget.
7. Reddy, Y. (2015). Continuity, change and the way forward: The fourteenth finance commission. *Economic and Political Weekly*, 50(21), 27-36.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Economic survey, union budget, government policy

Research Methodology (PS41)

Skill Enhancement Elective Courses (SEC) Credit: 4

Course Objective

This course is designed to provide students skills for collecting and analysing data to answer real world problems. It will cover modes of data collection, data cleaning and data representation.

Course Learning Outcomes

The student will develop an understanding of how commonly available data is collected and analyzed. This would help in the interpretation of secondary data and in the management of small primary surveys.

Unit 1

Data Types and sources: Qualitative and quantitative data, measurement and scales; overview of some secondary data sources

Unit 2

Questionnaire design: Measurement and scales, ordering of questions, coding responses

Unit 3

Sampling techniques: Simple random sampling, stratification, sequential sampling; Size and cost trade-offs

Unit 4

Processing of survey data: Data cleaning, checking for consistency

Unit 5

Analysing data: Generating sample statistics and representing them in an easily comprehensible manner

Unit 6

Ethics and Scientific Integrity: Respecting respondent privacy, ethical standards of conduct

References

1. Cochran, W. (2008). *Sampling techniques*, 3rd ed. Wiley.
2. Groves, R., Fowler, F., Couper, M., Lepkowski, J., Singer, E., Tourangeau, R. (2009). *Survey Methodology*. Wiley.
3. Kumar, R. (2014). *Research methodology: A step by step guide for beginners*, 4th ed. Sage Publications.

Teaching Learning Process

Combination of labs and lectures

Assessment Methods

Assessment will be based on lab tests and projects.

Keywords

Data, sampling, surveys, data analysis, ethics

Data Analysis (PS51)

Skill Enhancement Elective Courses (SEC) Credit: 4

Course Objective

The students will be instructed on the use of spreadsheet and statistical software to analyse data. Software used for the course will vary based on what is available. Open access software such as R will be encouraged.

Course Learning Outcomes

Students will learn to input, visually represent and analyse data.

Unit 1

Introduction to available software and how it deals with data

Unit 2

Data cleaning: checking for outliers, cleaning variable names, consistency checks

Unit 3

Data visualisation: scatter plots, line graphs, box plots and other graphical formats

Unit 4

Calculating and representing summary statistics and lines of best fit

Unit 5

Elements of statistical inference: calculating and plotting confidence intervals; tests of population differences in population statistics

Unit 6

Miscellaneous other topics: elements of writing simple programs for repetitive tasks, etc.

References

1. Levine, D., Stephan, D., Szabat, K. (2017). *Statistics for managers using Microsoft Excel, 8th ed.* Pearson.
2. Tattar, P., Ramaiah, S., Manjunath, B. (2018). *A course in statistics with R.* Wiley.

Teaching Learning Process

Combination of labs and lectures

Assessment Methods

Assessment will be based on lab tests and projects.

Keywords

Data representation, statistical software, estimation

Department of Economics
SEC IV(6th Semester) for B.A. (P)

Basic Computational Techniques for Data Analysis

Purpose/Objective of the Paper:

The main purpose of this Skill Enhancement Course (SEC) is to provide B.A.(P) students with hands-on experience to develop skills in statistical techniques using computer applications. The course would help students to get familiar with data sources on different aspects of the Indian economy, estimate simple relationships between economic variables, and interpret estimation results to write up a project report.

This course is an extension of the previous semester's SEC: Data Analysis, which is a prerequisite for taking this course. This course intends to develop computational skills based on the statistics knowledge developed in the last semester. Along with the previous semesters' SEC papers viz. 'Understanding the Economic Survey and Budget', 'Research Methodology' and 'Data Analysis', the course will equip the students to undertake basic research projects on the Indian economy which would be helpful in a variety of professions.

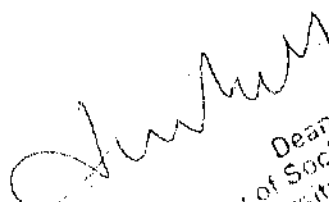
Course Outline:

Unit-I

Introduction to Excel (Microsoft Office) / Open Office by Libre or Apache, spreadsheet basics and inputting of data, word processing and presentation of data with graphs and tables.

Unit-II

- a. Review of concepts: Measures of central tendency- mean, median and mode; arithmetic, geometric and harmonic mean. Measures of dispersion (standard deviation and variance), skewness and kurtosis.
- b. Introduction to calculation of financial formulae: net present value (NPV), internal rate of return, future value, Equated Monthly Installment (EMI), compound growth rate.
- c. Using Spreadsheet to perform the above mathematical/statistical/financial functions.


Dean
Faculty of Social Sciences
University of Delhi
110007

Review of the concepts of correlation and rank correlation.

Introduction to the method of Ordinary Least Squares (OLS) in two-variable case (one dependent and one explanatory). Testing of hypothesis related to regression coefficient and goodness of fit (R^2). Reporting of the estimation results.

c. Using Excel/GRETl (Free ware) for above.

Unit-IV

Introduction to economic and business data sets available in public domain such as NSE, BSE, RBI, MOSPI etc.

Unit-V

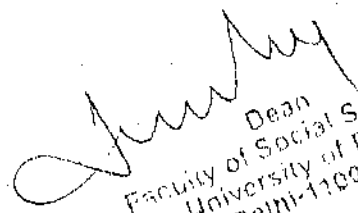
Preparation of a project report based on data available in public domain, using concepts studied in Units II and III.

Readings:

1. Spreadsheet-Microsoft Office/Open Office manual.
2. GRETl-Manual.
3. P.H.Karmel and M. Polasek (1978), *Applied Statistics for Economists* (4th edition), Pitman
4. M. R. Spiegel, L.J. Stephens and N. Kumar (2010), *Statistics* (4th edition) Schaum series, McGraw-Hill.

Marking Scheme:

- i. Internal Assessment : 25 marks, as distributed below:
 - a) 5 marks for attendance
 - b) 10 marks for written test
 - c) 10 marks for computer-based test
- ii. End-semester assessment: 75 marks, comprising (a) 25 marks for project based on Unit V, to be submitted before the final exam, and (b) 50 marks written final exam, which will include one compulsory question based on interpreting computer output related to OLS. Questions in the final exam will be based on only Units I to IV.


Dean
Faculty of Social Sciences
University of Delhi
Delhi-110007

**DEPARTMENT OF ENGLISH
UNIVERSITY OF DELHI
DELHI - 110007**

**DEPARTMENT OF ENGLISH
UNIVERSITY OF DELHI
DELHI - 110007**



**Structure of BA Honours English
English for BA/ BCom/BSc Programme
and
English for BA(H)/BCom(H)/BSc (H)
under Learning Outcomes-based Curriculum Framework for Undergraduate Education**

SEMESTER 1

**Core, Ability Enhancement Course Compulsory (AECC), B.A/B.Com Program, B.A.
English Discipline and Generic Electives (GE)**

*Syllabus applicable for students seeking admission to the
BA Honours English, BA/BCom/BSc Programme and BA(H)/BCom(H)/BSc(H) under LOCF
w.e.f. the academic year 2019-20*

SEMESTER I

B. A. & B. COM. PROGRAMME

CORE ENGLISH LANGUAGE

General Course Statement

1. The course will retain streaming. The structure of three graded levels of English language learning is required in a diverse central university like Delhi University to address the differential learning levels of students and achieve the desired competence.

2. **The existing English A, B, and C will be renamed as English Language through Literature, English Fluency and English Proficiency respectively. This will remove any discriminatory, hierarchical attributes in the existing nomenclature and refocus the pedagogic exercise on the respective objectives of the three streams in an academically thorough and non-hierarchical way.**

As 98% of the BA & B.Com Programme students have done English in class 12, **streaming will be now based on their Class XII marks in English.** There will be three streams:

1. 80% and above: **ENGLISH LANGUAGE THROUGH LITERATURE**
 2. 60% and above up to 80%: **ENGLISH FLUENCY**
 3. Less than 60%: **ENGLISH PROFICIENCY**
- We have retained the present Delhi University Rule of streaming students who have done English up to Class X and Class VIII to ENGLISH FLUENCY and ENGLISH PROFICIENCY respectively to take care of the 2% who may not have done English up to Class XII
 - We have provided a 10% relaxation in Class XII English marks while streaming for students who have studied English Elective in class XII

The detailed syllabus with suggested readings, teaching plans, testing/evaluation pattern and learning outcomes for two semesters under CBCS is as follows:

ENGLISH LANGUAGE THROUGH LITERATURE I & II
ENGLISH FLUENCY I & II
ENGLISH PROFICIENCY I & II

A -- ENGLISH LANGUAGE THROUGH LITERATURE

Course Objectives

This course aims to

- develop in students the ability and confidence to process understand and examine different kinds of texts - verbal and written - that they encounter in everyday life
- enable students to identify and understand social contexts and ethical frameworks in the texts they encounter
- encourage suitable research; to recognize sources; to distinguish fact from opinion/editorialization; produce objective versus subjective pieces
- teach skilled comprehension; listening/reading; skimming; summarising; précis writing; paraphrasing; note making
- identify key topics/arguments/ideas
- accomplish writing goals: creating an essay; writing a thesis statement; producing topic sentences; developing organised paragraphs; evolving the skill of producing suitable transitions between paragraphs
- enable students to write in expository argumentative and descriptive modes
- help students identify and use the characteristic features of various writing forms: letters programmes reports/press-releases; newspaper hard news; feature articles; fiction and nonfiction
- enable students to choose between expository argumentative descriptive and narrative writing styles to assemble their own writing
- inculcate confident expression: to enable students to articulate their own views confidently because their language skills sufficiently empower them to converse research and collate information from various textual sources be these verbal or written.

COURSE CONTENT FOR SEMESTERS I / II

Unit 1

Understanding Everyday Texts

This unit aims to help students understand that we are surrounded by texts So thinking about texts reading writing and comprehension are necessary life skills not merely language skills

Reading: Texts may include reportage open letters campaigns social reports etc Students will practice skimming scanning analysing interpreting

Writing: Descriptive passage making notes drafting points creating a program sheet paragraphs outlines drafts etc

Speaking: Make short presentations 2-3 minutes long showcasing their understanding of any topical issues

Listening and responding to short presentations

Grammar/Vocabulary: Tenses -- verb tenses and the ability to use them in a variety of contexts

Suggested Readings:

Edwards, Adrian 'Forced displacement worldwide at its highest in decades'

UNHCR.org UNHCR <http://www.unhcr.org/afr/news/stories/2017/6/5941561f4/forced-displacement-worldwide-its-highest-decades.html#> Accessed 1 June 2018

Jadhav, Radheshyam 'Groom wanted: Trader peon...anyone but a farmer' *Times News Network*
1 Jan 2018 <https://timesofindia.indiatimes.com/city/chandigarh/groom-wanted-trader-peon-anyone-but-a-farmer/articleshow/62321832.cms> Accessed 1 June 2018

Knapton, Sarah 'Selfitis' -- the obsessive need to post selfies-- is a genuine mental disorder say psychologists' *The Telegraph* 15 December 2017
<https://www.telegraph.co.uk/science/2017/12/15/selfitis-obsessive-need-post-selfies-genuine-mental-disorder/> Accessed 1 June 2018

'13 letters every parent every child should read on Children's Day' *The Indian Express* 10 November 2014
<http://indianexpress.com/article/lifestyle/feelings/12-letters-every-parent-every-child-should-read-on-childrens-day/> Accessed 1 June 2018

Unit 2

Understanding Drama

This unit focuses on dramatic texts centre human communication; the focus will be to see how speech is connected to character and situation

Reading one-act/short plays to identify different elements of drama characterization/ conflict/ plot etc

Writing: Rewriting dialogue for a character; writing an alternative playscript for a scene with stage directions; practicing expository writing; writing analytical pieces about the plays

Speaking: Learning to use one's voice and body to perform/enact a character

Listening: Watching plays live or recorded; studying why actors perform the way they do

Grammar/Vocabulary: Observing and learning the use of the first person/second person/third person address

Suggested Readings:

Lakshmi CS 'Ambai' 'Crossing the River' *Staging Resistance: Plays by Women in Translation* edited by Tutun Mukherjee Oxford: Oxford University Press 2005

Unit 3

Understanding Poetry

Poetic texts centre the use of language in clear and striking ways: students will learn how poetic language can help them attain brevity clarity depth and complexity in verbal and written expression

Reading poetry to identify tone imagery rhythm rhyme and use of tropes

Writing and reviewing poems with particular emphasis on formal elements; paraphrase and analysing poems to produce argumentative interpretations of poems

Speaking: reading poetry out loud as in poetry slam in order to listen to tone emphasis etc

Listening to others' poetry and preparing responses

Grammar/Vocabulary: Modifiers Synonyms Antonyms Homophones Simile Metaphor

Suggested Readings:

Angelou Maya 'Caged Bird' *The Complete Collected Poems of Maya Angelou* New York: Random House Inc 1994

Ezekiel Nissim 'Goodbye Party For Miss Pushpa TS' *Collected Poems* New Delhi: Oxford University Press 2005

Okara Gabriel 'Once Upon a Time' *Gabriel Okara: Collected Poems* Nebraska: University of Nebraska 2016

Lawrence DH 'Last Lesson of the Afternoon' *The Complete Poems of DH Lawrence* Hertfordshire: Wordsworth Editions 1994

Unit 4

Understanding Fiction

Narrative texts use language to recreate experience: students will learn how to order their experiences into meaningful narratives

Reading a short story to identify themes, plot, structure, characterisation and narrative voice

Rewriting the story from another perspective to redevelop plot and characters

Speaking discussing the formal elements of a piece of fiction of their choice

Listening to audio clips of writers reading their work/work read aloud to study how fiction uses literary devices and also rhythm pauses punctuation etc

Grammar/Vocabulary: Imperatives Conditional Clauses Transitions

Suggested Readings:

Kumar E Santhosh 'Three Blind Men describe an Elephant' *Indian Review*

<http://indianreviewin/fiction/malayalam-short-stories-three-blind-men-describe-an-elephant-by-e-santhosh-kumar/> Accessed 1 June 2018

Mistry Rohinton 'The Ghost of Firozsha Baag' *Tales from FirozshaBagh* McClelland & Stewart 1992

Joshi Umashankar 'The Last Dung Cake' *The Quilt from the Flea-market and Other Stories* Delhi: National Book Trust 2017

Unit 5

Creating Your Own Voice

This unit helps students understand that the creation of a unique personal voice is possible through an understanding of the mechanics of language. This section will study how different audiences lead us to modify what we wish to say so that our thoughts become accessible and communication is successful

Reading: Texts may include columns opinion and editorial pieces from newspapers magazines social media online news and e-zines

Writing: Examine the process of writing: drafting editing and revising; respond to what you are reading in the form of a personal essay preliminary forms can include social posts or blogs structured as brief personal essays

Speaking about thematically similar content to different audiences to help students understand how the listener affects form and content

Listening: Students' presentations can supply the core listening task; listen to texts on similar themes addressed to different audiences film clips from feature and documentary films; songs on the same theme

Grammar/Vocabulary: Register tone word choice

Suggested Readings:

<https://www.wired.com/story/wikipedias-fate-shows-how-the-web-endangers-knowledge/> Accessed 18 July 2019

Khanna Twinkle 'Lesson from Frida: Backbone can win over broken spine' in 'Mrs. Funnybones' *The Times of India* 16 September 2018
<https://timesofindia.indiatimes.com/blogs/mrsfunnybones/lesson-from-frida-backbone-can-win-over-broken-spine/> Accessed 13 June 2018

TESTING AND EVALUATION

Internal Assessment: Of 20 marks 10 marks will be allocated for assessment of reading and writing assignments and 10 marks for assessment of speaking and listening test.

Semester I/II Final Examination 75 marks

Reading and Writing skills:

- Unseen comprehension passage 650 words to test reading comprehension critical thinking and vocabulary skills 15 marks
- Questions related to the suggested literary texts: to test awareness of literary form and context through comprehension testing 2 x 15 = 30 marks
- Questions testing composition skills: descriptive passage; personal essay; paraphrasing poem; re-writing story-ending etc. 2 x 10 = 20 marks

Grammar: Different grammar topics to be tested via exercises of editing/rewriting a given passage 10 marks

Teaching Plan

Week 1 – Introduction; Unit 1 --Understanding Everyday Texts

Week 2 – Unit 1 contd

Week 3 – Unit 1 contd

Week 4 – Unit 2 -- Understanding Drama

Week 5 – Unit 2 contd

Week 6 – Unit 2 contd

Week 7 – Unit 3 -- Understanding Poetry

Week 8 – Unit 3 contd

Week 9 – Unit 4 -- Understanding Fiction

Week 10 – Unit 4 contd

Week 11 – Unit 4 contd

Week 12 – Unit 5 -- Creating Your Own Voice

Week 13 – Unit 5 contd

Week 14 – Unit 5 contd and summing up

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Keywords

Language through literature

Verbal and written texts

Social and ethical frameworks

Listening and reading comprehension

Argumentative descriptive and narrative writing styles

Confident self-expression

B -- ENGLISH FLUENCY

Course Objectives

This course is intended for students who possess basic grammatical and vocabulary skills in English but may not be able to effectively communicate in their everyday contexts. The course aims to equip them with skills that will help them interact with people around their personal, institutional, and social spaces. The course will help students to

- describe or express their opinions on topics of personal interest such as their experiences of events, their hopes and ambitions
- read and understand information on topical matters and explain the advantages and disadvantages of a situation
- write formal letters, personal notes, blogs, reports, and texts on familiar matters
- comprehend and analyse texts in English
- organise and write paragraphs and short essays in a variety of rhetorical styles

COURSE CONTENTS FOR SEMESTERS I / II

Unit 1

In the University

Introducing oneself -- Note-making

Pronunciation Intonation – Nouns, Verbs, Articles

- Introduce yourselves as individuals and as groups -- group discussion exercise. Take notes on your fellow students' introductions
- Introduce characters from the text you are reading via posters

Suggested Readings:

Tales of Historic Delhi by Premola Ghose Zubaan. 2011

Unit 2

In the domestic sphere

Diary/ Blog writing

Modifiers, Prepositions, Conjunctions

- Write a diary entry and convert it into a blog post

- Convert a transcript/ script/ piece of dialogue into a diary entry/ blog post

Suggested Readings:

‘The Lost Word’ by Esther Morgan From *New Writing*, ed. Penelope Lively and George Szirtes, Picador India, New Delhi, 2001.

Squiggle Gets Stuck: All About Muddled Sentences: Natasha Sharma. Puffin Young Zubaan. 2016.

Unit 3

In public places

CV Job applications

Tenses and concord

- Write the CV of a fictional character
- Write the perfect job application for your dream job

Suggested Readings:

‘Amalkanti’ by Nirendranath Chakrabarti From Oxford Anthology of Modern Indian Poetry, ed. Vinay Dharwadkar and A.K. Ramanujan, OUP, New Delhi, 1994, pp 52-3.

Extract from *Bhimayana* Srividya Natarajan and S. Anand. Navayana Publications. pp 60-71.

Unit 4

In the State

Research -- Filing an FIR, making an RTI request, submitting a consumer complaint

Active & Passive voice; idioms

- Find out what the procedure is for making a complaint about trees being cut in your neighbourhood
- Draft a formal letter requesting information about the disbursement of funds collected by a residents' welfare association

Suggested Readings:

Where the Wild Things Are by Maurice Sendak Random House UK, 2000.

rtionline.gov.in/index.php

consumerhelpline.gov.in/consumer-rights.php

www.jaagore.com/know-your-police/procedure-of-filing-fir

www.consumercomplaints.in/municipal-corporation-of-delhi-b100274

Unit 5

Interface with Technology

Book/film reviews

Punctuation

- Write a review of a text you have read in class
- Record a collaborative spoken-word review of the latest film your group have all seen

Suggested Readings:

Priya's Shakti: Ram Devineni, Lina Srivastava and Dan Goldman. Rattapallax, 2014.

www.priyashakti.com/priyas_shakti/

Kennedy, Elizabeth. "Breakdown and Review of 'Where the Wild Things Are'." ThoughtCo, Jul. 3, 2019, [thoughtco.com/where-the-wild-things-are-maurice-sendak-626391](https://www.thoughtco.com/where-the-wild-things-are-maurice-sendak-626391).

Teaching Plan

Week 1 – Introduction & Unit 1 -- In the University

Week 2 – Unit 1 contd

Week 3 – Unit 2 --In the domestic sphere

Week 4 – Unit 2 contd

Week 5 – Unit 2 contd

Week 6 – Unit 3 --In public places

Week 7 – Unit 3 contd

Week 8 – Unit 3 contd

Week 9 – Unit 4 --In the State

Week 10 – Unit 4 contd

Week 11 – Unit 4 contd

Week 12 – Unit 5 --Interface with Technology

Week 13 – Unit 5 contd

Week 14 – Unit 5 contd & Summing Up

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions

Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Keywords

Effective communication

Listening

Speaking

Reading and writing

Communicative tasks and activities

Familiar contexts

Professional contexts

Social contexts

Evaluation:

Internal assessment (25 marks)

Reading & Writing assignment(10 marks)

Oral listening & speaking test(10 marks)

Attendance: 5 marks

FINAL EXAM 75 marks

Semester I/II

Book or film review(15 marks)

Comprehension passage(15 marks)

RTI request or FIR(10 marks)

Dialogue or Interview(10 marks)

Diary or blog post(10 marks)

Proofreading/Punctuation passage(5 marks)

Note-making(5 marks)

Facebook or Twitter post(5 marks)

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Keywords

Effective communication

Listening

Speaking

Reading

Writing

Communicative tasks and activities

Familiar context

Personal communication

Professional communication

Social communication

C ENGLISH PROFICIENCY

Course Objectives

The English Proficiency course is intended for students who have had inadequate exposure to English and hence exhibit a very low level of proficiency in the language – difficulty in comprehending simple texts, limited vocabulary, a poor grasp of basic syntactical structures, and an inability to speak or write the language with confidence. The course that is spread over two semesters aims to redress these issues and aims to

- enhance comprehension skills and enrich vocabulary through the reading of short and simple passages with suitable tasks built around these
- introduce simple syntactical structures and basic grammar to students through contextualized settings and ample practice exercises so that they can engage in short independent compositions
- introduce the sounds of the language and the essentials of English pronunciation to students in order to remove the inhibitions experienced by them while speaking English
- acquaint students with social formulae used to perform various everyday functions so that they can converse in English in simple situations

COURSE CONTENTS FOR SEMESTER I / II

Unit 1

Reading and Comprehension - I

Note: The unit names are indicative only and identify core language areas that are targeted through the course. The learning of various language skills needs to happen in an integrated fashion. It is therefore imperative that for every unit learners should work through the whole range of tasks in the prescribed readings irrespective of the title of the unit.

- Short and simple passages from the prescribed books
- These texts are to be used to enhance reading and comprehension skills of learners through various textual tasks such as reading aloud, sentence completion, true / false activities, re-ordering jumbled sentences, identifying central ideas, supplying alternative titles, attempting short comprehension questions, etc.
- Learners are encouraged to exploit the recommended books beyond the prescribed sections

- The end-semester examination will include the testing of the comprehension of an unseen passage of an equivalent level

Suggested Readings:

A Foundation English Course for Undergraduates: Reader I, Delhi: Oxford University Press, 1991, pp. 1 - 36 Units 1 - 6

Everyday English Delhi: Pearson, 2005, pp. 1 - 15 Units 1 - 3 & 21 - 31 Units 5 - 6

Unit 2

Learning about words

Students cultivate the habit of using a dictionary to learn about words - their spelling, pronunciation, meaning, grammatical forms, usage, etc. Students are introduced to word associations, the relationships between words – synonyms, antonyms, homonyms, homophones. They learn the use of prefixes and suffixes; commonly confused words; phrasal verbs and idioms

The specific reading prescribed for this unit is to be used in conjunction with the vocabulary sections in the other recommended course texts, where activities like matching, sorting, and fill-in-the-blanks are used to engage the learners with words.

As a semester-long project the learners could be required to prepare 'mini-dictionaries' of their own, consisting of unfamiliar words they come across on a daily basis

Suggested Readings:

Everyday English Delhi: Pearson, 2005, pp. 36 - 43 Unit 8

Unit 3

Basic Grammar Rules - I

Subject-verb agreement; tenses; modals; articles; prepositions; conjunctions

The prescribed reading for this unit is to be supplemented by the grammar tasks contained in the other recommended course books to provide intensive practice to learners

Suggested Readings:

Developing Language Skills I, Delhi: Manohar, 1997, pp. 186 - 195 & 206 - 209 Units 2 3 & 5 of the 'Grammar' section

Unit 4

Writing Skills - I

This section will introduce students to the structure of a paragraph; they will write a short guided composition of up to 100 words. These skill is to be practised through activities such as supplying topic sentences to given paragraphs, completing given paragraphs, expressing given facts or information from tables and expressing it in paragraphs, re-ordering jumbled sentences, and then re-writing them as connected paragraphs, using suitable linking devices etc

Relevant sections from the other recommended course books are to be used for this purpose in addition to the prescribed reading for this section

Suggested Readings:

Everyday English, Delhi: Pearson, 2005, pp. 21 - 31 Units 5 - 6

A Foundation English Course for Undergraduates: Workbook I, Delhi: Oxford University Press, 1919, pp. 1 - 31 Units I - V

Unit 5

Conversing - I

Students will learn to listen to the sounds of English; the essentials of English pronunciation; conversational formulae used for greetings. After introducing themselves and others, students will learn correct modes of thanking, wishing well, apologizing, excusing oneself, asking for and giving information, making offers and requests, and giving orders.

In addition to the prescribed reading for this unit, the 'Speaking' sections at the end of the first five units of the *Everyday English* text should be used

Suggested Readings:

Developing Language Skills I, Delhi: Manohar, 1997, pp. 8 - 26 Units 1 - 5 of 'Oral Communication: Speech Patterns'

Teaching Plan

Teaching Learning Process

Since language skills can only be learnt and mastered through the teaching-learning process, instruction needs to be learner-centric. The class time is to be taken up with hands-on activities by learners, involving reading aloud / silently, speaking, listening, and writing. Peer and group work should be used extensively. The teacher is to act as a facilitator, setting up and overseeing learner tasks and providing stimulus, encouragement, and corrective inputs as and when necessary. The teacher is also expected to source additional related material and activities pitched at an appropriate level of difficulty, to plug in gaps in the prescribed readings as well as to extend the knowledge of the learners and to hone their skills.

Teaching Plan for Semester I / II

Week 1 – Introduction; *A Foundation English Course for Undergraduates: Reader I*, pp. 1 – 15
Units 1 - 3

Week 2 – *A Foundation English Course for Undergraduates: Workbook I*, pp. 1 – 14 Unit I

Week 3 – *A Foundation English Course for Undergraduates: Reader I*, pp. 17 – 33 Units 4 – 6

Week 4 – *Developing Language Skills I*, pp. 186 – 189 Unit 2 of ‘Grammar’; *Everyday English*, pp. 1- 9 Units 1 – 2

Week 5 – *Everyday English*, pp. 10 - 15 36 - 43 Units 3 & 8

Week 6 – *English at the Workplace II*, pp. 10 - 13 Unit 3; *Developing Language Skills I*, pp. 1 – 13 Units 1 & 2 of ‘Oral Communication: Speech Patterns’

Week 7 – *A Foundation English Course for Undergraduates: Workbook I*, pp. 15 – 20 Unit II; *Everyday English*, pp. 21 - 27 Unit 5

Week 8 – *Everyday English*, pp. 28 - 31 Unit 6; *Developing Language Skills I*, pp. 18 – 21 Unit 4 of ‘Oral Communication: Speech Patterns’

Week 9 – *Developing Language Skills I*, pp. 189 – 195 Unit 3 of ‘Grammar’

Week 10 – *A Foundation English Course for Undergraduates: Workbook I*, pp. 21 – 22 Unit III; *Developing Language Skills I*, pp. 14 – 18 Unit 3 of ‘Oral Communication: Speech Patterns’

Week 11 – *Developing Language Skills I*, pp. 21 - 26 Unit 5 of ‘Oral Communication: Speech Patterns’

Week 12 – *Developing Language Skills I*, pp. 206 – 208 Unit 5 of ‘Grammar’

Week 13 – *A Foundation English Course for Undergraduates: Workbook I*, pp. 23 – 27 Unit IV

Week 14 - *A Foundation English Course for Undergraduates: Workbook I*, pp. 28 – 31 Unit V

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
--------------------------	--------------------------------	------------------

Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Note: The entire course is practical in nature. The prescribed readings are rich in tasks and activities that aim at developing essential language skills. Working their way through these tasks will give the learners hands-on practice in the use of these skills.

References

A Foundation English Course for Undergraduates: Reader I, Delhi: Oxford University Press, 1991

A Foundation English Course for Undergraduates: Workbook I, Delhi: Oxford University Press, 1991

Everyday English, Delhi: Pearson, 2005

Developing Language Skills I, Delhi: Manohar, 1997

Additional Resources:

English at the Workplace, Delhi: Macmillan, 2006

Assessment Methods

Since the class is conceived as learner-centric and built around tasks that require learners to actively use various language skills, formative assessment can and should be used extensively. The focus here could be on skills and activities that are harder to test in a written evaluation, such as speaking and listening skills, dictionary work, etc. Oral presentations, peer interviews, and group tasks can be used for this purpose. The end-semester written examination will test all the areas targeted in the course – reading comprehension, vocabulary, grammar, composition, and oral communication. The proposed weightage for these sections in the end-semester exam is as follows:

- Reading Comprehension - 25 marks
- Vocabulary - 15 marks
- Grammar - 15 marks
- Written composition - 10 marks
- Oral communication - 10 marks

Keywords

English proficiency

Reading

Writing

Speaking

Listening

Pronunciation

Comprehension

Vocabulary

Syntax

Grammar

Composition

Conversation

**DEPARTMENT OF ENGLISH
UNIVERSITY OF DELHI
DELHI - 110007**



**Structure of BA Honours English
English for BA/ BCom/BSc Programme
and
English for BA(H)/BCom(H)/BSc (H)
under Learning Outcomes-based Curriculum Framework for Undergraduate
Education**

*Syllabus applicable for students seeking admission to the
BA Honours English, BA/BCom/BSc Programme and BA(H)/BCom(H)/BSc(H) under
LOCF w.e.f. the academic year 2019-20*

For Semester II

Structure of B. A. Honours English under LOCF

CORE COURSE

Paper Titles	Page
Semester II	
Paper 3 ; Indian Writing in English	3
Paper 4: British Poetry and Drama: 14 th to 17 th Centuries	6

B.A. PROGRAMME

DISCIPLINE ENGLISH	9
--------------------	---

NOTE:

The syllabi of BA/BCom Programme (Core Language), Generic Electives(GE) and Ability Enhancement Credit Course (AECC) of Semester II are the same as that of Semester I and have already been notified by the University

I. B. A. HONOURS ENGLISH UNDER LOCF

CORE COURSE: SEMESTER II

PAPER 3

INDIAN WRITING IN ENGLISH

Course Statement

Over the past two centuries and especially after the 1980s Indian writing in English has emerged as a major contribution to Indian—and global—literary production. A close analysis of some of the major works of Indian writing in English is crucial in any exploration of modern Indian subjectivities histories and politics.

Course Objectives

This course aims to

- introduce students to Indian English Literature and its major movements and figures through the selected literary texts across genres;
- enable the students to place these texts within the discourse of post-coloniality and understand Indian literary productions in English in relation to the hegemonic processes of colonialism, neo-colonialism, nationalism and globalization; and
- allow the students to situate this corpus within its various historical and ideological contexts and approach the study of Indian writing in English from the perspectives of multiple Indian subjectivities.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Novel

Amitav Ghosh, *The Shadow Lines* (1988/1997, New Delhi: Oxford University Press)

Unit 2

Novel

Anita Desai, *In Custody* (1984/2012, New Delhi: Random House India)

Unit 3

Poems

- a) Kamala Das, 'My Grandmother's House'
- b) Nissim Ezekiel, 'Enterprise'
- c) Robin Ngangom, 'A Poem for My Mother'
- d) Meena Kandasamy, 'Touch'

Drama

Mahesh Dattani, *Tara*

Unit 4

Short Stories

- a) R. K. Narayan, 'A Horse and Two Goats'
- b) Salman Rushdie, 'The Free Radio'
- c) Rohinton Mistry, 'Swimming Lessons'
- d) Shashi Deshpande, 'The Intrusion'

Unit 5

Readings

- Raja Rao, 'Foreword', to *Kanthapura* (New Delhi: OUP, 1989) pp. v–vi.
- B.R. Ambedkar, "Annihilation of Caste" in *Dr. Babasaheb Ambedkar: Writings and Speeches*, vol. 1 (Maharashtra: Education Department, Government of Maharashtra, 1979) pp. 36-80
- Meenakshi Mukherjee, 'Divided by a Common Language', in *The Perishable Empire* (New Delhi: OUP, 2000) pp.187–203.
- Bruce King, 'Introduction', in *Modern Indian Poetry in English* (New Delhi: OUP, 2nd ed., 2005) pp. 1–10.

Essential Reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

Teaching Plan

Paper 3: Indian Writing in English

Week 1 -- Introduction to Paper 3: Indian Writing in English

Week 2 – Unit 1 -- Novel: Amitav Ghosh, *The Shadow Lines*

Week 3 – Ghosh (contd)

Week 4 – Unit 2 -- Novel: Anita Desai, *In Custody*

Week 5 – Desai (contd)

Week 6 – Unit 3 -- Poems

Week 7 – Poems (contd)

Week 8– Unit 3 -- Drama: Dattani *Tara*

Week 9 – Dattani (contd)

Week 10 – Unit 4 -- Short Stories

Week 11 – Short Stories (contd)

Week 12- Unit 5 – Readings:

(a) Rao 'Foreword' to *Kanthapura*

(b) Ambedkar "Annihilation of Caste"

Week 13 – Readings (contd):

(c) Mukherjee, 'Divided by a Common Language'

(d) Bruce King, 'Introduction'

Week 14 -- Concluding lectures exam issues etc.

Keywords

Postcolonial writing

Nationalism

Tradition

Modernity

Native imagery

PAPER 4

BRITISH POETRY AND DRAMA: 14TH TO 17TH CENTURIES

Course Statement

This paper is the first Core British literature paper out of a cluster of six, and initiates the student into the earliest writings in England from medieval literature through the Renaissance. The first unit of the paper on British literature begins with Chaucer's 'General Prologue', which is taught in Middle English. It introduces students to *Canterbury Tales* and helps them recognize its narrative complexity and structure. The second unit on the Renaissance poetry explores the form and innovation in content in the Elizabethan sonnet tradition and the metaphysical poetry underlining a critical engagement with the Petrarchan tradition. The two plays, Marlowe's *Dr. Faustus* as a tragedy on Renaissance man and *Twelfth Night* as a Shakespearean comedy enable a focus on drama as a significant genre in the Renaissance. The prose readings establish the European context for the Renaissance and offer readings crucial to understanding the sociocultural and religious aspects of the age.

Course Objectives

This course aims to

- introduce students to the tradition of English Literature from the Medieval till the Renaissance;
- explores the key writers and texts within their historical and intellectual contexts;
- offer a perspective on the history of ideas including that of disability and its varied meanings within this period.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course content

Unit 1

Geoffrey Chaucer, 'General Prologue' (in Middle English), from *The Canterbury Tales*, The Riverside Chaucer, ed. Larry D. Benson (Boston: Houghton Mifflin, 2000).

Unit 2

- a) Thomas Wyatt, (i) 'Whoso List to Hunt'; (ii) 'They Flee from Me'
- b) Edmund Spenser, (i) Sonnet LVII 'Sweet warrior'; (ii) Sonnet LXXV 'One day I wrote her name', both from 'Amoretti'
- c) Isabella Whitney, (i) 'I.W. To Her Unconstant Lover'
- d) John Donne, (i) 'The Sunne Rising' ;(ii) 'A Valediction: 'Forbidding Mourning'

Unit 3

Christopher Marlowe *Doctor Faustus*

Unit 4

William Shakespeare *Twelfth Night*

Unit 5

- Pico Della Mirandola, excerpts from the *Oration on the Dignity of Man* (1486), in *The Portable Renaissance Reader*, eds James Bruce Ross and Mary Martin McLaughlin (New York: Penguin Books, 1953) pp. 476–9.
- Desiderius Erasmus, *In Praise of Folly* (1511), trans. Hoyt Hopewell Hudson (Princeton University Press: 2015) pp. 139-155.
- Niccolo Machiavelli, *The Prince* (1513), Chaps 15, 16, 18, and 25, ed. and trans. Robert M. Adams (New York: Norton, 1992).
- John Calvin, 'Predestination and Free Will', from *Institutes of the Christian Religion* (1536), in *The Portable Renaissance Reader*, ed. James Bruce Ross and Mary Martin McLaughlin (New York: Penguin Books, 1953) pp. 704–11.
- Michel de Montaigne, 'Of a Monstrous Child' (1580), from *Essays*.

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

TEACHING PLAN

Paper 4: British Literature Poetry and Drama: From 14th to 17th C

Week 1 -- Introduction to Medieval Literature

Week 2 --Chaucer, 'General Prologue'

Week 3 – Chaucer (contd)

Week 4 – Chaucer (contd)

Week 5 – Poetry:

- (a) Wyatt, (i) ‘Whoso List to Hunt’, (ii) ‘They Flee from Me’
- (b). Spenser, (i) Sonnet LVII ‘Sweet warrior’; (ii) Sonnet LXXV ‘One day I wrote her name’

Week 6 – a) Whitney, ‘I. W. To Her Unconstant Lover’

- b) Donne, i) Sunne Rising; ii) Valediction: Forbidding Mourning

Week 7 – Introduction to Renaissance Drama: Forms and Debates

Week 8 – Marlowe *Dr. Faustus*

Week 9 – Marlowe (Contd)

Week 10 -Shakespeare, *Twelfth Night*

Week 11 – Shakespeare (contd)

Week 12 – Readings:

- (a) Mirandola, excerpts from the *Oration on the Dignity of Man*
- (b) Erasmus, *In Praise of Folly*

Week 13 – Readings:

- (c) Machiavelli, *The Prince*, Chaps. 15, 16, 18, and 25

- (d) John Calvin, ‘Predestination and Free Will’

Week 14 – Montaigne, ‘Of a Monstrous Child; Conclusions and Questions

Discipline English (BA Programme): Semester II

Course Statement

The English Discipline-centric papers are designed to give students a broad yet deep understanding of English Literatures, both through canonical and translated literary texts and anthologies. It draws on current issues and ideas to familiarize students of writings in the West and in the Asian subcontinent. Different genres are introduced to give the students knowledge of cultural motifs and ideologies that would help in their understanding of the world. Starting with the 'Individual and Society' anthology that introduces them to significant contemporary issues like Caste and Globalization, the papers move on to texts from the European Renaissance, Victorian and Modern poetry and ends with some optional papers that a student may choose out of his/her interest. They include a paper on Modern Drama, Children's Literature, Postcolonial Literature and Popular Literature.

Course Objectives

- * The course offers the BA Programme student an opportunity to study three years of English Discipline papers that enable them to go for further studies in English if they so desire
- * The course attributes to the students a working knowledge of how to read literary texts and enables them to use such knowledge to enhance and augment their professional job opportunities
- * The course introduces students to contemporary literary ideas and issues in an increasingly complex world
- *The course allows the student a familiarity with literary texts through different genres and time periods

Course Contents

DSC 1B

Selections from *Modern Indian Literature* (Orient Longman, 2007) as follows:

1. Short stories: 6 stories

Premchand, *The Holy Panchayat*

R. K. Narayan, *The M. C. C*

Basheer, *The Cardsharp's Daughter*

Sadat Hasan Manto, *Toba Tek Singh*

Ambai, *Squirrel*

IshmatChughtai, *Lihaf*

2. Poems: 10 poems

Jibanananda Das, (i) 'Windy Night', (ii) 'I Shall Return'

Muktibodh, (i) 'The Void', (ii) 'So Very Far'

Nissim Ezekiel, (i) 'Enterprise', (ii) 'Goodbye Party for Miss Pushpa'

Jayanta Mahapatra, (i) 'Hunger', (ii) 'Dhuli', (iii) 'Grandfather'

Sri Sri, 'Forward March'

Keywords: Short Story in the Indian Context, Modern Indian Poetry

Teaching Plan:

Week 1: Introduction to the short story genre with especial references to Indian writers in the syllabus

Week 2: Premchand

Week 3: R.K. Narayan

Week 4: Basheer

Week 5: Manto

Week 6: Ambai

Week 7: Chughtai

Week 8: Introducing poetry

Week 9: Jibanananda Das

Week 10: Muktibodh

Week 11: Ezekiel

Week 12: Mahapatra

Week 13: Sri Sri

Week 14: Discussions on poems/Questions etc

Essential Readings

Note: This is a literature-based programme, and students will be examined on all the prescribed readings in various sections of the syllabus. Therefore, all those texts are to be considered essential reading.

Suggested Readings

These prescribed texts are meant to be read in the context of their particular times of composition. The key words at the end of each paper indicate the issues and motifs that may interest the student to read about a particular writer or her time. Therefore no suggested readings have been offered, so that these papers do not become burdensome for students opting for English under the BA Programme.

Examination Scheme for Discipline English (B. A. Programme) under CBCS

RTC $3 \times 10 = 30$ marks

Long Questions $3 \times 15 = 45$ marks

Each question will have internal choice. All texts in a paper will be examined.

**DEPARTMENT OF ENGLISH
UNIVERSITY OF DELHI
DELHI - 110007**



**Structure of BA Honours English
English for BA/ BCom/BSc Programme
and
English for BA(H)/BCom(H)/BSc (H)
under Learning Outcomes-based Curriculum Framework for Undergraduate
Education**

*Syllabus applicable for students seeking admission to the
BA Honours English, BA/BCom/BSc Programme and BA(H)/BCom(H)/BSc(H) under
LOCFw.e.f. the academic year 2019-20*

For Semesters III and IV

Structure of B. A. Honours English under LOCF

CORE COURSE

Paper Titles	Page
---------------------	-------------

Sem III

1. American Literature
2. Popular Literature
3. British Poetry and Drama: 17th and 18th Centuries

Sem IV

4. British Literature: 18th Century
5. British Romantic Literature
6. British Literature: 19th Century

SKILL ENHANCEMENTCOURSE (SEC)

Paper Titles

SEC 1: Analytical Reading and Writing

SEC 2: Literature in Social Spaces

SEC 3: Literature in Cross-Cultural Encounters

(ONLY for English Honours Students)

SEC 4: Oral, Aural and Visual Rhetoric

SEC 5: Introduction to Creative Writing for Media

SEC 6: Translation Studies

SEC 7: Introduction to Theatre and Performance

SEC 8: Modes of Creative Writing: Poetry, Fiction and Drama

SEC 9: English Language Teaching

SEC 10: Film Studies

SEC 11: Applied Gender Studies: Media Literacies

**B. A. & B. COM. PROGRAMME
(CORE ENGLISH LANGUAGE)**

Note for Visually Impaired Students

For visually impaired students to be able to take some of these papers, a number of supplementary readings are offered. These are to be read/discussed in connection with the texts in the classroom, so as to create a sustainable and diverse model of inclusive pedagogy. For visually impaired students, this set of readings will also be treated as primary, and may be examined as such. The supplementary readings may be used as theorizations or frameworks for understanding the course.

For purposes of assessment/ evaluation, a general advisory may be made to assist visually impaired students filter out areas they may not be able to address due to the nature of their disability and to focus on using supplementary texts to instead create other perspectives/ forms of knowledge on the same texts.

I. B. A. HONOURS ENGLISH UNDER LOCF

CORE COURSE

PAPER 5

AMERICAN LITERATURE

Semester 3

Course Statement:

This course offers students an opportunity to study the American literary tradition as a tradition which is distinct from, and almost a foil to, the traditions which had developed in European countries, especially in England. A selection of texts for this course therefore highlights some of the key tropes of mainstream America's self-perception, such as Virgin Land, the New World, Democracy, Manifest Destiny, the Melting-Pot, and Multiculturalism. At the same time there are specifically identified texts that draw the attention of students to cultural motifs which have been erased, brutally suppressed or marginalized (the neglected and obscured themes from the self-expression of the subaltern groups within American society) in the mainstream's pursuit of the fabled American Dream. A careful selection of writings by Native Americans, African Americans, as well as texts by women and other sexual minorities of different social denominations seek to reveal the dark underside of America's progress to modernity and its gradual emergence as the most powerful nation of the world.

Course Objectives:

The course aims to acquaint students with the wide and varied literatures of America: literature written by writers of European, particularly English, descent reflecting the complex nature of the society that emerged after the whites settled in America in the 17th century; include Utopian narrative transcendentalism and the pre- and post- Civil War literature of the 19th century introduce students to the African American experience both ante-bellum and post-bellum reflected in the diversity of literary texts, from narratives of slavery, political speeches delivered by Martin Luther King Jr. and Frederick Douglass, as well as the works of contemporary black woman writers familiarize students with native American literature which voices the angst of a people who were almost entirely wiped out by forced European settlements; and include modern and contemporary American literature of the 20th century.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive	Reading material together in

		discussions in small groups in Tutorial classes	small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Content

Unit 1

Tennessee Williams *The Glass Menagerie*

Unit 2

Toni Morrison, *Beloved*

Unit 3

Poetry

Walt Whitman, 'O Captain! My Captain', in *Walt Whitman: Poetry and Prose*, ed. Shira Wolosky (The Toby Press, 2003) pp. 360-61).

Allen Ginsberg, 'A Supermarket in California', in *Selected Poems 1947-1995* (Penguin Books, 2001) p. 59.

Langston Hughes, (i) 'The Negro Speaks of Rivers'; (ii) 'The South'; (iii) 'Aunt Sue's Stories', in *The Weary Blues* (New York: Alfred A. Knopf, 2015) pp. 33; 36; 39.

Joy Harjo, (i) 'Perhaps the World Ends Here'; (ii) 'I Give You Back', in *The Woman That I Am: The Literature and Culture of Contemporary Women of Color*, ed. D. Soyini Madison (New York: St Martin's Press, 1994) pp. 37-40.

Unit 4

Short Stories

Edgar Allen Poe 'The Purloined Letter'

William Faulkner 'Dry September'

Flannery O' Connor, 'Everything that Rises Must Converge', in *Everything that Rises Must Converge* (New York: Farrar Straus Giroux, 1965)

Leslie Marmon Silko, 'The Man to Send Rain Clouds', in *Nothing but the Truth: An Anthology of Native American Literature*, ed. John L. Purdy and James Ruppert (New Jersey: Prentice Hall, 2001) pp. 358-61.

Unit 5

Readings:

- ‘Declaration of Independence’ July 4, 1776, in *For Liberty and Equality: The Life and Times of the Declaration* (OUP, 2012) pp. 312); and ‘Abraham Lincoln Gettysburg Speech’, in *Gettysburg Speech and Other Writings* (Barnes & Noble, 2013).
- Ralph Waldo Emerson, ‘Self Reliance’ in *The Selected Writings of Ralph Waldo Emerson*. ed. with a biographical introduction by Brooks Atkinson (New York: The Modern library, 1964)
- Martin Luther King Jr, ‘I have a dream’, in *African American Literature*, ed. Kieth Gilyard, Anissa Wardi (New York: Penguin, 2014) pp. 1007-11)
- Frederick Douglass, *A Narrative of the life of Frederick Douglass* (Harmondsworth: Penguin, 1982) chaps. 1–7, pp. 47–87.
- Adrienne Rich, ‘When We Dead Awaken: Writing as Re-Vision’, *College English*, Vol. 34, No. 1, Women, Writing and Teaching, pp. 18-30.

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

TEACHING PLAN

Paper 5: American Literature

Week 1 -- Introduction to Paper 1: American Literature

Week 2 – Unit 1 -- Drama: Tennessee Williams *The Glass Menagerie*

Week 3 – Unit 1 – Tennessee Williams (contd)

Week 4 – Unit 2 -- Novel: Morrison, *Beloved*

Week 5 – Unit 2 –Morrison (contd)

Week 6 – Unit 3 -- Poetry: (a) Whitman, ‘O Captain! My Captain’;

Week 7 – Unit 3 – (b) Ginsberg, ‘A Supermarket in California’

Week 8 – Unit 3 – (c) Langston Hughes, (i) ‘The Negro Speaks of Rivers’, (ii) ‘The South’, (iii) ‘Aunt Sue’s Stories; (d) Joy Harjo, (i) ‘Perhaps the World Ends Here’, (ii) ‘I Give You Back’

Week 9 – Unit 4 -- Short Stories:

(a); Edgar Allen Poe ‘ The Purloined Letter’

b) William Faulkner 'Dry September'

Week 10 --

(c) O' Connor, 'Everything that Rises Must Converge';

(d) Silko, 'The Man to Send Rain Clouds'

Week 11 – Unit 5 -- Prose Readings:

(a) Declaration of Independence' July 4, 1776, or 'Abraham Lincoln Gettysburg Speech'

(b) Ralph Waldo Emerson, 'Self Reliance'

Week 12 – Prose Readings (contd):

(c) Martin Luther King Jr, 'I have a dream'

(d) Douglass, Frederick, Selection from *A Narrative of the life of Frederick Douglass*

Week 13 – Prose Readings (contd):

(e) Adrienne Rich, 'When We Dead Awaken: Writing as Re-Vision.'

Week 14 - Concluding lectures; exam issues, etc.

PAPER 6
POPULAR LITERATURE
Semester 3

Course Statement

The paper will trace the emergence of a mass printing culture from the nineteenth century onwards, and the rise of genres such as Literature for Children, Detective Fiction, Science Fiction, and Graphic Fiction. The course introduces students to the idea of ‘popular literature’ and stresses its importance within modern culture. It familiarises students with the debate between ‘high’ and ‘low’ culture, and the tension between what is studied as ‘canonical’ texts and other texts. Students will also engage with issues concerning print culture, bestsellers, and popular literature in other media.

Course Objectives

This course aims to

- enable students to trace the rise of print culture in England, and the emergence of genre fiction and bestsellers;
- familiarize students with debates about culture, and the delineation of high and low culture; and
- help them engage with debates about the canonical and non-canonical, and hence investigate the category of literary and non-literary fiction.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Literature for Children

- a) Lewis Carroll, 'Through the Looking Glass', in *Alice's Adventures in Wonderland and Through the Looking Glass*, ed. Hugh Haughton (Penguin Classics: London, 1998).
- b) Sukumar Ray, (i) 'The Sons of Ramgaroo'; (ii) 'Stew Much'; both in *A Few Poems by Sukumar Ray*, trans. Satyajit Ray (Open Education Project OKFN, India) pp. 4, 12. <https://in.okfn.org/files/2013/07/A-Few-Poems-by-Sukumar-Ray.pdf>

Unit 2

Detective Fiction

Agatha Christie, *The Murder of Of Roger Ackroyd* (Harper Collins :New York, 2017)

Unit 3

Science Fiction

- a) Isaac Asimov, 'Nightfall', in *Isaac Asimov: The Complete Short Stories*. Vol I. (New York: Broadway Books, 1990) pp. 334-62.
- b) Ursula le Guin, 'The Ones Who Walk away from Omelas', in *The Wind's Twelve Quarters and The Compass Rose* (London: Orion Books, 2015) pp. 254-62.
- c) Philip K. Dick, 'Minority Report', in *The Complete Stories of Philip K. Dick*. Vol.4: The Minority Report and Other Classic Stories (Citadel Books: New York, 1987) pp. 62-90.
- d) Ray Bradbury, 'A Sound of Thunder', in *A Sound of Thunder and Other Stories*. (New York: William Morrow, 2005).
- e) JayantNarlikar, 'Ice Age Cometh' in *It Happened Tomorrow* ed Bal Phondke, National Book Trust: New Delhi, 1993. Pgs 1-20

Unit 4

Graphic Fiction

DurgabaiVyam and Subhash Vyam, *Bhimayana:Experiences of Untouchability*. Navayana : New Delhi, 2011)/

B.R.Ambedkar, *Waiting for a Visa* (For the Visually Challenged students)

Unit 5

Readings

- Christopher Pawling, 'Popular Fiction: Ideology or Utopia?', in *Popular Fiction and Social Change*, ed. Christopher Pawling (London: Macmillan, 1984).
- Felicity Hughes, 'Children's Literature: Theory and Practice', *ELH* 45 (1978), pp. 542-62.
- Darko Suvin, 'On Teaching SF Critically', in *Positions and Presuppositions in Science Fiction* (London: Macmillan), pp. 86-96.
- Tzvetan Todorov. 'The Typology of Detective Fiction', trans. Richard Howard, in *The Poetics of Prose* (Ithaca: Cornell University Press, 1977).

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

Teaching Plan

Popular Literature

Week 1 – Introduction to Forms of Popular Fiction; [it is suggested that the reading for each section be done as an introduction to each of the genres represented];

Unit 5 – (a) Pawling, 'Popular Fiction: Ideology or Utopia?'

Week 2 – Unit 1 – Literature for Children: Introduction; Hughes, 'Children's Literature: Theory and Practice';

Start Unit 1 – (a) Carroll, 'Through the Looking Glass';

(b) Ray, (i) 'The Sons of Ramgaroo'; (ii) 'Stew Much'

Week 3 – Carroll and Ray (contd)

Week 4- Unit 2 --Detective and Spy Fiction, Introduction; Todorov, 'The Typology of Detective Fiction';

Week 5-Unit 2 – Christie , The Murder of Roger Ackroyd

Week 6 – Unit 2 (contd):

Week 7 – Unit 3 – Science Fiction, introduction; - Suvin, 'On Teaching SF Critically';

Week 8-(a) Asimov 'Nightfall';

(b) le Guin 'The ones who walk away from Omelas'

Week 9- (c) Dick 'Minority Report';

Week 10 – (d) Bradbury 'A Sound of Thunder';

(e) Narlikar 'The Ice Age Cometh'

Week 11 – Unit 4 -Introduction to Graphic Fiction, Sumathi Ramaswamy essay

Week 12 – Unit 4 :Bhimayana

Week 13 – Unit 4 (contd)

Week 14 – Concluding lectures; exam issues, etc.

Keywords

Popular Culture

Mass Culture

Popular Fiction

Popular Literature

Romance

Detective Fiction

Spy Fiction

Science Fiction

Children's Literature

Bestsellers

Thrillers

PAPER 7

BRITISH POETRY AND DRAMA: 17TH AND 18TH CENTURIES

Semester 3

Course Statement

The paper explores the British Literature in the 17th Century with its varied genres, the historical ruptures and the intellectual debates of the time. It begins with Shakespeare's tragedy *Macbeth*, exploring the issues of succession and individualism pertinent to the Jacobean age. Milton's significant portrayal of Satan in Book 1 of *Paradise Lost* has influenced imaginative writing on the idea of evil thereafter. Aemilia Lanyer was the first secular woman poet to be published professionally. The prescribed poem offers a perspective on Eve on the fall of Man. Aphra Behn, currently one of the most popularly studied writers of the Restoration, offers an opportunity to discuss the paradox of Tory conservatism and the woman's question in Restoration stage. Pope's *The Rape of the Lock* extends the mock epic tradition to the early 18thC as a representative of the neoclassical aesthetics. The readings enable a wide philosophical and political understanding of the period.

Course Objectives

This course aims to

- help students explore poetry, drama and prose texts in a range of political, philosophical and cultural material from the end of the Renaissance through the English Civil War and Restoration in the seventeenth century;
- examine the turmoil about succession and questions on monarchy as they lead up to the civil war, both in drama like Shakespeare and Behn as well as in the poetry of Milton;
- show a new interweaving of the sacred and the secular subjects of poetry 17th C;
- study Bacon's essay on deformity through the lens of disability and its definitions, linked back to Montaigne in the earlier paper;
- analyse Cartesian dualism that provides a basis for reading ideas of body and mind in the period and after;
- explore Hobbes's views on materialism and the equality of men, as they are interestingly juxtaposed with his argument for a strong state and his view of man as selfish by nature;
- show how Winstanley's writing, on the other hand, brings together Christianity and communality in an argument for equality after the civil war; and
- explore the newness of this century in Cavendish's bold exploration of natural philosophy or science as a domain for women

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in	Reading material together in small groups, initiating discussion topics, participation

		Tutorial classes	in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Content

Unit 1.

William Shakespeare *Macbeth*

Unit 2.

- a. *Paradise Lost* (1667) Book 1, in *John Milton: Paradise Lost*, Longman Annotated English Poets, 1998.
- b. Aemilia Lanyer, 'Eve's Apology in Defense of Women', section from *Salve Deus Rex Judaeorum* (1611), in *The Norton Anthology of English Literature*, 8th edition, ed. Greenblatt et al., Vol. 1, pp. 1317-19.

Unit 3.

Aphra Behn, *The Rover* (1677), in *Aphra Behn: The Rover and other Plays*, ed. Jane Spencer (Oxford: OUP, 2008).

Unit 4

Alexander Pope *The Rape of the Lock*

Unit 5.

- Francis Bacon, (i) 'Of Truth'; (ii) 'Of Deformity'; both in *Essays* (1597).
- René Descartes, excerpts from 'Discourse on Method' (1637) Part 4, in *Discourse on Method and Meditations on First Philosophy*, trans. Donald A. Cress, (Indianapolis: Hackett, 1998) pp. 18-19.
- Thomas Hobbes, selections from *The Leviathan* (1651): title page, Introduction, Chaps 1 and 13 from Part I, 'Of Man', ed. Richard Tuck (Cambridge University Press, 1996).
- Gerrard Winstanley, from 'A New Year's Gift Sent to the Parliament and Army' (1650), in *The Norton Anthology of English Literature*, Vol. 1, 8th edition, ed. Greenblatt et al., pp. 1752-57.
- Margaret Cavendish, excerpts from 'The Blazing World' (1666), in *The Norton Anthology of English Literature*, Vol. 1, 8th edition, ed. Greenblatt et al., pp. 1780-85.

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

TEACHING PLAN

Paper 7: British Poetry and Drama : 17th and 18th Century

Week 1 -- Introduction to the Jacobean period, the Civil War, and the Restoration:
period, genres, and themes;

Week 2 – Shakespeare *Macbeth*

Week 3 -- Shakespeare (contd)

Week 4 – Shakespeare (contd)

Week 5 - Milton, *Paradise Lost*

Week 6 -- Milton (contd)

Week 7 – Milton (contd)

Lanyer, ‘Eve’s Apology in Defense of Women’, section from *Salve Deus*

Rex Judaeorum

Week 8 – Aphra Behn ,*The Rover*

Week 9 – Behn (contd)

Week 10 – Pope, *The Rape of the Lock*

Week 11 – Pope (Contd)

Week 12 - Readings:

(a) Bacon, (i) ‘Of Truth’; (ii) ‘Of Deformity’

(b) Descartes, excerpts from ‘Discourse on Method’

Week 13 -(a) Hobbes, selections from *The Leviathan*, title page, Introduction, Chaps 1 and 13 from Part I, ‘Of Man’

(b) Winstanley, from ‘A New Year's Gift Sent to the Parliament and Army’

(c) Cavendish, excerpts from ‘The Blazing World’

Week 14 – Concluding Lectures on the 17th C: From the Jacobean to the Neoclassical.

PAPER 8
BRITISH LITERATURE: 18TH CENTURY
Semester 4

Course statement

This is a survey course covering a variety of genres in eighteenth-century England, including both canonical and new writings within a history of ideas. It is designed to represent a comprehensive study of texts both in the Augustan period and in the later eighteenth century, often called the age of sensibility. The first unit *The Way of the World* by William Congreve portrays the shift from the libertine sensibility to the culture of politeness at the turn of the century. The course includes the major canonical authors of the early eighteenth century—Swift and Johnson—with some of their representative texts, as well as writers who have received considerable recent scholarship like Daniel Defoe and Eliza Haywood. The latter half of the century is marked by the emerging genre of the novel and Fielding's first novel *Joseph Andrews* included here, is considered by many to be one of the earliest English novels. The paper includes non-fictional genres that were dominant in the age like the periodical essay and the public letter. The intellectual context includes Locke's treatise on empiricism and William Hay's observations on deformity. An excerpt from one of the earliest slave autobiographies at the end of the century helps to contextualize Britain in a global world and the debates on the abolition of the slave trade.

Course Objectives

The course aims to

- examine Congreve's *The Way of the World* as a Comedy of Manners.
- raise questions about satire as a mode, as well as look at questions of genre, through Swift's satiric narrative within the mode of fictional travel writing;
- show, through a critical examination of Johnson and Gray's poems a continued association with classical poetry, the continuities and contrasts from the age of satire to age of sensibility;
- study Fielding's *Joseph Andrews* providing a brilliant example of the amalgamation of previous genres which made the new genre of the novel, and to look at his indebtedness to Richardson despite the overt satire on *Pamela*;
- examine the eighteenth century as a great period for non-fictional forms of writing, drawing attention to the ways in which the periodical essay, for instance, sought to be like philosophy, just as Locke's treatise sought to be like a popular essay, thus pointing out the play with genre in these texts; and
- encourage an extended discussion on the meanings of disability in the early modern period through the Enlightenment, through William Hay's piece on deformity, a response to Bacon.

Course Content

Unit 1

William Congreve

The Way of the World

Unit 2

Jonathan Swift

Gulliver's Travels, Books 3-4

Unit 3

a. Samuel Johnson

'London'

b. Thomas Gray

'Elegy Written in a Country Churchyard'

Unit 4

Henry Fielding

Joseph Andrews

Unit 5

- John Locke, 'Of Ideas in general, and their Original', Paragraphs 1-8, from *An Essay concerning Human Understanding* (1689), Chap 1 Book II, ed. John Nidditch (Oxford: Clarendon Press, 1975) pp. 104-108.
- Addison and Steele, (i) Addison, Essay No. 10, Monday, March 12, 1711; (ii) Addison, Essay No. 69, on the stock-exchange, Saturday, May 19, 1711, both from *The Spectator* (1711-12); Eliza Haywood, Selections from *The Female Spectator* (1744-46), ed. Patricia Meyer Spacks, pp.7-23.
- Daniel Defoe, 'The Complete English Tradesman' (Letter XXII), 'The Great Law of Subordination Considered' (Letter IV), and 'The Complete English Gentleman', in *Literature and Social Order in Eighteenth-Century England*, ed. Stephen Copley (London: Croom Helm, 1984).
- William Hay, from *Deformity: An Essay* (1754) (London: R and J. Dodsley, 1756) pp. 1-11, 44-51.
- Olaudah Equiano, 'The Middle Passage', excerpt from Chapter Two in *The Interesting Narrative of the Life of Olaudah Equiano; or, Gustavus Vassa, the African, Written by Himself* (1789), ed. Robert J. Allison (Boston, 1995), pp. 54-8.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions

2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

TEACHING PLAN

Paper 8: Eighteenth Century Literature

Week 1 - Introduction to the long eighteenth century;

Unit 2 -- William Congreve, *The Way of the World*

Week 3 - Congreve (contd)

Week 4 - Congreve (contd)

Week 5 - Swift, *Gulliver's Travels*

Week 6 – Swift (contd)

Week 7 - Swift (contd)

Week 8 - Samuel Johnson, *London*

Week 9 - Gray, *Elegy*

Week 10 - Fielding, *Joseph Andrews*

Week 11 -Fielding (contd)

Week 12 - Fielding (contd)

Week 13 - Readings

(a) Locke, 'Of Ideas in general, and their Original', Paragraphs 1-8

b) Addison and Steele, (i) Addison, Essay No. 10, Monday, March 12, 1711; (ii) Addison, Essay No. 69, on the stock-exchange

c) Haywood, Selections from *The Female Spectator*

Week 14 – a) Defoe, (i) Letter XXII, 'The Complete English Tradesman' (1726); (ii)

Letter IV, 'The Great Law of Subordination Considered'; 'The Complete English Gentleman'

(b) Hay, from *Deformity: An Essay*

(c) Equiano, 'The Middle Passage', excerpt from Chapter Two in *The Interesting Narrative of the Life of Olaudah Equiano; or, Gustavus Vassa, the African, Written by Himself*

PAPER 9
BRITISH ROMANTIC LITERATURE
SEMESTER 4

Course Statement

This paper focuses on the Romantic period of English literature and covers a historical span of about 40 years (1789-1830). Individual units deal with both canonical and non-canonical writers of the period.

Course Objectives

This course aims to

- introduce students to the Romantic period in English literature, a period of lasting importance, since it serves as a critical link between the Enlightenment and Modernist literature;
- offer a selection of canonical poems and prose that constitute the core texts of the Romantic period;
- introduce marginal voices that were historically excluded from the canon of British Romantic writers; and
- provide an introduction to important French and German philosophers who influence the British Romantic writers.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

- a) William Blake, from *Songs of Innocence and Experience*, (i) 'Introduction' (to *Songs of Innocence*); (ii) 'Lamb'; (iii) 'Tiger'; (iv) 'Chimney Sweeper' (*Songs of Innocence*); (v) 'Chimney Sweeper' (*Songs of Experience*); (vi) 'The Little Black Boy'; (vii) 'London'.
b) Charlotte Smith, (i) 'To Melancholy'; (ii) 'Nightingale'

Unit 2

- a) William Wordsworth, (i) 'Lines Composed a Few Miles Above Tintern Abbey'; (ii) 'Ode: Intimations of Immortality'.
b) Samuel Coleridge, (i) 'Kubla Khan'; (ii) 'Dejection: An Ode'

Unit 3

- a) Lord George Gordon Noel Byron 'Childe Harold': canto III, verses 36–45 (lines 316–405); canto IV, verses 178–86 (lines 1594–674)
b) Percy Bysshe Shelley (i) 'Ozymandias'; (ii) 'Ode to the West Wind'
c) John Keats, (i) 'Ode to a Nightingale'; (ii) 'Ode on a Grecian Urn'; (iii) 'Ode to Autumn'

Unit 4

Mary Shelley, *Frankenstein*.

Unit 5

Readings

- J. J. Rousseau, 'Discourse on the Origin of Inequality', Part One, in *Jean-Jacques Rousseau: Basic Political Writings* (Hackett Publishing Company, 1987) pp. 37-60.
- Immanuel Kant, 'Analytic of the Sublime', in *The Critique of Judgment* (Cambridge University Press, 2001) pp. 128-49.
- William Wordsworth, 'Preface to Lyrical Ballads', in *Romantic Prose and Poetry*, ed. Harold Bloom and Lionel Trilling (New York: OUP, 1973) pp. 594– 611.
- William Gilpin, 'On Picturesque Travel', in *Three Essays: On Picturesque Beauty*.

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

TEACHING PLAN

Paper 9: British Romantic Literature

Week 1 -- Introduction to the Romantic period;

Blake: From *Songs of Innocence and Experience*, (i) 'Introduction' to *Songs of Innocence*; (ii) 'Lamb'; (iii) 'Tiger'; (iv) 'Chimney Sweeper' (*Songs of Innocence*); (v) 'Chimney Sweeper' (*Songs of Experience*); (viii) 'The Little Black Boy'; (ix) 'London'

Week 2 – Blake (contd)

Week 3 – Blake (contd);

Smith, (i) 'To Melancholy', (ii) 'Nightingale'

Week 4 – Wordsworth, (i) 'Lines Composed a Few Miles Above Tintern Abbey'; (ii) 'Ode: Intimations of Immortality'.

Week 5 -- Wordsworth (contd)

Week 6 – Coleridge, (i) 'Kubla Khan', (ii) 'Dejection: An Ode'

Week 7 – Keats, (i) 'Ode to a Nightingale'; (ii) 'Ode on a Grecian Urn'; (iii) 'Ode to Autumn'

Week 8 – Keats (contd); Shelley, (i) 'Ozymandias'; (ii) 'Ode to the West Wind'

Week 9 -- Shelley (contd)

Week 10 – Mary Shelley, *Frankenstein*

Week 11 -- Mary Shelley (contd)

Week 12 -- Readings:

- (a) Rousseau, 'Discourse on the Origin of Inequality', Part One;
- (b) Kant, 'Analytic of the Sublime';
- (c) Wordsworth, 'Preface to Lyrical Ballads';
- (d) Gilpin, 'On Picturesque Travel'

Week 13 – Readings (contd)

Week 14 – Readings (contd)

Keywords

Imagination

Nature

French Revolution

Sublime

Science

PAPER 10
BRITISH LITERATURE: 19TH CENTURY
SEMESTER 4

Course Statement

This paper focuses on the Victorian period of English literature and covers a large historical span from 1814 to 1900. Individual units deal with important examples of the novel form, with one unit on Victorian poetry.

Course Objectives

This course aims to

- introduce students to the Victorian Age in English literature through a selection of novels and poems that exemplify some of the central formal and thematic concerns of the period;
- focus on three novels, a major genre of the nineteenth century, so as to show both the formal development of the genre as well as its diverse transactions with the major socio-historic developments of the period; and
- introduce the students, through the readings in Unit 5, to the main intellectual currents of the period.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Jane Austen, *Pride and Prejudice*

Unit 2

Charles Dickens, *Great Expectations*.

Unit 3

Charlotte Bronte, *Jane Eyre*.

Unit 4

Poetry

- a) Alfred Tennyson, (i) 'The Lady of Shalott' (ii) 'Ulysses' (iii) 'The Defence of Lucknow'.
- b) Robert Browning, (i) 'My Last Duchess'; (ii) 'Fra Lippo Lippi'.
- c) Christina Rossetti, 'Goblin Market'.
- d) Mathew Arnold, 'Dover Beach'

Unit 5

Readings

- Thomas Carlyle, 'Signs of the Times'.
- Oscar Wilde, 'The Critic as Artist'
- J. S. Mill, 'Of the Limits to the Authority of Society over the Individual, from 'On Liberty'.
- Karl Marx, (i) 'Mode of Production: The Basis of Social Life'; (ii) 'The Social Nature of Consciousness', both in *A Reader in Marxist Philosophy*, ed. Howard Selsam and Harry Martel (International Publishers, 1963) pp. 186–8, 190–1; 199–201.
- Charles Darwin, excerpts from 'On Origin of Species by Means of Natural Selection', from Chapter 3; from Chapter 4, ed. Joseph Carroll (Broadview Press, 2003) pp. 132–34; 144–162.

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

Teaching Plan

Paper 10: British Literature: Nineteenth Century

Week 1 – Introduction to the Nineteenth Century; Unit 1 -- Austen, *Pride and Prejudice*

Week 2 -- Austen (contd)

Week 3 -- Austen (contd)

Week 4 -- Unit 2 -- Dickens, *Great Expectations*

Week 5 -- Dickens (contd)

Week 6 -- Dickens (contd)

Week 7 -- Unit 3 – Charlotte Bronte, *Jane Eyre*

Week 8 -- Charlotte Bronte (contd)

Week 9 -- Charlotte Bronte (contd)

Week 10 - Poetry:

(a) Tennyson, (i) 'Lady of Shalott', (ii) 'Ulysses' (iii) 'The Defence of Lucknow';

(b) Browning, (i) 'My Last Duchess', (ii) 'Fra Lippo Lippi';

(c) Arnold, 'Dover Beach';

(d) Rossetti, 'Goblin Market';

Week 11 – Poetry (contd)

Week 12 – Poetry (contd)

Week 13 -- Readings:

(a) Carlyle, 'Signs of the Times';

(b) Wilde, 'The Critic as Artist';

(c) Mill, 'Of the Limits to the Authority of Society over the Individual', from 'On Liberty';

(d) Marx, (i) 'Mode of Production: The Basis of Social Life', (ii) 'The Social Nature of Consciousness';

(e) Darwin, excerpts from 'On the Origin of the Species by Means of Natural Selection'

Week 14 -- Readings (contd)

Keywords

Realism

Novel

Industrial Revolution

Liberalism

Feminism

Bourgeois

Socialism

Darwinism

SKILL ENHANCEMENT COURSES (SEC)

PAPER S1: ANALYTICAL READING AND WRITING

Course Objectives

This course will teach students the fundamentals of rhetorical or persuasive writing organized according to a pedagogic system of academic writing that is followed the world over. Students everywhere are expected to follow this system in universities while they write assignments and take term examinations. In this age of globalized academics, Indian students need to know both the theory and practice of academic analysis and academic writing in order for them to participate in an increasingly international academic environment. All of us who teach analysis and writing have learned and internalized this pedagogic structure usually without being consciously aware of its mechanics. In our M. Phil courses we learnt through trial and error, emulation and example, how to write research papers. Those of us who have written Ph. D. theses are aware that we had to write within strict academic norms. Likewise, when we read essays that students have written, we expect the same academic form of writing from them and penalize them or reward them for their accomplishment in this discipline of writing. But so far, nowhere across Indian universities have we seen a systematized codification of such norms in the form of courses or workshops. This course is an attempt to fill this academic gap.

As the title of the course suggests we focus on both reading (which is comprehending and analyzing other writers' rhetorical arguments) and writing (which is producing cogent and complex rhetorical arguments of our own. We want to pass on a uniform set of writing strategies to our students. Students will learn according to the classical principles of rhetoric.

Learning Outcomes

At the end of this course we expect the students to

- consider the act of writing as a goal oriented task, oriented towards the goal of persuasion;
- examine and interpret other writers' writings (contained in the course reader) as a crucial preliminary stage to being able to produce successfully persuasive writing themselves;
- identify the writer's central purpose or thesis;
- consider how writers use personal authority and trustworthiness, argumentative logic, comparison and contrast, example, and emotional appeals to make their arguments;
- identify their own historical social and personal contexts to understand their own biases and ideologies;
- analyse an academic topic or question;
- gather information and to notionally organize material required to address that topic or to answer that question;

- design and then write a lucid thesis statement that outlines the students' central argument in the paper, essay or article.
- produce both preliminary and fleshed-out outlines which identify the structure of the proposed paper;
- finally produce a paper that follows the guidelines of their own theses and outlines; and
- use the appeals of ethos, logos and pathos throughout the paper as multiple persuasive strategies.

Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

How to read/write/think: Rhetoric or the art of persuasion.

The Rhetorical Triangle: Consider each writing task as an act of rhetoric—that is, an act where someone is communicating to someone else on a subject that is known to both. Imagine a rhetorical triangle made up of a speaker (the writer) the subject (the answer/tute/presentation) and the audience (the teacher/examiner). It is the interaction of the three that makes the act of writing rhetorical in nature. The relationship between writer and audience is unequal, in the sense that the writer needs to prove something to an audience, who must be assumed to be skeptical and in need of persuasion. To be able to write articulately, it is first crucial to read and think with clarity. Each of the three components therefore need to be studied in detail.

a. Writer/Speaker – In the act of writing, the writer or the speaker is the student in this class. Therefore, the first task is to locate the students in their historical, socio-economic, cultural materiality. Antonio Gramsci's idea of creating a personal inventory of historical traces to date on the self would be one useful way to think about this.

b. Text – What is a text? From what perspective do we read a text? What is the perspective from which it is written? What is the context in which this argument was made? What is the context in which we are reading it? One of the ways of thinking about these issues is to consider everything around us as a text. We read the world around us all the time. Reading means critically analyzing through the prism of one's own ideology. As we read and analyze, we evaluate and also form value judgments about the text.

c. Audience – We only ever speak/write to persuade an audience. Who are we writing to? With what motive? What investment? Eagleton points out that we only speak if there is reason, a motive, a message. To analyze the appeals that are used in persuading the audience, one first needs to understand the character of the audience.

Unit 2

How to write: Creating a rhetorical argument: What, How, Why (Definition, Evaluation, Proposal)

Writing is a goal-oriented task. It is the teaching of each specific rhetorical tool that will form the stages of this course. The syllabus is structured to teach the following: how to analyze questions; how to make thesis statements, outlines and paragraphs; how to link ideas; how to write introductions and conclusions; and how to use examples and critics. These skills are to be taught not for their own sakes or to fulfil some aesthetic desire to see a nicely written essay. These skills are inextricable from the rhetorical act of persuasion itself, and persuasive writing cannot take place until these skills are systematically learnt.

Thesis Statement

How do we recognize a thesis statement? It answers the question – What are you going to prove? What do you want your reader to believe by the end of your answer? While planning the thesis statement it is important to spell out precisely what you're going to say. It should answer how and why the argument is being written.

Unit 3

How to write: Creating a rhetorical argument: What, How, Why (Definition, Evaluation, Proposal)

Outline

The thesis statement discussed earlier outlines the major sections of the essay. The technique of writing the thesis statement is sometimes called *blueprinting*. Based on the thesis statement, the formal outline provides a clearer blueprint of the assignment.

Expanding the Outline

In this step the information required under each point in the rough outline needs to be sourced and noted. The evidence needed to support the thesis statement and the authority or analysis of the evidence will flesh out the outline made in the above section.

Unit 4

How to write: Creating a rhetorical argument.

Introduction and Conclusion

There is a format or structure for writing the introduction and the conclusion that is generic to all tasks of writing. These two paragraphs are to be written after the argument has been established and proven to aid the rhetorical task of persuasion.

Unit 5

How to write: Creating a rhetorical argument.

Linkages Transitions and Signposting

These elements are crucial for the writer to lead the reader through the process of following the thesis, the outline, the evidence, and the progression of the argument.

Paragraphing and Sentence Structure

These skills are not taught for their aesthetics. They are crucial to the logical argument, as language determines order at the sentence level, and the ordering of points in paragraphs determines the structure of the argument.

Readings

There will be a Reader with 8 – 12 texts/readings, which will be selected according to graded difficulty to be accessible to students of different abilities. Each reading will be accompanied by a series of topics of discussion to aid reading the text from the different aspects taught in the class. They will also be accompanied by a series of 6 – 10 questions from which one or two questions can be chosen to ask the class to write assignments. The texts would try to cover different issues of interest to students to generate meaningful discussion in class and analysis in the process of writing.

Course structure

The course will be structured around 3 assignments. In the first assignment the student will be expected to analyze the reading and the question and to write about the issues the question asks for and then to condense that into a roughly three sentence thesis statement. The second assignment will require the student to write a thesis statement and to make an outline to match the thesis statement. The third assignment will require the student to start with the thesis statement follow with outline and finally produce an entire essay.

Prose:

1. Jane Tompkins, 'Indians', Textualism Morality and the Problem of History' (Difficult)
2. Paulo Friere, 'The Banking Concept of Education' (Medium Difficult)
3. Martin Luther King Jr, Letter from Birmingham Jail (Medium Medium)
4. Rebecca Solnit:, 'Men Explain Things to Me' (Medium Easy)
5. Aurangzeb, Letter to his Teacher (Easy)

Poetry

1. Agha Shahid Ali, 'Ghazal', (Difficult)
2. Margaret Atwood, 'This is a photograph of me' (Medium Difficult)
3. Dylan Thomas, 'Do not go gentle into the night' (Medium medium)
4. Bob Dylan, 'The Times They are A-changing' (Medium easy)
5. Robert Frost, 'The Road Not Taken' (Easy)

Short Story

1. Heinrich Boll, 'Stranger Bear word to the Spartans we...' (Difficult)
2. Alice Munro, 'Gravel' (Medium Difficult)
3. Shirley Jackson, 'The Lottery' (Medium Medium)
4. Vaikom Basheer, 'The Card-Sharp's Daughter' (Medium Medium)
5. Om Prakash Valmiki, 'Joothan' (Easy)

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading. The 15 texts of essential reading are listed above – 5 prose pieces, 5 poems, and 5 short stories.

Teaching Plan

Paper S1 – Analytical Reading and Writing

Week 1 – Introduction to Analytical Reading and Writing

Weeks 2 – How to read

Week 3 -- Introduce and Discuss Reading 1

Week 4 -- Thesis Statement

Assignment 1 due Week 4: Three paragraphs for thesis statement, reduced to three sentences

Week 5 -- Introduce and Discuss Reading 2

Week 6 -- Thesis Statement

Week 7 & 8 -- Outline corresponding to Thesis statement

Assignment 2 due Week 8

Week 9 -- Introduce Reading 3

Week 10 --Thesis Statement
Week 11 -- Outline/ Introduction and Conclusion
Week 12 -- Rough draft
Week 13 -- Assignment 3 due
Week 14 – Concluding discussion

Keywords

Reading analytically
Reading techniques
Audience
Persuasive writing
Argumentation
The appeals
Logical argument
Authority
Rhetoric
Thesis
Outline
Writing introduction
Writing conclusion
Signposting
Transitions

PAPER S2: LITERATURE IN SOCIAL SPACES

Course Objectives

According to Emile Durkheim, the categories of time, space, class, personality (and so on) are social in nature. Social spaces therefore have to be understood as products of the distribution of individuals/communities, kinship ties, and professional relationships. Since such spaces are crucial for the orientation and growth of individuals, ideally they should be constructed by ensuring inclusivity empathy and self-awareness.

Humanities as a field encourages us to ask pertinent questions, share different world-views, and produce alternate truths in the process. It is in this regard that we are offering a course that will use texts (literary or otherwise) to equip students with skills crucial to understand and deal with the practicalities of the everyday, be it with regard to workplace intimate networks or social media.,Recent research has inferred that the study of Humanities and Social Sciences are effective in developing soft skills considered of vital importance in the dynamic workplace of the 21st Century.

This course draws attention to the link between critical thinking skills developed by studying the Humanities, especially Literature, and other skills that are often termed, ‘soft skills’. The course focuses on the empathy building capacity of Literature and the application of critical thinking and problem solving skills employed in literary analysis to develop an understanding

of the value of literature in social and professional spaces. Literary readings will provide the foundation for developing skills such as better communication and empathy, understanding the value of teamwork, the need for adaptability, and the role of leadership and mentoring.

Learning Outcomes

- Students will be familiarised with the link between the Humanities and, ‘soft skills’
- They will be encouraged to focus on the value of literature as an empathy-building experience.
- They will learn to apply critical thinking and problem solving skills developed by the study of literature to personal social and professional situations.
- Students will be encouraged to enhance their teamwork skills by working in groups and to understand the processes of leadership and mentoring.
- Students will work on their presentation skills and build on the idea of, ‘narratives’, to better communicate with target audiences.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Humanities and Soft skills

- ‘Creative and Arts Graduates have the Soft Skills needed to make them Work-Ready’, by Mark Harman in *The Independent* 22 June 2016
(<https://www.independent.co.uk/student/career-planning/creative-arts-graduates-soft-skills-graduate-employment-university-subjects-work-ready-a7095311.html>)
- ‘Leadership in Literature’, by Diane Coutu in *The Harvard Business Review* March

2006 (<https://hbr.org/2006/03/leadership-in-literature>)

- c) 'How Literature informs Notions of Leadership', by Gregory L. Eastwood in *Journal of Leadership, education* Vol 9 Issue 1 2010 (http://journalofleadershiped.org/attachments/article/161/JOLE_9_1_Eastwood.pdf)

Unit 2

Emotional Intelligence Adaptability and Mental Health

- a) Daniel Goleman., 'Don't let a bully boss affect your mental health', <http://www.danielgoleman.info/dont-let-a-bully-boss-affect-your-mental-health/>
- b) William Blake, 'The Chimney Sweeper', from *Songs of Innocence and Songs of Experience* (both versions - 2 poems)
- c) W. Somerset Maugham, 'The Verger', (short story)

Unit 3

Critical Thinking and Problem Solving

- a) 'On the Writers Philosophy of Life', by Jack London in *The, editor* October 1899 (essay)
- b) Nicholas Bentley, 'The Lookout Man', (short story) in S. P. Dhanvel's *English and Soft Skills* (Delhi: Orient Blackswan 2010).
- c) J. K. Rowling., 'The Fringe Benefits of Failure and the Importance of Imagination', (extract from her speech at Harvard 2008) <https://news.harvard.edu/gazette/story/2008/06/text-of-j-k-rowling-speech/>

Unit 4

Teamwork and Team Management

- a) Extract from Mark Twain *Huckleberry Finn* in S.P. Dhanvel's *English and Soft Skills* (Delhi: Orient Blackswan 2010).
- b) 'The Builders', by Henry Wadsworth Longfellow (poem)

Unit 5

Leadership and Mentoring

- a) 'If', by Rudyard Kipling (poem)
- b) 'Are you my Mentor?', by Sheryl Sandberg in *Lean in: Women Work and the Will to Lead* (London: Penguin Random House 2015).

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Suggested Films

1. 2002 Documentary -- *The Tales of the Night Fairies* (teamwork leadership and adaptability)
2. 1993 Film -- *What's Eating Gilbert Grape?* (self-awareness family and care)
3. 2000 Film -- *Erin Brockovich* (soft skills and empathy)
4. 2003 Film -- *Monalisa Smile* (leadership and mentorship)
5. 2016 Film-- *Hidden Figures* (affective leadership and teamwork)
6. 2016 TV Serial -- *Black Mirror: Season 3 Nosedive* (mental health and social media)
7. 2007 Film -- *Chak De India* (teamwork leadership mentoring)

Teaching Plan

Paper S2 – Literature in Social Spaces

Week 1 – Introduction

Week 2 – Unit 1 - Humanities and Soft skills

Week 3 – Unit 1 - contd

Week 4 – Emotional Intelligence, Adaptability, and Mental Health

Week 5 – Unit 2 - contd

Week 6 – Unit 2 - contd

Week 7 –Unit 3 - Critical Thinking and Problem Solving

Week 8 – Unit 3 - contd

Week 9 – Unit 3 - contd

Week 10 – Unit 4 - Teamwork and Team Management

Week 11 – Unit 4 - contd

Week 12 – Unit 5 - Leadership and Mentoring

Week 13 – Unit 5 - contd

Week 14 – Conclusion

Keywords

Soft skills

Humanities and soft skills

Literature and EQ

Leadership and Literature

Critical thought in Humanities

Mentoring and Literature

PAPER S3: LITERATURE IN CROSS-CULTURAL ENCOUNTERS

Course Objectives

Acknowledging literature's status as an important medium in making sense of the world we live in, this paper will enable students to critically view their location within a larger globalized context. By reading texts cross-culturally, students will engage with people's

experience of caste/class, gender, race, violence and war, and nationalities and develop the skills of cross-cultural sensitivity. The paper will give them the vocabulary to engage with experiences of people from varying cultures and backgrounds, particularly relevant in contemporary times as these issues continue to be negotiated in the workplace as well as larger society.

Learning Outcomes

This course aims to help students

- develop skills of textual and cultural analysis;
- develop insights into and interpretations of complex cultural positions and identities; and
- pay specific attention to the use of language and choice of form/genre that affects the production and reception of meaning between writers and readers.

Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

The readings of all units are taken from *The Individual and Society: Essays Stories and Poems*, edited by Vinay Sood et al., for The Department of English, University of Delhi, New Delhi: Pearson, 2006.

Unit 1

Caste/Class

1. Jotirao Phule, 'Caste Laws'
2. Munshi Premchand, 'Deliverance'
3. Ismat Chughtai, 'Kallu'
4. Hira Bansode, 'Bosom Friend'

Unit 2

Gender

1. Virginia Woolf, 'Shakespeare's Sister'
2. Rabindranath Tagore, 'The Exercise Book'
3. W. B. Yeats, 'A Prayer for My Daughter'
4. Eunice de Souza, 'Marriages Are Made'
5. Margaret Atwood, 'The Reincarnation of Captain Cook'

Unit 3

Race

1. Roger Mais, 'Blackout'
2. Wole Soyinka, 'Telephone Conversation'
3. Langston Hughes, 'Harlem'
4. Maya Angelou, 'Still I Rise'

Unit 4

Violence and War

1. Wilfred Owen, 'Dulce et Decorum Est'
2. Edna St Vincent Millay, 'Conscientious Objector'
3. Henry Reed, 'Naming of Parts'
4. Bertolt Brecht, 'General Your Tank Is a Powerful Vehicle'
5. Intizar Husain, 'A Chronicle of the Peacocks'
6. Amitav Ghosh, 'Ghosts of Mrs Gandhi'

Unit 5

Living in a Globalized World

1. Roland Barthes, 'Toys'
2. Chitra Banerjee Divakaruni, 'Indian Movie New Jersey'
3. Imtiaz Dharker, 'At Lahore Karhai'
4. Naomi Klein, 'The Brand Expands'

(5 sections – 12 poems 11 essays/stories – to be completed in 14 weeks 42 lectures + 14 practicals)

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Teaching Plan

Paper S3 -- Literature in Cross-Cultural Encounters

Week 1 -- Introduction

Week 2 -- Unit 1 -- Caste/Class

Week 3 -- Unit 1 contd

Week 4 -- Unit 2 -- Gender

Week 5 -- Unit 2 contd

Week 6 -- Unit 2 contd

Week 7 -- Unit 3 -- Race

Week 8 -- Unit 3 contd

Week 9 -- Unit 3 contd

Week 10 -- Unit 4 -- Violence and War

Week 11 -- Unit 4 contd

Week 12 -- Unit 5 -- Living in a Globalized World

Week 13 -- Unit 5 -- contd

Week 14 -- Concluding lectures; discussion on exam pattern etc.

Keywords

Race

Caste

War

Class

Globalisation

Gender

Violence

Literature

Culture

Cross Cultural Encounters

Critical thinking

PAPER S4: ORAL AURAL AND VISUAL RHETORIC

Course Description

This paper is designed to introduce students to the theory and practice of rhetorical studies. Rhetoric has meant an art, an artifact, and a kind of discourse. The aim here is to investigate the art of expression, whether with words, with musical notes or with lens. It is to treat all cultural artifacts such as oratory, music, and photography as texts that can be read/heard/seen, and analyzed and appreciated in class. The paper initiates the students to classical and modern rhetorical theories, both in the West and in India, in the first unit. In the rest of the units, students will learn to closely read any non-literary text, become attentive listeners, and feel the tone and texture of images.

This course surveys and explores a number of rhetorical traditions from around the world, studying sample texts along two axes: firstly, *temporal* where texts are read in their original historical contexts; and secondly, *ideational* where texts are read for themes and perspectives.

Learning Outcomes

In this course, students will

- develop their oral/aural/visual senses to appreciate a cultural text, while at the same time using a theoretical framework and position to read a text; and
- identify and engage with the themes of:

- i. Argumentation and persuasion
- ii Language and writing
- iii. Intention and motivation of the author/orator/painter/musician.
- iv. Emotive element in speech and music
- v. Performative language

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests	Discussing exam questions and answering	Class tests

	and examinations	techniques	
--	------------------	------------	--

Course Contents

Unit 1

Theory of Rhetoric: Western and Indian

1. James A. Herrick, 'An overview of rhetoric', *The History and Theory of Rhetoric: An Introduction* (Routledge 2016) p 1-30
2. Aristotle *On Rhetoric: A Theory of Civic Discourse*, trans. George A Kennedy. Book 1 chapter 3 p 46-51.
3. M. Perelman, *The Idea of Justice and the Problem of Argumentation* ('Act and Person in Argument' p 196-208).
4. Bharata, *Natyasastra*, ed. and trans. Manmohan Ghosh (selections Chapter 19 p 344-352).
5. Lawrence McCrea, "'Resonance', and its Reverberations: Two cultures in Indian epistemology of Aesthetic Meaning', *The Bloomsbury Research Handbook of Indian Aesthetics and the Philosophy of Art.*, ed. Arindam Chakrabarti (London: Bloomsbury 2016) pp. 25-42.

Unit 2

Oratory

1. Martin Luther King: Messianic Myth
28th August 1963, 'I have a Dream', address at march on Washington for Jobs and Freedom
<https://www.youtube.com/watch?v=3vDWWy4CMhE>
25th March 1965, 'Our God is Marching on!' <https://www.youtube.com/watch?v=5n5WbNCEeHM>

Reading

Black Jonathan-Charteris., 'Martin Luther King: Messianic Myth', (chapter 3 pp 58-84) *Politicians and Rhetoric: The Persuasive Power of Metaphor* (Palgrave Macmillan 2005).

2. Susan B Anthony on Women's Right to Vote
<https://www.youtube.com/watch?v=T57dwhJBtts>

Reading

Katheryn M. Conway, 'Woman Suffrage and the History of Rhetoric at the Seven Sisters College 1865-1919' *Reclaiming Rhetorica: Women in the Rhetorical Tradition*, ed. Andrea A Lunsford.

3. Nehru Tryst with Destiny speech to the Indian constituent assembly on 14th August 1947.
<https://www.youtube.com/watch?v=AzdVKGdZUpQ>

Reading

Black Jonathan-Charteris., 'Persuasion Legitimacy and Leadership', (chapter 1 pp 1-26)
Politicians and Rhetoric: The Persuasive Power of Metaphor (Palgrave Macmillan 2005).

Unit 3

Music

1. Bob Dylan musical piece, 'Blowin', in the wind'.
<https://www.youtube.com/watch?v=G58XWF6B3AA>

Readings and music

1. Brian Vickers, 'Figures of Rhetoric/Figures of Music?', *Rhetorica* ii (1984) 1-44
Karl Eschman, 'The Rhetoric of Western Music', *The Musical Quarterly* vol 7 no 2
(April 1921) pp 157-166.
2. Ol', Man River in many versions and contexts:
 - i. Ol', Man River by Paul Robeson for the film, 'Showboat', in 1936.
 - ii. The version with altered and more revolutionary lyrics which he sang on stage in the 1930s.
 - iii. Bhupen Hazarika's Assamese version, 'BistirnoParare'
 - iv. Bangla, 'BistirnoDupare',
 - v. Nepali, 'Bristit Kinarako', with subtitles
3. The chapter, 'Ol', Man River', in the book *The Undiscovered Paul Robeson: An Artist's Journey 1898-1939* by Paul Robeson Jr.
4. Hemango Biswas, 'A Glorious Heritage', *Folkmusic and Folklore: An Anthology*.
Pradip Kumar Sengupta *Foundations of Indian Musicology* (ch7:, 'Raga and Rasa', p 99-124).
5. 'Na to Karvankitalaashhai', *BarsaatkiRaat* movie of 1950s.
6. Kumkum Sangari, 'Viraha: A Trajectory in the Nehruvian Era', in *Poetics and Politics of Sufism and Bhakti in South Asia: Love Loss and Liberation*, ed. Kavita Panjabi

Unit 4

Photography

Lady Filmer's Album

Readings and visuals

1. 'Photographs fun and flirtations', Patrizia De Bello *Women's Albums and Photography in Victorian England: Ladies Mothers and Flirts* (Ashgate 2007).
2. Jyotindra Jain, 'The visual culture of the Indo-British cotton trade', *Marg: A Magazine of the Arts The Story of Early Indian Advertising* (March-June 2017).
3. 1857 uprising photos - Memorial well at Cawnpore (Kanpur) Kashmiri Gate in Delhi the Residency at Lucknow.

4. Malavika Karlekar, 'Sites of Past Conflict', (pp57-62) and, 'The, 'Second Creature' (pp. 15-164) *Visual History: Photography in the Popular Imagination* (OUP, 2013)
5. Dayanita Singh and Aweek Sen, 'House of Love'(short story) *House of Love* (Peabody Museum Press 2010)

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Teaching Plan

Paper S4 - Oral Aural and Visual Rhetoric

Week 1 – Unit 1 -- Theory of Rhetoric: Western and Indian
Week 2 – Unit 1 (contd)
Week 3 – Unit 1 (contd)
Week 4 – Unit 1 (contd)
Week 5 – Unit 2 -- Oratory
Week 6 – Unit 2 (contd)
Week 7 – Unit 2 (contd)
Week 8 – Unit 3 -- Music
Week 9 – Unit 3 (contd)
Week 10 – Unit 3 (contd)
Week 11 – Unit 4 -- Photography
Week 12 – Unit 4 (contd)
Week 13 – Unit 4 (contd)
Week 14 – Concluding lectures discussion on exam pattern etc.

Keywords

Rhetoric
Close Reading
Writing
Oratory
Photography
Music

PAPER S5: INTRODUCTION TO CREATIVE WRITING FOR MEDIA

Course Objectives

This course introduces students to the concepts of ‘creativity’ in general and ‘creative writing’ in particular. This paper focuses especially on writing for the media, ranging from newspapers and magazines to emerging new media forms. After being given a foundation in the theoretical aspects of writing for the media, real life examples will provide practical exposure. This course will encourage students to be active readers and writers, who will engage with contemporary issues in a well informed manner. This course will be of interest to those students who wish to pursue creative writing, especially those who wish to work in the media.

Learning Outcomes

This course aims to

- introduce students to the idea that creativity is a complex and varied phenomenon that has an important relationship with social change;
- familiarize students with ideas about language varieties and the nuances of language usage;
- introduce students to the language and types of media writing across forms and genres; and
- encourage students to revise their work critically and inculcate the skills of proofreading.

Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests	Discussing exam questions and answering	Class tests

	and examinations	techniques	
--	------------------	------------	--

Course Contents

Unit 1

What is Creative Writing?

- a) Defining and Measuring Creativity
- b) Inspiration and Agency Creativity and Resistance
- c) What is Creative Writing? Can it be taught?
- d) The importance of Reading

Unit 2

The Art and Craft of Creative Writing

- a) Styles and Registers
- b) Formal and Informal Usage
- c) Language Varieties Language and Gender
- d) Disordered Language
- e) Word order Tense and Time Grammatical differences

Unit 3

Writing for the Media

- a) Introduction to Writing for the Media
- b) Print Media
- c) Broadcast Media
- d) New Media
- e) Advertising and Types of Advertisements

Unit 4

Revising Rewriting and Proof Reading (pages 205-208)

- a) Revising
- b) Rewriting
- c) Proof reading and proof-reading marks

Prescribed Text

Creative Writing: A Beginners', Manual by Anjana Neira Dev et al. For The Department of English, University of Delhi (New Delhi: Pearson, 2008).

Essential Reading

Dev, Anjana Neira et al. *Creative Writing: A Beginners' Manual*. For The Department of English, University of Delhi, New Delhi: Pearson, 2008

Suggested Methods of Internal Evaluation

It is recommended that students be asked to prepare a portfolio of original writings, which will include any 4 from:

- a) Creativity in everyday life
- b) An advertisement
- c) A news report
- d) A review of a film/book/play/restaurant
- e) A travel review /page from a travelogue
- f) An, editorial
- g) A blog /vlog entry

Teaching Plan

Paper S5 -- Introduction to Creative Writing for Media

Note: Ample time must be devoted in during practical periods to actual writing and the practice of the theory that is taught in class. Contemporary real time examples are encouraged. The student's portfolio must emerge based on classroom work and exercises

Week 1 – Introduction to Paper S5 -- Creative Writing for Media

Week 2 – Unit 1 -- What is Creative Writing?

Week 3 – Unit 1 contd

Week 4 – Unit 1 contd

Week 5 – Unit 2 -- The Art and Craft of Creative Writing

Week 6 – Unit 2 contd

Week 7 – Unit 2 contd

Week 8 – Unit 3 -- Writing for the Media

Week 9 – Unit 3 contd

Week 10 – Unit 3 contd

Week 11 – Unit 4 -- Revising, Rewriting and Proof Reading

Week 12 -- Unit 4 contd

Week 13 – Unit 4 contd

Week 14 – Concluding lectures; exam issues, etc.

Keywords

Creative writing

Writing for the media

Advertisements

Proof reading

Newspaper reports

Media literacy

Blogs
Vlogs
Reviews
Language for the media

PAPER S6 -- TRANSLATION STUDIES

Course Objectives

In a multicultural country like India, translation is necessary for better governance and for greater sensitivity to other cultural groups. As the world shrinks further due to increased communication, translation is required for smooth flow of knowledge and information. The course will sensitise students to the processes involved in translation. Students will be familiarised with various methods, strategies and theories of translation. Further they will learn to recognise a translated text as a product of its cultural, social, political and historical contexts.

Learning Outcomes

Through the study of this course the student will develop the ability to

- sensitively translate literary and non-literary texts including official and technical documents from one language to another;
- interpret from one language to another;
- examine what is translated and why;
- discern the difference in language systems through the practice of translation;
- understand the processes involved in translation in mass media, especially news reporting, advertising and films;
- engage with the demands of subtitling and dubbing;
- compare translations;
- evaluate and assess translated texts; and
- edit translated texts.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2.	Expressing concepts through writing	How to think critically and write	Writing essay length assignments

		with clarity	
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Introducing Translation

Introducing a brief history and significance of translation in a multi-linguistic and multicultural society like India.

Introducing basic concepts and terms used in Translation Studies through relevant tasks:

Equivalence, Source Language, Target Language, Source Text, Target Text, Language variety, Dialect, Idiolect, Register, Style, Mode, Code mixing and Switching, transliteration, simultaneous and consecutive interpreting.

Unit 2

- a. Brief Theory of Linguistics – morphology phonology syntax
- b. Defining the process of translation (analysis transference restructuring) through critical examination of diverse translated texts.

Unit 3

Types and modes of translation

- a. Semantic and Literal translation
- b. Free Sense-to-sense and Literary translation
- c. Functional and Communicative translation
- d. Technical and Official translation
- e. Transcreation
- f. Audio-visual translation: subtitling dubbing voice-overs
- g. Back translation
- h. Rank-bound and Unbounded translation
- i. Machine Translation

Unit 4

Practice of Translation

Source Texts
 Idiomatic Expressions/ Headlines/Taglines
 Poetry
 Short-story/Novella/Excerpt from a novel
 Newspaper Report/Editorial/Review/Feature Article
 Songs/Films

Unit 5

Issues in Translation

Translation and Gender
Translation and Caste
Translation and Culture
Translation and Technology
Translation and Mass Communication
Comparison and Evaluation of Translated texts

Essential Readings

Baker, Mona, *In Other Words: A Coursebook on Translation*. London and New York: Routledge, 2011. (Useful exercises for practical translation and training)
Bassnett, Susan. *Translation Studies*. 4th edn. London and New York: Routledge, 2014.
Bassnett, Susan and Trivedi, Harish eds. *Postcolonial Translation: Theory and Practice*. London and New York: Routledge, 1999.
Routledge Encyclopedia of Translation Studies. London and New York: Routledge, 2001.

Teaching Plan

Paper S6 – Translation Studies

- Week 1 – Unit 1 (a) -- Introduction to Translation Studies; A brief history of translation in India; significance of translation in a multilingual and multicultural society like India
- Week 2 – Unit 1 (b) Introduction to basic terms and concepts used in translation studies through relevant tasks -- Source Language, Target Language, Source Text, Target Text.
- Week 3 -- Unit 1 (b) contd -- Language Variety, Dialect, Idiolect, Register, Style, Equivalence, Mode, Code Mixing and Switching, Transliteration, Simultaneous and Consecutive Interpreting.
- Week 4 -- Unit 2 (a) Brief theory of Linguistics – Morphology, Phonology, Syntax
- Week 5 -- Unit 2 (b) Defining the process of translation (analysis, transference, restructuring) through critical examination of diverse translated texts.
- Week 6 -- Unit 3: Discussing types and modes of translation with examples
- Semantic and Literal translation
 - Free, Sense-to-sense and Literary translation
 - Functional and Communicative translation
- Week 7 -- Unit 3 contd.
- Technical and Official translation
 - Transcreation

- f. Audio-visual translation: subtitling, dubbing, voice-overs
- Week 8 -- Unit 3 contd. g. Back translation
- h. Rank-bound and Unbounded translation
- i. Machine Translation
- Week 9 -- Unit 4: Practice of translation with examples
 - Idiomatic Expressions/ Headlines/Taglines
 - Newspaper Report/Editorial/Review/Feature Article
- Week 10 -- Unit 4 contd.
 - Poetry
 - Songs/Films
 - Advertisements: Print and Audio-Visual
- Week 11 -- Unit 5: Discussing Issues in Translation
 - Translation and Gender
 - Translation and Caste
- Week 12 -- Unit 5 contd -- Translation and Technology
 - Translation and Mass Communication
 - Translation and Culture
- Week 13 -- Unit 5 contd -- Comparison and Evaluation of Translated Texts
- Week 14 -- Discussion of individual portfolios

Keywords

Translation
 Interpreting
 Source text
 Target text
 Source language
 Target language
 Equivalence
 Machine translation
 Adaptation
 Transcreation

PAPER S7 -- INTRODUCTION TO THEATRE AND PERFORMANCE

Course Objectives

The course is intended for students who specialise in English Literature. The idea is to acquaint them with historical processes at work, to understand the way in which techniques/methodology of drama have evolved over a period of time. There are two aspects to this course. One is the development of aesthetics in the Indian context, from the pre-Independence to post-Independence period. The course also looks at censorship acts, the

politics of the market and other factors, to locate the socio-political context of drama. There will also be a discussion of the popular forms of performance in India. The second aspect is the development of theories and practice of drama in Europe and their impact on the Indian context.

Learning Outcomes

Through this course, students will be able to

- understand the different theories of drama in Europe and India, both from the point of view of theory and performance;
- make connections between socio-economic processes at work and the emergence of a certain kind of dynamic within theatre; and
- put up a performance at the end of the course, making use of the different kinds of aesthetics they have studied (since this is a Skill Enhancement Course)

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Introduction

- What is a text?
- What is a performance?
- The uniqueness of the dramatic text: Literature and/or Performance?

- The politics of a Dramatic text: endorsement status quo vs. subversion

Unit 2

Theories of Performance

- Performance theory
(Richard Schechner/Dwight Conquergood)
- Radical theories
(Bertolt Brecht, Augusto Boal)
- Classical theories
(Natyashastra, Aristotle)

Unit 3

The State the Market and the History of Theatre

- Under British rule
(Viceroy Northbrook—censorship Neeldarpan Nabanna— Pre-Independence Indian Theatre)
- (Popular forms: Jatra Tamasha Nautanki Burrakatha Dastangoi and others)
- Modern Indian theatre in the post-independence period
 - o (Bourgeois theatre and theatre of change Feminist theatre)
 - o (Street theatre Janam)

Unit 4

Modern Western theatre

- Naturalism (Realism)
 - o (Stanislavsky)
- Epic theatre: theatre as criticism
 - o (Brecht, Dario Fo, France Rame)
- Theatre that resists the state and market

Unit 5

The Performative Act

- Performance space
 - o (in the round proscenium amphitheatre thrust stage etc.)
- Space, Lights, Costumes, Sets

The students must be asked to create a performance from a text (their choice/assisted by the teacher).

Essential Readings

Brecht, Bertolt. 'A Short Organum for the Theatre' (para 26 - 67) in *Brecht on Theatre: The Development of an Aesthetic*. Trans. and Ed. Willett, John. New York: Hill and Wang, 1957, pp. 186-201.

Fo, Dario. 'Breaking Down the Fourth Wall', in *The Tricks of the Trade*. Trans. Joe Farrell. London: Methuen Drama, 1991, pp. 73-4.

Schechner, Richard. 'The Fan and the Web', in *Performance Theory*. New York:

Routledge, 2002, pp. xvi-xix.

Stanislavski, Constantin. 'Faith and the Sense of Truth', Chapter 8, Section I, in *An Actor Prepares* [1936]. London: Methuen, 1988, pp. 121-23.

Suggested Plays for Performance

Bertolt Brecht, *Caucasian Chalk Circle*

Bijon Bhattacharya, *Nabanna*

Clifford Odet, *Waiting For Lefty*

Dario Fo, *Can't Pay Won't Pay*

Euripides, *Medea*

Franca Rame, *A Woman Alone*

Mahesh Dattani, *Dance Like A Man*

Teaching Plan

Paper S7 -- Introduction to Theatre and Performance

Week 1 – Introduction to Paper 10: Introduction to Text and Performance

Week 2 – Unit 2 – Theories of Performance

Week 3 – Unit 2 contd

Week 4 – Unit 3 -- The State, the Market and the History of Theatre

Week 5 – Unit 3 contd

Week 6 – Unit 3 contd

Week 7 – Unit 4 -- Modern Western theatre

Week 8 – Unit 4 contd

Week 9 – Unit 4 contd

Week 10 – Unit 5 -- The Performative Act

Week 11 -- Unit 5 contd

Week 12 – Discussion of plays and rehearsals for performance

Week 13 – Discussion of plays and rehearsals for performance

Week 14 – Concluding lectures; exam issues, etc.

Keywords

Performance theory

Natyashastra^[1]_[SEP]

Classical theory

Bertolt Brecht

Augusto Boal

Neeldarpan

Nabanna

Jatra

Tamasha

Nautanki

Burrakatha
Dastangoi
Street theatre
Janam in the round
Proscenium
Amphitheatre
Thrust stage

PAPER S8: MODES OF CREATIVE WRITING – POETRY, FICTION, AND DRAMA

Course Objectives

This course introduces students to Creative Writing in the three fundamental modes – poetry, fiction (short story and novel), and drama (including scripts and screenplays). The students will be introduced to the main tropes and figures of speech that distinguish the creative from other forms of writing. The students will be able to see language as not just a means of communication but as something that can be played with and used for the expression of the whole range of human emotion and experiences. Within each literary mode, the students will study conventional as well as contemporary expressions. This course will interest those who wish to engage with the discipline of creative writing in its varied manifestations.

Learning Outcomes

Through this course, students will

- be introduced to a variety of tropes and figures of speech, and sensitised to the texture of literary language;
- understand the importance of reading with a view to unlocking the writers' craft;
- be introduced to various forms of poetry, fiction and drama and the wide range of possible genres within them;
- be made aware of the range of career opportunities that exist within the field of creative writing as well as within the realm of theatre and performance; and
- be encouraged to revise their work critically and inculcate the skills of editing and preparing their work for publication.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide	Reading theoretical material together in small groups working in peer groups to discuss

		them towards skill based learning	material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

Prescribed Text

Creative Writing: A Beginners' Manual by Anjana Neira Dev et al. for The Department of English, University of Delhi (New Delhi: Pearson, 2008).

Unit 1

The Art and Craft of Writing

Tropes and Figures of Speech

(examples of figures of speech based on similarity/obliqueness/difference/extension/utterance and word building should be discussed and practiced in class)

Unit 2

Modes of Creative Writing -- Poetry and Fiction

- a) Writing to Communicate
- b) Writing Poetry -- Definitions of Poetry/Difference between Poetry and Prose
- c) Form and Technique Shapes
- d) Dominant Forms and Modes of Poetry
- e) Writing Verse for children
- f) Writing Fiction -- Differences between Fiction and Non Fiction
- g) Literary and Popular Fiction
- h) Creating Character, Plot, Setting, and POV
- i) Writing for Children

Unit 3

Modes of Creative Writing-Drama and Screenplay

- a) What is a Drama -- Concept
- b) Plot and Character in Drama
- c) Verbal and Non-verbal Elements in Drama
- d) Contemporary Theatre in India – a brief overview

- e) Writing for Films -- Screenplay conventions
- f) Scripting for Children -- Theatre and Films

Unit 4

Editing and Preparing for Publication (pages 208-216)

- a) Editing and proof-reading your manuscript
- b) Preparing a manuscript for Publication

Essential Reading

Dev, Anjana Neira et al. *Creative Writing: A Beginners' Manual*. For The Department of English, University of Delhi, New Delhi, Pearson, 2008.

Suggested Methods of Internal Evaluation

It is recommended that students be asked to prepare a portfolio of original writings which will include any 4 from:

- a) Illustrated examples using tropes and figures of speech in writing
- b) A Poem
- c) A Short Story
- d) A Dramatic Sequence
- e) Writing for Children -- a poem/short story/dramatic sequence
- f) A Dummy Manuscript
- g) A poem/short story/dramatic sequence in a different form from the one used in a)/b)/c)

Teaching Plan

Paper S8: Modes of Creative Writing -- Poetry Fiction and Drama

Note: Ample time must be devoted, during practical periods, to actual writing and the practice of the theory that is taught in class. Students should be encouraged to engage with texts and can suggest texts in which they are interested. The students' portfolio must emerge based on classroom work and exercises.

Week 1 -- Introduction

Week 2 -- Unit 1 -- The Art and Craft of Writing

Week 3 -- Unit 1 contd

Week 4 -- Unit 2 -- Modes of Creative Writing- Poetry and Fiction

Week 5 -- Unit 2 contd

Week 6 -- Unit 2 contd

Week 7 -- Unit 2 contd

Week 8 -- Unit 3 -- Modes of Creative Writing-Drama and Screenplay

Week 9 -- Unit 3 contd

Week 10 -- Unit 3 contd

Week 11 -- Unit 4 -- editing and Preparing for Publication

Week 12 – Unit 4 contd

Week 13 – Unit 4 contd

Week 14 – Concluding lectures; discussion on exam pattern etc.

Keywords

Creative writing

Writing fiction

Writing poetry

Writing for children

Writing for the stage

Script writing

Writing for theatre

PAPER S9: ENGLISH LANGUAGE TEACHING

This course is designed to help students of the undergraduate program develop pedagogical and theoretical skills required for teaching the English language. Other than basic theories in ELT, the course will examine a variety of aspects related to learner needs, including multiple intelligences, learning styles and strategies, communication strategies, classroom management issues, the use of technology, and concepts of learner autonomy and learner training. The course will also explore important aspects of learning, teaching, and assessment for the English language.

Course Objectives

The course intends to enable students to

- recognize the role of affect in language learning, and account for individual differences among learners in regard to motivation and attitude, personality factors, and cognitive styles;
- identify and adapt to the needs and expectations of the learner;
- be aware of the significant and current approaches in the fields of cognition and language pedagogy;
- understand the importance of teaching materials (in relation to the teaching-learning context and their teaching purposes);
- recognise the importance of planning in ELT and develop lessons in the framework of a planned strategy adapted to learners' levels;
- strengthen concepts of the fundamentals of the English language; and
- understand the need for assessment and devise techniques for an evaluation plan that is integrated into the learning process.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

English Language Teaching

1. Knowing the Learner
2. Learner Variables – age, gender, learning and participation styles, learning disabilities, multiple intelligences, socioeconomic & cultural background, motivation, levels of proficiency
3. Theories of Learning – Bloom’s taxonomy, Krashen’s concept of Comprehensible Input, Vygotsky’s Zone of Proximal Development (Vygotsky could be deleted)
4. Modern Approaches to teaching -- Communicative Language, Teaching Task based Approach, Cooperative Learning, Dogme approach (materials-light teaching) and Bring your own device (Mobile learning).

Unit 2

Structures of English Language:

1. Phonetics – speech mechanisms (vowels and consonants) features of connected speech – word stress rhythm intonation
2. Morphology – word formation processes (coining borrowing etc.)
3. Syntax – parts of speech clauses & phrases punctuation

Unit 3

Teaching Language: Methods Practices and Materials

1. Lesson Planning: lesson aim and objectives context for practice skill focus board work.
2. Teaching listening skills
3. Teaching speaking skills
4. Teaching reading skills
5. Teaching vocabulary
6. Teaching writing skills
7. Teaching grammar

Unit 4

Assessing language skills

1. Addressing errors and language expectations (desired level of proficiency)
2. Qualities of a good test – transparency validity reliability wash back effect
3. Types of assessment – formal versus informal summative versus formative large scale versus classroom

Essential Readings

Celce-Murcia, Marianne et al. *Teaching English as a Second or Foreign Language*. Delhi: Cengage Learning, 4th, edn, 2014.

Ur, Penny. *A Course in Language Teaching: Practice and Theory*. Cambridge: CUP, 1996.

Woodward, T. *Planning Lessons and Courses*. Cambridge: CUP, 2012.

Teaching Plan

Paper S9 -- English Language Teaching

- Week 1 -- Introduction to ELT, Knowing the variables regarding the learner
- Week 2 -- Learning Theories
- Week 3 – Learning Theories contd
- Week 4 -- Modern Approaches to teaching
- Week 5 -- Phonetics, morphology and Syntax
- Week 6 -- Lesson Plan
- Week 7 & 8 --Teaching Listening, Speaking, Reading, Writing Skills
- Week 9 --Teaching Vocabulary and Grammar
- Week 10 -- Assessing proficiency
- Week 11 -- Knowing the Qualities of a good test
- Week 12 -- Knowing the different kinds of test
- Week 13 -- Preparing a lesson plan and a test of proficiency

Keywords

Pedagogical skills

Learner needs

Learner autonomy

Assessment

Teaching Plan

Phonetics

Listening

Good test

Teaching Plan

Communicative skills

Reading skills

Writing skills

Speaking and listening

PAPER S10: FILM STUDIES

Course Objectives

This paper enables students to gain skills in the language of film via the appreciation of its specific features as a medium. The course is practically oriented so as to encourage students to acquire the competence necessary to become engaged viewers critics/reviewers and creators/producers in the medium. The course will attempt to make film a democratic and accessible medium for students as creative and analytical persons, and may further enable students to take up work in different arenas of digital humanities.

Learning Outcomes

This course will enable students to

- examine those specific features of composition that help create films: camera, sound, script, and editing will be studied, so that students learn the elements of putting a film together
- study cinema as a form with history and context, tracing genres and geographies, examining legacies, and exploring potential renewals;
- take up work in the medium, to write and review films so as to generate a repertoire of analyses and interpretations;
- engage in projects and/or practical work to supplement units 1&4; and
- build up a portfolio of work through practice of the discipline.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Language of Cinema

Mise en scene -- cinematography -- editing -- sound

Reading

Andrew Dix, *Beginning Film Studies* (New Delhi: Viva, 2010) pp. 9-100.

Unit 2

Genre in Hollywood Cinema

Definitions of genre -- taxonomies of genre -- genre as economic strategy -- genre as cognition -- rethinking genre

Reading

Jill Neldes, ed. *An Introduction to Film Studies* (London and New York: Routledge, 2003) pp. 152-69.

Unit 3

Themes from Contemporary Indian Cinema (from the 70s to the present)

The city -- underworld -- communalism -- terrorism -- gender issues -- the Indian Art Cinema

Readings

Ranjani Mazumdar, *Bombay Cinema: An Archive of the City* (Ranikhet: Permanent Black 2007) pp. 79-109.

Ravi Vasudevan, *The Melodramatic Public* (Ranikhet: Permanent Black, 2010) pp. 303-33.

Unit 4

Film Review Criticism and Script writing

Readings

Timothy Corrigan, *A Short Guide to Writing About Film*, 9th edn, (Pearson, 2014).

Unit 5

Practical Component Evaluation

1. Students may turn in a portfolio of 4 film reviews/one academic paper/one short film/one film script (fiction or nonfiction)
2. For reviews: criteria for choice of films must be explicitly stated in the form of a position paper. Films must be from a wide time-arc and must include old and just-released films. Total word count of 4 reviews+position paper must not exceed 3000 words.
3. Academic paper can be on any aspect of film and follow all the usual considerations thereon. 3000 words including bibliography and notes.
4. Film script including shots camera position sound/background notes and cuts. Script may be for a film of max 20 minutes length.
5. Film Length: 5-7 minutes of moving image not stills. Films can be evaluated as creative output on the following counts and teachers may decide what gets weightage for the entries they receive: Creativity Originality Screenplay/ Storytelling Technical Execution Narrative/ Performance/Props costumes sets locations (production design) Cinematography (camera angles movement lighting frames etc.) Use of background music/enhancement w credit - Use of visual enhancements like transitions titles credits subtitles or even special effects etc...if any

Suggested Films

- a) *Psycho* (1960 dir. Alfred Hitchcock)
- b) *JaaneBhi Do Yaaro* (1983 Kundan Shah)
- c) *Akam* (2013 dir. Shalini Usha Nair)
- d) *Nayakan* (1987 dir. Mani Ratnam) - Tamil
- e) *HirakRajarDeshe* (1980 dir. Satyajit Ray) – Bangla

Suggested Screenplays

- a) Vishal Bhardwaj, *Maqbool*
- b) Callie Khouri, *Thelma and Louise*

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Teaching Plan

Paper S10 – Film Studies

Week 1 – Introduction to Film Studies

Week 2 – Unit 1 -- Language of Cinema

Mise en scene - cinematography - editing - sound

Readings: Dix, *Beginning Film Studies*

Week 3 – Unit 1 contd

Week 4 – Unit 1 contd

Week 5 -- Unit 2 -- Genre in Hollywood Cinema; definitions of genre - taxonomies of

genre – genre as economic strategy - genre as cognition – rethinking genre

Readings: Nelmes, *An Introduction to Film Studies*. Pp. 152-169. London and New York: Routledge, 2003.

Week 6 – Unit 2 contd

Week 7 – Unit 2 contd

Week 8 – Unit 3 -- Themes from Contemporary Indian Cinema. From the 70s to the present, city

—underworld - communalism - terrorism - gender issues - the Indian Art Cinema

Readings: (a) Mazumdar, *Bombay Cinema: An Archive of the City*; Vasudevan, *The Melodramatic Public*

Week 9 – Unit 3 – contd

Week 10 -- Unit 3 – contd

Week 11 – Unit 4 -- Film Review, Criticism and Script writing

Readings: *How to write about film* by Timothy Corrigan.

Week 12 – Unit 4 contd

Week 13 – Unit 5

Week 14 – Unit 5 contd; conclusion

Keywords

Language of Cinema

Genre

Hollywood Cinema

Contemporary Indian Cinema

Indian Art Cinema

Film Review

Criticism

Script Writing

PAPER S11: APPLIED GENDER STUDIES: MEDIA LITERACIES

Course Objectives

- This course will help students perceive, understand and interpret issues of gender in various cultural texts in India, particularly in mass media representations, including advertising, cinema and journalism. The course aims to mainstream ideas from gender theory, so as to equip the common student to intervene in these issues in an informed way and to become both an informed consumer as well as a confident and ethical participant. The course will focus on enhancing students' textual skills via the use of Indian primary, conceptual, critical and applied texts to create media literacy. The course may be taught to Honours and Program course students. Teachers may evolve more advanced practical work methodologies for advanced students.

Learning Outcomes

This course will enable students to

- identify, read closely, and rewrite narratives of gendered privilege in contemporary Indian popular representation;
- examine the intersections of gender with other categories like caste, race, etc., to understand how different forms of privilege/oppression and resistance/subversion interact in heterogeneous and variable formations; and
- focused on practical application, creating, over the duration of the course, a portfolio of interpretative work that analyses fictional and non-fictional mass medium narratives and that can serve as foundations/sourcebooks for intervention to reduce gender discrimination through media literacy.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders

3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests
----	---	--	-------------

Course Content

Unit 1

Gender/s: concepts and frameworks

Femininities/Masculinities Cis/Trans bodies Heterosexuality/ Homosexuality/ Heteronormativity/ Heteropatriarchy/Sexism/Privilege/Biology/Reproduction

Unit 2

Analysing gender in advertising

The use of gendered stereotypes and privilege in advertising; hegemonic and normative ideas of gender and sexuality in selling and buying products; consumption of goods/bodies; commodification and objectification; the reach and memorability of advertising; matrimonial and personal ads; and reinforcement of caste/class/gender binaries.

Unit 3

Analysing representations of gender in reporting and journalism

Vocabulary of news media coverage in relation to gender representation of masculine/feminine/non-dimorphic bodies re-narrativizing this vocabulary productively; difference in coverage of stories of obviously 'gendered' subjects such as rape, heroism, war, domestic violence, sexual harassment, and supposedly 'neutral' subjects, like labour rights, or work and wages, or health, or politics; advocacy networks for various minority subjects; persistence of sexism in new media

Unit 4

Gender as represented in film (fiction and nonfiction/documentary);

Narrative time available to male/female/trans subjects; use of normative heterosexuality and gender privilege in plots, casting, narrative development, and marketing of films; the Bechdeltest: the importance of clearing it and the implications for mainstream narrativization; consistently failing the test; documentary films for presentation of alternative narratives.

Readings

1. Kandasamy, Meena. "Screwtiny," "Pride goes before a full-length mirror," "Joiissance," and "Backstreet Girls" in *Ms Militancy*. Delhi: Navayana, 2014.

2. Dasgupta R.K and Gokulsing K. M., Introduction: Perceptions of Masculinity and Challenges to the Indian Male from Rohit K. Dasgupta & K. Moti Gokulsing (eds). *Masculinity and its Challenges in India: Essays on Changing Perceptions*. Jefferson, NC: McFarland, 2014. pp 5-26

3. Revathi, A. *A Life in Trans Activism*. Delhi: Zubaan, 2016. Pp. 158—168
4. Nadimpally, S., and V. Marwah.. “Shake Her, She is Like the Tree That Grows Money! In Of Mothers and Others: Stories, Essays, Poems.” Edited by J. Mishra. New Delhi: Zubaan, 2013.

5. Chaudhuri, Maitrayee. “Gender and Advertisements: The Rhetoric of Globalisation”, *Women's Studies International Forum* 2001 24.3/4 pp. 373-385.

6. Jha, Sonora, and Mara Adelman. "Looking for love in all the white places: a study of skin color preferences on Indian matrimonial and mate-seeking websites." *Studies in South Asian Film & Media* 1.1 (2009): 65-83.

7. View and discuss *any one* of the feature films: *Dangal* (Dir. Nitish Tiwari. 2016. UTV and Walt Disney Pictures) or *Chak De* (Dir. Shimit Amin. Yash Raj Films, 2007). *Pink* (Dir. Aniruddha Roy Chowdhury. Rashmi Sharma Telefilms, 2016).

8. View and discuss the documentary films *Unlimited Girls* (Dir. Paromita Vohra. Sakshi, 2002); and, *Newborns* (Dir. Megha Ramaswamy. Recyclewala Labs, 2014).

9. Khabar Lahariya FAQ (<http://khabarlahariya.org/faqs/>, accessed on 05.05.2018) and “Open letter to our Male Colleagues of the Media World, from Khabar Lahariya Editors” (<http://khabarlahariya.org/an-open-letter-to-our-male-colleagues-of-the-media-world-from-khabar-lahariya-editors/> May 03. 2018. Accessed on 05.05.2018).

10. Rege, Sharmila, ‘Dalit Women Talk Differently: A Critique of 'Difference' and Towards a Dalit Feminist Standpoint Position’ in *Economic and Political Weekly*, Vol. 33, No. 44, 1998, pp. WS39-WS46.

11. “Sarpanch, Woodcutter, Handpump Mechanic: Dalit Women in UP tell Women@WorkStories”. (<http://theladiesfinger.com/woodcutter-sarpanch-handpump-mechanic-dalit-women-work-stories>. May 02, 2018. Accessed on 05.05.2018).

12. Siddiqui, Gohar. "Behind her Laughter is Fear: Domestic violence and transnational feminism". *Jump Cut* 55 (2013 Fall) (<https://www.ejumpcut.org/archive/jc55.2013/SiddiquiDomesAbuseIndia/index.html>. accessed on 05.05.2018)

For Visually Disabled Students

(i) Reading no. 7 (*Dangal* and *Pink* movies) replaced with

Phadke, Shilpa, Sameera Khan, and Shilpa Ranade. *Why Loiter? Women and Risk on Mumbai Streets*. New Delhi: Penguin, 2011. Pp. 65—106.

(ii) Reading no. 8 (documentaries *Unlimited Girls* and *Newborns*) replaced with

Agnihotri, Anita. "The Peacock." *Seventeen*. New Delhi: Zubaan, 2011.69-79 **and**

Paromita Vohra's "Interview with Veena Mazumdar, part 1" and "Interview with Veena Mazumdar, part 2". *Unlimited Girls* footage. Point of View.

<https://pad.ma/MH/info> and (<https://pad.ma/NC/info>. Accessed on 05.05.2018).

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 4. Therefore, all those texts are to be considered essential reading.

Suggested Reading

Poyntz, Stuart R. *Media Literacies: A Critical Introduction*. Wiley Blackwell, 2012.

Evaluation

Emphasis will be on student's ability to apply concepts generatively rather than to test memory and to encourage intersectional thinking. Therefore all the readings may be treated as applying to all units in terms of concepts and techniques therein.

Practicals (14 hours)

1. Students may submit for evaluation either one full-length academic essay or produce a portfolio that re-writes or re-scripts or reviews texts they select (with the assistance of the teacher) from contemporary Indian media such that units 2 3 and 4 each are represented in the portfolio. Alternatively students may choose to focus on any one of units 2/3/4 should they have special aptitude for or interest in any area.
2. The objective of the course is to enable the student to intervene as an informed gender-ethical respondent to media narratives so any mode of media that permits this analysis such as blog-posts television programming new media including social media documentary and other short films news coverage may also be admitted such that they are equivalent in total effort to a full-length academic essay.
3. Students may also be encouraged to create samplers and portfolios of contemporary coverage thematically.
4. Students are to be encouraged to find and bring supplementary texts to classroom discussion for all units.

Teaching Plan

Paper S11: Applied Gender Studies: Media Literacies

Week 1 – Introduction to Paper S11

Week 2 -- Unit 1 -- Gender/s: concepts and frameworks

Topics: Femininities/Masculinities; Cis/Trans bodies; Heterosexuality/ Homosexuality/ Heteronormativity/ Heteropatriarchy; Sexism/Privilege/Biology/Reproduction

Texts:

a. Kandasamy, Meena. “Screwtiny,” “Pride goes before a full-length mirror,” “Joiissance,” and “Backstreet Girls”.

b. Dasgupta R.K and Gokulsing K. M., Introduction: Perceptions of Masculinity and Challenges to the Indian Male.

c. Revathi, A. *A Life in Trans Activism*. Pp. 158—168.

d. Nadimpally, S., and V. Marwah. “Shake Her, She is Like the Tree That Grows Money!”

e. Rege, Sharmila, ‘Dalit Women Talk Differently: A Critique of, ‘Difference’, and Towards a Dalit Feminist Standpoint Position’.

(Practicals as applicable to unit)

Week 3 -- Unit 1 contd

Week 4 -- Unit 1 contd

Week 5 -- Unit 2 -- Analysing gender in advertising

Topics: The use of gendered stereotypes and privilege in advertising; hegemonic and normative ideas of gender and sexuality in selling and buying products; consumption of goods, bodies; commodification and objectification; the reach and memorability of advertising; matrimonial and personal ads and reinforcement of caste/class/gender binaries.

Readings

a. Chaudhuri, Maitrayee. “Gender and Advertisements: The Rhetoric of Globalisation”.

b. Jha, Sonora, and Mara Adelman. "Looking for love in all the white places: a study of skin colour preferences on Indian matrimonial and mate-seeking websites."

(Practicals as applicable to unit)

Week 6 -- Unit 2 contd

Week 7 -- Unit 2 contd

Week 8 -- Unit 3 -- Analysing representations of gender in reporting and journalism

Topics: Vocabulary of news media coverage in relation to gender; representation of masculine/feminine/non-dimorphic bodies; Re-narrativizing this vocabulary productively; difference in coverage of stories of obviously “gendered” subjects such as rape; heroism; war; domestic violence; sexual harassment, and supposedly “neutral” subjects like labour rights or work and wages, or health or politics; advocacy networks for various minority subjects; persistence of sexism in new media

Readings

a. *Khabar Lahariya* FAQ (<http://khabarlahariya.org/faqs/>) and “Open letter to our Male Colleagues of the Media World, from Khabar Lahariya, editors”.

b. “Sarpanch, Woodcutter, Handpump Mechanic: Dalit Women in UP tell Women@Work Stories”. (<http://theladiesfinger.com/woodcutter-sarpanch-handpump-mechanic-dalit-women-work-stories>). May 02, 2018. Accessed on 05.05.2018).

(Practicals as applicable to unit)

Week 9 -- Unit 3 contd

Week 10 -- Unit 3 contd

Week 11 -- Unit 4 -- Gender as represented in film (fiction and nonfiction/documentary)

Topics:

- Narrative time available to male/female/trans subjects; use of normative heterosexuality and gender privilege in plots, casting, narrative development and marketing of films; the Bechdel test: the importance of clearing it and the implications for mainstream narrativization consistently failing the test; documentary films for presentation of alternative narratives.

Readings and viewings

a. View and discuss *any one* of the feature films: *Dangal* or *Chak De* or *Pink*.

b. View and discuss the documentary films *Unlimited Girls* and *Newborns*.

c. Siddiqui, Gohar. "Behind her Laughter is Fear: Domestic violence and transnational feminism".

For visually challenged students:

a. (*Dangal* and *Pink* movies) **replaced with** Phadke, Shilpa, Sameera Khan, and Shilpa Ranade. Why Loiter? Women and Risk on Mumbai Streets. Pp. 65—106.

b. (documentaries *Unlimited Girls* and *Newborns*) **replaced with**

Agnihotri, Anita. "The Peacock." *Seventeen*. New Delhi: Zubaan, 2011.69-79 **and** Paromita Vohra's "Interview with Veena Mazumdar, part 1" and "Interview with Veena Mazumdar, part 2". *Unlimited Girls* footage. Point of View. <https://pad.ma/MH/info> and (<https://pad.ma/NC/info>. Accessed on 05.05.2018).

Week 12 -- Unit 4 contd

Week 13 -- Unit 4 contd

Week 14 -- Conclusions

For entire course: Practical work done by students is to be shared in class to enable dissemination of knowledge produced.

Keywords

Femininities

Masculinities

Heteronormativity

Heteropatriarchy

Social Reproduction

Intersections

Resistance

Examination Scheme for all SEC Papers

Internal Assessment 25 marks

Portfolio 25 marks

Examination 50 marks

For the examination paper:

Question 1 – 10 marks x 2

Question 2 – 15 marks x 2

The questions should be application based, and NOT based on definitions.

B. A. & B. COM. PROGRAMME

CORE ENGLISH LANGUAGE

General Course Statement

1. The course will retain streaming. The structure of three graded levels of English language learning is required in a diverse central university like Delhi University to address the differential learning levels of students and achieve the desired competence.

2. The existing English A, B, and C will be renamed as English Language through Literature, English Fluency and English Proficiency respectively. This will remove any discriminatory, hierarchical attributes in the existing nomenclature and refocus the pedagogic exercise on the respective objectives of the three streams in an academically thorough and non-hierarchical way.

3. The existing criteria for streaming was discussed thoroughly in the context of the almost complete collapse of English B and English C classes across colleges. This structural collapse has led to severely compromised language acquisition opportunities for BA & BCom students. At present 98% of BA& BCom programme applicants are from boards where English is offered as a subject in class XII. Currently in Delhi University, a student with minimum pass marks in English in Class XII will do the same English course as a student scoring above 90%. Such guaranteed variance in competences and standards in the classroom is a huge pedagogic challenge that stalls the aim of achieving any tangible proficiency in the language over two semesters.

In order to address this reality, which was further aggravated by the reduction in the language teaching span in CBCS to two semesters, the committee concluded that it is imperative to have additional streaming criteria (NOT eligibility or admission criteria) to benefit the students in the classroom and in their careers. A hugely participative student feedback survey was conducted online. Thousands of BA & BCom Delhi University students responded to the detailed questionnaire and helped us to our conclusions.

Based on these findings and the consensus in our meetings the BA/BCom Programme Cluster Subcommittee proposes the following:

As 98% of the BA & BCom Programme students have done English in class 12, streaming will be now based on their Class XII marks in English. There will be three streams:

1. 80% and above: **ENGLISH LANGUAGE THROUGH LITERATURE**
2. 60% and above up to 80%: **ENGLISH FLUENCY**
3. Less than 60%: **ENGLISH PROFICIENCY**

- We have retained the present Delhi University Rule of streaming students who have done English up to Class X and Class VIII to ENGLISH FLUENCY and ENGLISH PROFICIENCY respectively to take care of the 2% who may not have done English up to Class XII
- We have provided a 10% relaxation in Class XII English marks while streaming for students who have studied English Elective in class XII

This proposal is the most academically sound non-hierarchical and inclusive one we could arrive at that successfully addresses the pedagogical and learning imperatives in English language teaching.

The revised syllabus proposed here is in sync with the CBCS outline. Additionally, this syllabus works out the specifics of language learning required to enable the students of Delhi University in the process of language acquisition and proficiency, as it integrates critical thinking, reading, writing, and speaking capabilities, without compartmentalising any one or two as the expected focus or outcome of language study. For this purpose, a compiled list of suggested readings collated by the Department of English Delhi University can be finalised .

The detailed syllabus with suggested readings, **Teaching Plans**, testing/evaluation pattern and learning outcomes for two semesters under CBCS is as follows:

ENGLISH LANGUAGE THROUGH LITERATURE I & II
ENGLISH FLUENCY I & II
ENGLISH PROFICIENCY I & II

COURSE CONTENT FOR SEMESTERS III / IV

Unit 1

Understanding Life Narratives

Giving students the skills to document their own lives meaningfully; journals, memoirs, and autobiographical writings can be excellent tools for personal reflection and growth, therapeutic as well as a method for organising one's own thoughts in a fashion that helps one live meaningfully

Reading sections from life narratives, biographies, autobiographies and diary entries

Writing a statement of purpose for university applications; CV/resume; daily/weekly journal

Speaking to your class to persuade them to do something public speech

Listening to public speeches like convocation addresses, political speeches, TED Talks to trace structure of argument and worldview; to observe the use of description, persuasion, and argument

Grammar/Vocabulary:

- Action Verbs
- Active and Passive voice

Suggested Readings:

Das, Kamala. 'The Park Street Home' *My Story* Kottayam: DC Books, 2009.

Singh, Mayank 'Mayank Austen Soofi'. Selected extracts from 'I Had Come Too Far' *Nobody Can Love You More* Delhi: Penguin Books, 2014.

Bhattacharjee, Kishalay. 'Back To Where I Never Belonged' *First Proof: The Penguin Book of New Writing From India* Delhi: Penguin Books India, 2005.

Issacson, Walter. Selected extracts from *Steve Jobs* New York: Simon and Schuster, 2011.

Unit 2

Exploring Poetry

Here, students are trained to use the techniques of poetry to write in poetic form; they understand how the concept of beauty works through access to aesthetic forms; they learn how to express the same thought in different ways and observe how form impacts meaning; these skills can become tools for personal confidence in linguistic use

Reading: Using context to read effectively; identifying elements of poetics in different forms of poetry prose poems / slam poetry

Writing slam poetry; writing a critical response to a poem

Listening: Reciting/performing poetry; listening to audio/video clips of poets reading their poetry to appreciate the significance of pauses, rhythm etc

Grammar/Vocabulary: Denotation/Connotation

Suggested Readings:

Nair, Rukmini Bhaya. 'Gargi's Silence' *Yellow Hibiscus: New and Selected Poems* Delhi: Penguin, 2004.

Nongkynrih, Kynpham Sing. 'Light-In-The-Night (For Amanda)'

Seth, Vikram. 'Part One' *The Golden Gate* London: Faber and Faber, 1999.

Charara, Hayan. 'Usage' *Something Sinister* Pittsburgh: Carnegie Mellon University Press, 2016.

Unit 3

Exploring Drama

To highlight the rhetorical possibilities of drama through an understanding of its form and mechanics; students learn how to handle conflict, how to have meaningful conversations, and, above all, learn how one's words and gestures impact others.

Reading a one-act/ longer play to understand the interaction of dramatic forms/elements and social context

Writing a critical response to the dramatic text; writing the script for a skit/short play, keeping in mind formal features like characterisation, plot development, stage directions, etc

Speaking: Students learn to use their voices and bodies to perform/enact skits in groups

Listening to a radio play to appreciate the aural elements of drama

Grammar/Vocabulary: Direct/ Indirect Speech
Phrases and Idioms
Tone and Register

Suggested Readings:

Sarkar, Badal. 'Beyond the Land of Hattamala' *Beyond the Land of Hattamala and Scandal in Fairyland* Calcutta: Seagull Books, 1992.

Unit 4

Exploring Fiction - Novella

Narrative texts can be seen as a tool for exploring reality including contests of what should be accepted as real. Students will learn how to write narrative and through narrative to examine their own responses to issues confronting them.

Read a longer piece of fiction to discern narrative voice, narrative structure, character development, while locating the text in its socio-historical context

Write your own short story/novella; speculative fiction can be particularly useful as young people are often in positions of contest with the social reality afforded to them; read and review short stories/novellas/novels

Speak: Initiate discussion about a novella, drawing upon the critical reading skills developed by students in the previous semester; focus will be on broadening their repertoire of reading: texts chosen and responded to for personal pleasure

Listen to audio clips/ videos of writers talking about what writing means to them; audio clips of books being read aloud to enable discussion of reading styles, pauses, punctuation etc

Grammar/Vocabulary: Punctuation, pauses, manner of reading/speaking/crafting complex sentences

Suggested Reading:

Cisneros, Sandra. *The House on Mango Street* New York: Knopf Doubleday Publishing Group, 2013.

Unit 5

Writing your own academic essay / paper for the classroom

Using language skills learned over the course, students are to create academic documents such as term papers, reports and assignments. They should examine and revisit earlier such submissions to learn how to improve and edit these better; to learn to identify and cite the right sources to avoid plagiarism; to recognise and rectify bias in their own writing: biases such as those of class/caste/race/gender/sexuality/religion can be discussed in class.

Writing, revising and formatting drafts of essays analysing the coherence of arguments; perspectives on a topic; balance of presentation; students can test their ability to choose between various forms of information/fact/opinion; they can create questionnaires, conducting surveys; edit and create bibliographies and checklists.

Speaking: Students should be able to tell the class what their core idea is in the essay / paper, and why they have chosen a particular topic or idea; they should be able to debate various points of view on the same topic.

Listening to others' views and being able to figure out which arguments are key and why; examining ideology and location of speakers.

Grammar/Vocabulary: Paragraphs
Topic sentences and transitions

Suggested Readings:

Patel, Raj and Moore, Jason W. 'How the chicken nugget became the true symbol of our era' *The Guardian*, 8 May 2018

<https://www.theguardian.com/news/2018/may/08/how-the-chicken-nugget-became-the-true-symbol-of-our-era> Accessed 4 June 2018

Latest editions of the MLA and APA style sheets

TESTING AND EVALUATION

Internal Assessment: Of 20 marks, 10 marks are to be allocated for assessment of reading and writing assignments and 10 marks for assessment of speaking and listening test.

Semester III/ IV Final Examination 75 marks

Reading and Writing skills:

- Unseen comprehension passage 750 words to test reading comprehension critical thinking and vocabulary skills 15 marks
- Questions related to suggested literary texts: to test awareness of literary form and context through comprehension testing 2 x 15 = 30 marks
- Questions testing composition skills: essay statement-of-purpose essay / argumentative / personal / descriptive ; diary/journal; questionnaire; dramatise story/write short scene etc 2 x 10 = 20 marks
- Question testing academic writing formats via exercise of correcting citation or bibliographical entry 5 marks

Grammar: Different grammar topics to be tested via exercise of editing/rewriting a given passage 5 marks

Teaching Plan

Week 1 – Introduction & Unit 6 -- Understanding Life Narratives

Week 2 – Unit 6 contd

Week 3 – Unit 6 contd

Week 4 – Unit 7 -- Exploring Poetry

Week 5 – Unit 7 contd

Week 6 – Unit 8 -- Exploring Drama

Week 7 – Unit 8 contd

Week 8 – Unit 8 contd

Week 9 – Unit 9 -- Exploring Fiction - Novella

Week 10 – Unit 9 contd

Week 11 – Unit contd

Week 12 – Unit 10 --Writing your own academic essay / paper for the classroom

Week 13 – Unit 10 contd

Week 14 – Unit 10 contd& Summing Up

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Keywords

Language through literature

Verbal and written texts

Social and ethical frameworks

Listening

Reading

Comprehension

Argumentation
Descriptive writing
Narrative writing

BA/ B COM PROGRAMME CORE ENGLISH LANGUAGE:

B -- ENGLISH FLUENCY

Course Objectives

This course is intended for students who possess basic grammatical and vocabulary skills in English but may not be able to effectively communicate in their everyday contexts. The course aims to equip them with skills that will help them interact with people around their personal, institutional and social spaces. The course will help students to

- describe or express their opinions on topics of personal interest such as their experiences of events, their hopes and ambitions
- read and understand information on topical matters and explain the advantages and disadvantages of a situation
- write formal letters, personal notes, blogs, reports, and texts on familiar matters
- comprehend and analyse texts in English
- organise and write paragraphs and short essays in a variety of rhetorical styles

COURSE CONTENTS FOR SEMESTER III / IV

Unit 1

In the University II

Elements of debate/ Academic writing
Argument and Textual evidence

- Prepare a presentation on a topic you have seen debated on television; delineate the arguments and textual evidence used by both sides
- Write a paragraph on any topic you are studying in any of your courses at present; cite all sources of information you use

Suggested Readings:

Peeradina, Saleem. 'Sisters', *Group Portrait*. Madras: OUP. pp. 21-22.

<https://kafila.online/2016/09/20/the-radical-significance-of-the-du-photocopy-case-for-global-copyright/> Accessed on 19 September 2019

Unit 2

In the domestic sphere II

Informal/ Epistolary writing

Descriptive & Expository writing

- Write a letter to your daughter -- in your own mother's voice; use a text you have read in class as a sample
- Prepare a presentation on a fictional place as though you have visited it

Suggested Readings:

"To Jyotiba, From Savitribai Phule: These Aren't Love Letters, But Tell You What Love Is All About". 2016. *Scroll.In*.

<https://scroll.in/article/801848/to-jyotiba-from-savitribai-phule-these-arent-love-letters-but-tell-you-what-love-is-all-about> Accessed on 19 September 2019

Payne, Karen. *Between Ourselves: Letters Between Mothers and Daughters* 1750-1982, Virago 1994.

Unit 3

In public places II

Dialogue: Conversation/ Interview between fictional characters

Narrative logic; connectives & transitions

- Group exercise: Prepare an interview between a refugee and her prospective landlord
- Write a conversation you have overheard in a public place recently

Suggested Readings:

<https://www.businessinsider.com/a-12-year-old-syrian-refugee-wrote-this-heartbreaking-letter-to-the-king-of-sweden-2016-2?IR=T> Accessed on 19 September 2019

‘We Sinful Women’ by KishwarNaheed from *We Sinful Women: Contemporary Urdu Feminist Poetry*. Translated and edited by Rukhsana Ahmed. The Women’s Press, 1991.

Unit 4

In the State II

Paragraph writing

Brainstorming planning/outline rough drafts editing

- Work in groups to brainstorm ideas for a paragraph on any social topic

- Prepare individual outlines and rough drafts
- Peer review and edit each others' writing

Suggested Readings:

Sharma, Natasha. *Squiggle Takes a Walk: All About Punctuation*. Penguin/Young Zubaan and Puffin: 2014.

Lorde, Audre. 'The Transformation of Silence into Language and Action'. *Sister Outsider*. Random House: New York, 1984. pp. 40-44

Unit 5

Interface with technology II

Creative writing/ Social media presence

Affective & Poetic expression; rhetoric

- Write a Facebook post announcing a cultural event
- Write a poem of 140 characters to post on twitter
- Evaluate your favourite WhatsApp group's last 10 posts

Suggested Readings:

Extract from *Haroun and the Sea of Stories*: Salman Rushdie. Penguin Books, New Delhi, 1991. pp. 15-23.

Evaluation:

Internal assessment (25 marks)

Reading & Writing assignment(10 marks)

Oral listening & speaking test(10 marks)

Attendance: 5 marks

FINAL EXAM 75 marks

Semester III/IV

Literature review(15 marks)

Comprehension passage(15 marks)

Debate(15 marks)

Job application(10 marks)

Informal letter(10 marks)

Proofreading/Punctuation passage(5 marks)

Paragraph writing(5 marks)

Teaching Plan

Week 1 – Introduction & Unit 1 - In the University

Week 2 – Unit 1contd

Week 3 – Unit 2 - In the domestic sphere

Week 4 – Unit 2contd

Week 5 – Unit 2contd

Week 6 – Unit 3: In public places

Week 7 – Unit 3 contd

Week 8 – Unit 3 contd

Week 9 – Unit 4: In the State

Week 10 – Unit 4 contd

Week 11 – Unit 4 contd

Week 12 – Unit 5: Interface with Technology

Week 13 – Unit 5 contd

Week 14 – Unit 5 contd& Summing Up

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Keywords

Effective communication

Listening

Speaking

Reading

Writing

Communicative tasks and activities

Familiar context
Personal communication
Professional communication
Social communication

BA/ B COM PROGRAMME CORE ENGLISH LANGUAGE:

C ENGLISH PROFICIENCY

Course Objectives

The English Proficiency course is intended for students who have had inadequate exposure to English and hence exhibit a very low level of proficiency in the language – difficulty in comprehending simple texts, limited vocabulary, a poor grasp of basic syntactical structures, and an inability to speak or write the language with confidence. The course that is spread over two semesters aims to redress these issues and aims to

- enhance comprehension skills and enrich vocabulary through the reading of short and simple passages with suitable tasks built around these
- introduce simple syntactical structures and basic grammar to students through contextualized settings and ample practice exercises so that they can engage in short independent compositions
- introduce the sounds of the language and the essentials of English pronunciation to students in order to remove the inhibitions experienced by them while speaking English
- acquaint students with social formulae used to perform various everyday functions so that they can converse in English in simple situations

COURSE CONTENT FOR SEMESTER III / IV

Building on the contents of the introductory semester, the focus in this semester is to further develop the language skills of the learners in all the core areas. The approach is to develop these skills in an integrated way through an intense engagement with the prescribed texts. In each unit, teachers are to eschew a narrow focus and ensure that all the activities in the prescribed sections are attempted by the learners

UNIT 1

Reading & Comprehending - II

This section involves reading and comprehending passages of greater length and complexity, using the prescribed texts that develop and test these skills through a variety of tasks: re-ordering, true / false sentence completion, fill in the blanks, short comprehension questions, etc.

Learners are to be encouraged to explore the texts listed below beyond the prescribed sections. The comprehension of an unseen passage will be a part of the end-semester written examination.

Suggested Readings:

A Foundation English Course for Undergraduates: Book II, Delhi: University of Delhi, 1992. pp. 1 - 7 Units 1 & 2; pp. 19 - 21 Unit 6; pp. 47 - 49 Unit 13; pp. 61 - 63 Unit 16 & pp. 75 - 79 Unit 19

Everyday English 2, Delhi: Foundation Books, 2006. pp. 14 - 29 Units 3 - 5; pp. 91 - 101 Units 16 - 17 & pp. 121 - 128 Unit 21

UNIT 2

Basic Grammar Rules - II

Questions, negatives, and question tags; conditionals; more on articles, prepositions, tenses, simple present, present continuous, present perfect, simple past, past continuous, past perfect, modals and linking words.

Relevant sections from all the recommended books are to be used in addition to the specific reading prescribed for this unit.

Suggested Readings:

Developing Language Skills I Delhi: Manohar, 1997. pp. 183 - 186 & pp. 209 - 216 Units 1, 6 & 7 of 'Grammar'

UNIT 3

Conversing - II

Understanding word stress and features of connected speech; conversational formulae for getting and giving permission agreeing and disagreeing warning and persuading inviting suggesting accepting and refusing expressing likes and dislikes regulating speech and ending a conversation.

Suggested Readings:

English at the Workplace II, Delhi: Oxford University Press, 2007. pp. 10 - 13 Unit 3 & pp. 38 - 45 Unit 9

Developing Language Skills I, Delhi: Manohar, 1997. pp. 26 - 45 Units 6 - 10 of 'Oral Communication: Speech Patterns'

UNIT 4

Writing Skills - II

Writing short paragraphs of up to 150 words independently including describing people places events; giving directions; short application letters

Suggested Readings:

A Foundation English Course for Undergraduates: Workbook I, Delhi: Oxford University Press, 1991. pp. 32 - 63 Units VI - X

UNIT 5

Applying for a Job

Learning to present oneself at job interviews; writing simple job applications

Suggested Readings:

English at the Workplace, Delhi: Macmillan, 2006. pp. 67 - 75 Unit 11

Everyday English 2, Delhi: Foundation Books, 2006. pp. 121 - 128 Unit 21

References

A Foundation English Course for Undergraduates: Book II, Delhi: University of Delhi, 1992. pp. 1 – 7 Units 1 & 2; pp. 19 – 21 Unit 6; pp. 47 – 49 Unit 13; pp. 61 – 63 Unit 16 & pp. 75 – 79 Unit 19

Everyday English 2, Delhi: Foundation Books, 2006. pp.14 – 29 Units 3 – 5; pp. 91 – 101 Units 16 – 17 & pp.121 – 128 Unit 21

A Foundation English Course for Undergraduates: Workbook I Delhi: Oxford University Press, 1991. pp. 32 – 63 Units VI – X

Developing Language Skills I Delhi: Manohar, 1997. pp 26 – 45 Units 6 – 10 of ‘Oral Communication: Speech Patterns’; pp.183 – 186 & pp. 209 – 216 Units 1, 6 & 7 of ‘Grammar’

Internal Assessment:

Simple conversations in pairs; short oral presentations

End-semester evaluation pattern:

Reading comprehension	20 marks
Vocabulary	10 marks
Grammar	15 marks
Written composition	20 marks
Oral communication	10 marks

Teaching Plan

Teaching Learning Process

Since language skills can only be learnt and mastered through the use of the teaching-learning process, the course needs to be learner-centric. The class time is to be taken up with hands-on activities by learners, involving reading aloud / silently, speaking, listening, and writing. Peer and group work should be used extensively. The teacher is to act as a facilitator, setting up and overseeing learner tasks and providing stimulus, encouragement, and corrective inputs as and when necessary. Teachers are also expected to source additional related material and activities pitched at an appropriate level of difficulty, to plug in gaps in the prescribed readings as well as to extend the knowledge of the learners and hone their skills.

Teaching Plan for Semester III / IV

Week 1 – Introduction; *A Foundation English Course for Undergraduates: Book II*, pp. 1 – 7 Units 1 & 2

Week 2 – *Everyday English 2*, pp 14 – 29 Units 3 – 5

Week 3 – *A Foundation English Course for Undergraduates: Workbook I*, pp 32 – 36 Unit VI; *A Foundation English Course for Undergraduates: Book II*, pp 19 – 21 Unit 6

Week 4 – *A Foundation English Course for Undergraduates: Book II*, pp 47 – 49 Unit 13; *Developing Language Skills I*, pp 183 – 186 Unit 1 of ‘Grammar’

Week 5 – *A Foundation English Course for Undergraduates: Book II*, pp 61 – 63 Unit 16 75 – 79 Unit 19

Week 6 – *Developing Language Skills I*, pp 209 – 216 Units 6 & 7 of ‘Grammar’; *Everyday English 2*, pp 91 – 94 Unit 16

Week 7 – *A Foundation English Course for Undergraduates: Workbook I*, pp 37 – 42 Unit VII; *Everyday English 2*, pp 95 – 101 Unit 17

Week 8 – *A Foundation English Course for Undergraduates: Workbook I*, pp 43 – 47 Unit VIII; *Developing Language Skills I*, pp 26 – 31 Unit 6 of ‘Oral Communication: Speech Patterns’

Week 9 – *A Foundation English Course for Undergraduates: Workbook I*, pp 48 – 51 Unit IX; *Developing Language Skills I*, pp 31 – 34 Unit 7 of ‘Oral Communication: Speech Patterns’

Week 10 – *A Foundation English Course for Undergraduates: Workbook I*, pp 52 – 57 Unit X; *Developing Language Skills I*, pp 35 – 37 Unit 8 of ‘Oral Communication: Speech Patterns’

Week 11 – *Developing Language Skills I*, pp 37 - 45 Units 9 – 10 of ‘Oral Communication: Speech Patterns’

Week 12 – *English at the Workplace II*, pp 38 - 45 Unit 9

Week 13 – *English at the Workplace*, pp 67 - 75 Unit 11

Week 14 – *Everyday English 2*, pp 121 - 128 Unit 21

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching	and	Assessment Tasks
--------------------------	----------	-----	------------------

	Learning Activity	
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Practical

The entire course is practical in nature. The prescribed readings are rich in tasks and activities that aim at developing essential language skills. Working their way through these tasks will give the learners hands-on practice in the use of these skills.

References

A Foundation English Course for Undergraduates: Reader I. Delhi: Oxford University Press, 1991

A Foundation English Course for Undergraduates: Workbook I. Delhi: Oxford University Press, 1991

Everyday English Delhi: Pearson, 2005

Developing Language Skills I Delhi: Manohar, 1997

Additional Resources:

English at the Workplace Delhi: Macmillan, 2006

Assessment Methods

Since the class is conceived as learner-centric and built around tasks that require learners to actively use various language skills, formative assessment can and should be used extensively. The focus here could be on skills and activities that are harder to test in a written evaluation, such as speaking and listening skills, dictionary work, etc. Oral presentations, peer interviews, and group tasks can be used for this purpose. The end-semester written examination will test all the areas targeted in the course – reading, comprehension, vocabulary, grammar, composition, and oral communication. The proposed weightage for these sections in the end-semester exam is as follows:

Reading Comprehension - 25 marks

- Vocabulary - 15 marks
- Grammar - 15 marks
- Written composition - 10 marks
- Oral communication - 10 marks

Keywords

English proficiency

Reading

Writing

Speaking

Listening

Pronunciation

Comprehension

Vocabulary

Syntax

Grammar

Composition

Conversational formulae

General Note

No part of 'Fluency in English II' is proposed as suggested reading in this syllabus.

Discipline English (BA Programme) under CBCS

Course Statement

The English Discipline-centric papers are designed to give students a broad yet deep understanding of English Literatures, both through canonical and translated literary texts and anthologies. It draws on current issues and ideas to familiarize students of writings in the West and in the Asian subcontinent. Different genres are introduced to give the students knowledge of cultural motifs and ideologies that would help in their understanding of the world. Starting with the 'Individual and Society' anthology that introduces them to significant contemporary issues like Caste and Globalization, the papers move on to texts from the European Renaissance, Victorian and Modern poetry and ends with some optional papers that a student may choose out of his/her interest. They include a paper on Modern Drama, Children's Literature, Postcolonial Literature and Popular Literature.

Course Objectives

- * The course offers the BA Programme student an opportunity to study three years of English Discipline papers that enable them to go for further studies in English if they so desire
- * The course attributes to the students a working knowledge of how to read literary texts and enables them to use such knowledge to enhance and augment their professional job opportunities
- * The course introduces students to contemporary literary ideas and issues in an increasingly complex world
- *The course allows the student a familiarity with literary texts through different genres and time periods

Course Contents

Semester 3

DSC 1C

British Literature: Poetry and a Play, selections from *Living Literatures: An Anthology of Prose and Poetry*

1. Renaissance Poetry (sonnets and love lyrics): 6 poems

Wyatt, 'Whoso List to Hunt'
Spenser, 'Amoretti LXXV'
Shakespeare, (i) 'Sonnet LX', (ii) 'Sonnet CXXX'
Donne, 'The Sunne Rising'
Milton, 'On His Blindness'

2. Poetry of the Eighteenth Century and the Romantic Age: 7 poems

Swift, 'A Beautiful Young Nymph Going to Bed'
Blake, (i) 'The Garden of Love', (ii) 'London'
Wordsworth, (i) 'Composed Upon Westminster Bridge', (ii) 'It Is a Beauteous Evening'
Coleridge, 'Frost at Midnight'
Keats, 'To Autumn'

3. Play

William Shakespeare, *Othello*

Keywords: Renaissance, Humanism, The Sonnet Tradition, the Poet and Society, Courtly Love tradition, Race, Class, Gender, The Globe Theatre

Teaching Plan:

Weeks 1- 4: Renaissance Poetry

Weeks 5-8: 18th Century and Romantic poetry

Weeks 9-14: Shakespeare

Semester 4

DSC 1D

Literary Crosscurrents: Selections from *Living Literatures: An Anthology of Prose and Poetry*

1. Victorian and Modern Poetry: 8 poems

Browning: 'My Last Duchess'

Tennyson: 'The Lady of Shalott'

Emily Dickinson: 341 'After Great Pain', 754 'My Life Had Stood'

Thomas Hardy: 'Neutral Tones'

W. H. Auden: 'Musee des Beaux Arts'

T. S. Eliot: 'Preludes'

Sylvia Plath: 'The Moon and the Yew Tree'

2. Story

Mahasweta Devi: 'The Hunt'

3. Novel

Charlotte Bronte, *Jane Eyre*

Keywords: Faith and Doubt, Dramatic Monologue, Modernism, Gender, The Subaltern, Race, Colonialism

Teaching Plan:

Weeks 1-4: Poetry

Week 5: Short Story

Weeks 6-14: Novel

Introduction

Content: बी.ए. हिंदी (प्रोग्राम) पाठ्यक्रम विद्यार्थी के आलोचनात्मक विवेक और रचनात्मक क्षमता को बढ़ाने के उद्देश्य से तैयार किया गया है। साहित्य की समझ के साथ भाषा का ज्ञान विद्यार्थी को सम्वेदनात्मक क्षमता और ज्ञानात्मक सम्वेदन प्रदान करता है। समाज विज्ञान और मानविकी क्षेत्र की शाखाओं के साथ आज विश्व को सजग, आलोचनात्मक, विवेकशील और सम्वेदनशील व्यक्ति की आवश्यकता है, जो समाज की नकारात्मक शक्तियों के विरुद्ध समानता और बंधुत्व के भाव की स्थापना कर सके। भाषा, आलोचना, काव्यशास्त्र का अध्ययन जहाँ सैद्धांतिक समझ को विस्तृत करता है वहीं कविता, नाटक, कहानी में उन सिद्धांतों को व्यावहारिक रूप से समझने की युक्तियाँ छिपी रहती हैं। इस प्रकार हिन्दी (प्रोग्राम) का पाठ्यक्रम विद्यार्थी को सैद्धांतिक और व्यावहारिक दोनों रूपों में सक्षम बनाता है।

Learning Outcome based approach to Curriculum Planning

>> Aims of Bachelor's degree programme in (CBCS) B.A.(PROG)

Content: भारतीय संविधान में देवनागरी लिपि में लिखित हिंदी को संघ की राजभाषा घोषित किया गया है। हिन्दी पढ़ने वाले छात्र को भाषा की क्षमता से परिचित होना जितना आवश्यक है उतना ही उसे समाज की चुनौतियों के सन्दर्भ में जोड़ने की योग्यता विकसित करना भी जरूरी है। आज हम भूमंडलीकृत समाज का अंग हैं अतः पाठ्यक्रम का उद्देश्य विद्यार्थी को देश-विदेश के साहित्य में हो रहे बदलाव से परिचित कराना भी है और व्यावसायिक योग्यता उत्पन्न करना भी। यह पाठ्यक्रम बाजारवाद और भूमंडलीकरण की वैश्विक गति के बीच से ही हिंदी की राष्ट्रीय प्रगति को भी सुनिश्चित करेगा क्योंकि सशक्त भाषा के बिना किसी राष्ट्र की उन्नति संभव नहीं है। यह पाठ्यक्रम वर्तमान संदर्भों के अनुकूल है साथ ही इस पाठ्यक्रम का आधुनिक रूप रोजगारपरक भी है। यह पाठ्यक्रम विद्यार्थियों को व्यावहारिक पहलू से अवगत करा सकेगा। हिंदी साहित्य की नई समझ और भाषा की व्यावहारिकता की जानकारी इसका प्रमुख ध्येय है। इस पाठ्यक्रम का उद्देश्य भाषा और समाज के जटिल सम्बन्धों की पहचान कराना भी है जिससे विद्यार्थी देश, समाज, राष्ट्र और विश्व के साथ बदलते समय में व्यापक सरोकारों से अपना सम्बन्ध जोड़ सके साथ ही उसके भाषा कौशल, लेखन और सम्प्रेषण क्षमता का विकास हो सके।

Graduate Attributes in Subject

>> Disciplinary knowledge

Content: भाषा, साहित्य और संस्कृति के अध्ययन-विश्लेषण द्वारा इतिहास, समाजविज्ञान, मनोविज्ञान, दर्शन, भाषाविज्ञान आदि विषयों का तुलनात्मक ज्ञान विकसित होगा।

Graduate Attributes in Subject

>> Communication Skills

Content: साहित्य और भाषा के बहुआयामी अध्ययन से संवाद एवं लेखन की क्षमता विकसित होगी।

Graduate Attributes in Subject

>> Critical thinking

Content: अंतर-अनुशासनात्मक एवं तुलनात्मक अध्ययन करने से आलोचनात्मक विवेक विकसित होगा।

Graduate Attributes in Subject

>> Reflective thinking

Content: साहित्य और भाषा का अध्ययन करने से व्यक्तित्व विकास होने के साथ-साथ समाज और आत्म के अंतर्संबंध को समझने की विशेष योग्यता विकसित होती है।

Graduate Attributes in Subject

>> Moral and ethical awareness/reasoning

Content: साहित्य प्रत्यक्ष रूप से नैतिक मूल्यों के विकास का अवसर प्रदान करता है ।

Graduate Attributes in Subject

>> Multicultural competence

Content: साहित्य और भाषा का अध्ययन बहु-सांस्कृतिक अनुभव प्रदान करता है ।

Qualification Description

Content: 10+2 या समकक्ष

Programme Learning Outcome in course

Content: इस पाठ्यक्रम को पढ़ने- पढ़ाने की दिशा में निम्नलिखित परिणाम सामने आएंगे :-

- 1) इस पाठ्यक्रम के माध्यम से सीखने-सिखाने की प्रक्रिया में हिंदी भाषा के आरंभिक स्तर से अब तक के बदलते रूपों की विस्तृत जानकारी प्राप्त की जा सकेगी ।
- 2) भाषा के सैद्धांतिक रूप के साथ-साथ व्यावहारिक पक्ष को भी जाना जा सकेगा ।
- 3) उच्च शैक्षिक स्तर पर हिंदी भाषा किस प्रकार महत्वपूर्ण भूमिका निभा सकती है, इससे संबंधित परिणाम को प्राप्त किया जा सकेगा ।
- 4) छात्र अपनी भाषा को सीखने की प्रक्रिया में भाषागत मूल्यों को व्यावहारिक रूप से भी जान सकेंगे ।
- 5) व्यावसायिक क्षमता को बढ़ावा देने के लिए भाषा, अनुवाद, कम्प्यूटर जैसे विषयों को हिन्दी से जोड़कर पढ़ाना जिससे बाज़ार के लिए आवश्यक योग्यता का भी विकास किया जा सके।
- 6) हिंदी के अतिरिक्त भारतीय साहित्य का ज्ञान भी अपेक्षित रहेगा जो छात्रों के व्यक्तित्व विकास में सहायक होगा तथा अभिव्यक्ति क्षमता का विकास भी किया जा सकेगा ।
- 7) साहित्य के सौन्दर्य, कला बोध के साथ वैचारिक मूल्यों को बढ़ावा देना ।
- 8) साहित्य की विधाओं के माध्यम से विद्यार्थी की रचनात्मकता को दिशा देना ।
- 9) साहित्य के आदिकालीन सन्दर्भों से लेकर समकालीन रूप से परिचित कराना जिससे विद्यार्थी साहित्यकार और युगबोध के सम्बन्ध को परख और पहचान सकें।

Teaching-Learning Process

Content: सीखने की प्रक्रिया में इस पाठ्यक्रम में हिंदी भाषा दक्षता को मजबूती देना है। छात्र हिंदी भाषा में नयापन और वैश्विक माध्यम की निर्माण प्रक्रिया में सहायक बन सकें। अपनी भाषा में व्यवहार कुशलता एवं निपुणता प्राप्त कर सकें। साहित्य की समझ विकसित हो सके तथा आलोचनात्मक दृष्टि से साहित्यिक विवेक निर्मित किया जा सके। इसके लिए निम्नांकित बिन्दुओं को देखा जा सकता है -

कक्षा व्याख्यान

सामूहिक चर्चा

सामूहिक परिचर्चा और चयनित विषयों पर आधारित सेमिनार आयोजन

साहित्यिकता की समझ देना

प्रदर्शन कलाओं को वास्तविक रूप में देखना

कक्षाओं में पठन- पाठन पद्धति

लिखित परीक्षा

आंतरिक मूल्यांकन

शोध सर्वेक्षण

वाद -विवाद

आशु प्रस्तुति

कम्प्यूटर आदि का व्यावहारिक ज्ञान

दृश्य-श्रव्य माध्यमों की जानकारी व्यावहारिक रूप से देना

काव्य वाचन, पठन और आलोचनात्मक मूल्यांकन

कथा के पाठ और वाचन में अंतर समझाना

आलोचनात्मक मूल्यांकन पर बल

Assessment Methods

Content: (1) हिंदी भाषा के व्यावहारिक मूल्यों पर आधारित परियोजना कार्य व मूल्यांकन।

(2) भाषिक नमूने तैयार करना और विश्लेषण

(3) विद्यार्थियों का मौखिक और लिखित मूल्यांकन

(4) पी.पी.टी. (power point presentation) बनाने के लिए विद्यार्थियों को प्रोत्साहित करना। इस माध्यम से हिंदी की विविध विधाओं को दृश्य माध्यम से रुचिकर रूप से जाना जा सकेगा।

(5) विधा विशेष के भाव - सौंदर्य के साथ-साथ रचना में छंद, अलंकार, रस, गुण, शब्द आदि के सौंदर्य का मूल्यांकन करना।

(6) भाव विश्लेषण के लिए विधा आधारित प्रश्नोत्तरी कर मूल्यांकन करना।

(7) पारम्परिक और आधुनिक तकनीकी माध्यमों की सहायता से अध्ययन-अध्यापन

(8) समूह-परिचर्चा

अन्य गद्य विधाएँ (BAPHCC04) Core Course - (CC) Credit:6

Course Objective(2-3)

हिन्दी कथेतर गद्य की समझ विकसित करना

निबंध, संस्मरण, रेखाचित्र, व्यंग्य आदि विधाओं के विश्लेषण की पद्धतियों से परिचय कराना

Course Learning Outcomes

अन्य गद्य विधाओं की स्पष्ट समझ विकसित होगी

आलोचनात्मक समझ विकसित होगी

Unit 1

जातीयता के गुण – बालकृष्ण भट्ट (भट्ट निबंधमाला, नागरी प्रचारिणी सभा, काशी)

साहित्य का उद्देश्य – प्रेमचंद

भाषा, संस्कृति और राष्ट्रीयता - जयप्रकाश कर्दम

Unit 2

भक्तिन : संस्मरण - महादेवी वर्मा

अदम्य जीवन – रांगेय राघव

Unit 3

वैष्णव जन (ध्वनि रूपक)- विष्णु प्रभाकर

शायद : एकांकी - मोहन राकेश

Unit 4

उखड़े खम्भे – हरिशंकर परसाई (व्यंग्य)

लक्खा बुआ ('नंगा तलाई का गांव 'से) - विश्वनाथ त्रिपाठी

References

हिंदी का गद्य साहित्य - रामचन्द्र तिवारी

हिंदी साहित्य और संवेदना का विकास –रामस्वरूप चतुर्वेदी

हिंदी गद्य : विन्यास और विकास - रामस्वरूप चतुर्वेदी

Additional Resources:

इक्कीसवीं सदी में दलित आंदोलन (साहित्य एवं समाज चिंतन) - जयप्रकाश कर्दम

निबंधों की दुनिया – शिवपूजन सहाय ;निर्मला जैन /अनिल राय

छायावादोत्तर गद्य साहित्य – विश्वनाथ प्रसाद तिवारी

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट, असाइनमेंट

Keywords

कथेतर गद्य

हिंदी कथा साहित्य (BAPHCC03)Core Course - (CC) Credit:6

Course Objective(2-3)

हिन्दी कथा साहित्य के उद्भव और विकास का परिचय

गद्य साहित्य विश्लेषण

Course Learning Outcomes

कथा- साहित्य के विकास का परिचय

प्रमुख उपन्यास और कहानियों का अध्ययन

Unit 1

इकाई -1 : उपन्यास :स्वरूप और संरचना

Unit 2

इकाई -2 :गबन - प्रेमचंद

Unit 3

इकाई- 3 : कहानी : स्वरूप और संरचना

Unit 4

कहानी : परदा - यशपाल

रोज़ -अज्ञेय

दिल्ली में एक मौत - कमलेश्वर

दाज्यू - शेखर जोशी

हरी बिंदी - मुदुला गर्ग

References

प्रेमचंद और उनका युग – रामविलास शर्मा

हिंदी उपन्यास : एक अंतर्गता – रामदरश मिश्र

कहानी : नई कहानी - नामवर सिंह

Additional Resources:

हिंदी कहानी की रचना प्रक्रिया – परमानंद श्रीवास्तव

नई कहानी : संदर्भ और प्रकृति – देवीशंकर अवस्थी

साहित्य से संवाद – गोपेश्वर सिंह

कुछ कहानियाँ : कुछ विचारक – विश्वनाथ त्रिपाठी

एक दुनिया एक समानान्तर – राजेन्द्र यादव

नई कहानी की भूमिका – कमलेश्वर

हिंदी कहानी : अंतरंग पहचान - रामदरश मिश्र

Teaching Learning Process

कक्षा व्याख्यान, समूह चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

कक्षा व्याख्यान , परिचर्चा

Keywords

कथा साहित्य, कहानी, उपन्यास, कथा-विन्यास, शिल्प, कथा-भाषा

हिंदी कविता (मध्यकाल और आधुनिक काल) (BAPHCC02)Core Course - (CC) Credit:6

Course Objective(2-3)

विद्यार्थियों को हिन्दी के मध्यकालीन और आधुनिक कवियों से परिचित कराना ।

मुख्य कविताओं के माध्यम से तत्कालीन साहित्य की जानकारी देना ।

Course Learning Outcomes

कविताओं का अध्ययन-विश्लेषण करने की पद्धति सीख सकेंगे ।

साहित्य के सामाजिक-राजनीतिक-सांस्कृतिक पहलुओं की जानकारी प्राप्त होगी ।

Unit 1

कबीर – कबीर- ग्रन्थावली ; माताप्रसाद गुप्त ; लोकभारती प्रकाशन ,1969 ई.

कबीर – साँच कौ अंग (1) भेष कौ अंग (5,9,12,) सम्रथाई कौ अंग (12)

सूरदास – सूरसागर संपा.डॉ धीरेन्द्र बर्मा ;साहित्य भवन 1990 ई.

गोकुल लीला ---पद संख्या 20,26,27,60,

गोस्वामी तुलसीदास – तुलसी ग्रन्थावली (दूसरा खण्ड);संपा.आचार्य रामचन्द्र शुक्ल (नागरी प्रचारिणी सभा,काशी)

दोहावली – छंद संख्या -277,355,401,412,490,

Unit 2

बिहारी - रीतिकाव्य संग्रह,जगदीश गुप्त, ग्रंथम, कानपुर,1983 ई.

छंद संख्या -9,13,18,21,58,66,67

घनानंद – रीतिकाव्य संग्रह ;जगदीश गुप्त ;साहित्य भवन प्रा.लि; इलाहबाद ; प्रथम संस्करण ;1961 ई.

छंद संख्या -3,14,16,18,23,24

Unit 3

मैथिलीशरण गुप्त – रईसों के सपूत (भारतभारती, वर्तमान खण्ड ;साहित्य सदन झाँसी)

पद संख्या ---123 से 128

जयशंकर प्रसाद – बीती विभावरी जाग री !(लहर, लोकभारती प्रकाशन 2000)

हिमालय के आँगन में(स्कन्दगुप्त :भारती भण्डार,इलाहबाद,1973)

Unit 4

हरिवंश राय 'बच्चन'– जो बीत गयी (हरिवंश राय बच्चन :प्रतिनिधि कविता राजकमल पेपरबैक्स,संपा. - मोहन गुप्त)2009

नागार्जुन –उनको प्रणाम !(नागार्जुन : प्रतिनिधि कविताएँ ,संपा.नामवर सिंह ,राजकमल,पेपरबैक्स,2009)

भवानीप्रसाद मिश्र –गीत – फरोश (दूसरा सप्तक,भारतीय ज्ञानपीठ प्रकाशन ;द्वितीय संस्करण 1970 ई.)

References

कबीर – हजारी प्रसाद द्विवेदी

तुलसी काव्य मीमांसा – उदयभानु सिंह

बिहारी की वाग्विभूति-विश्वनाथ प्रसाद मिश्र

सूरदास –ब्रजेश्वर शर्मा

सूरदास - रामचन्द्र शुक्ल

गोस्वामी तुलसीदास - रामचन्द्र शुक्ल

घनानन्द और स्वच्छंद काव्यधारा - मनोहर लाल गौड़

मैथिलीशरण गुप्त :व्यक्ति और काव्य – कमलकांत पाठक

प्रसाद, पंत और मैथिलीशरण – रामधारी सिंह दिनकर

प्रसाद के काव्य – प्रेम शंकर

Additional Resources:

जयशंकर प्रसाद - नंददुलारे वाजपेयी

हरिवंशराय बच्चन - संपा.पुष्पा भारती

आधुनिक हिंदी कविता - विश्वनाथ प्रसाद तिवारी

Teaching Learning Process

कक्षा व्याख्यान, समूह परिचर्चा, ऑनलाइन लिंक

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट, असाइनमेंट

Keywords

मध्यकाल, आधुनिकता, आधुनिकतावाद, काव्य, विभिन्न बोलियाँ आदि

हिंदी भाषा और साहित्य का इतिहास (BAPHCC01)Core Course - (CC) Credit:6

Course Objective(2-3)

हिन्दी भाषा और साहित्य के इतिहास का परिचय प्राप्त होगा

साहित्य इतिहास के विभिन्न कालों की प्रमुख प्रवृत्तियों की आलोचनात्मक समझ विकसित होगी

Course Learning Outcomes

इतिहास के प्रति आलोचनात्मक-विश्लेषणात्मक ज्ञान के द्वारा हिन्दी भाषा और साहित्य इतिहास को संतुलित रूप से प्रस्तुत किया जा सकेगा

Unit 1

इकाई 1

क हिन्दी भाषा का विकास : सामान्य परिचय

1 हिन्दी भाषा का उद्भव

2. हिन्दी भाषा की बोलियाँ

3 हिन्दी भाषा का विकास : आदिकालीन हिन्दी , मध्यकालीन हिन्दी , आधुनिक हिन्दी

ख हिन्दी साहित्य का इतिहास : आदिकाल

1 आदिकाल : कालविभाजन एवं नामकरण

2. आदिकाल की प्रमुख प्रवृत्तियाँ (रासो साहित्य, धार्मिक साहित्य, लौकिक साहित्य)

Unit 2

इकाई 2

हिन्दी साहित्य का इतिहास : भक्तिकाल

1 भक्ति आंदोलन : उद्भव और विकास

2 भक्तिकाल की प्रमुख प्रवृत्तियाँ (संत काव्य, सूफी काव्य, राम काव्य, कृष्ण काव्य)

Unit 3

इकाई 3.

हिन्दी साहित्य का इतिहास : रीतिकाल

1. रीतिकाल : नामकरण विषयक विभिन्न मतों की समीक्षा

2. रीतिकाल की प्रमुख प्रवृत्तियाँ (रीतिबद्ध काव्य, रीतिसिद्ध काव्य, रीतिमुक्त काव्य)

Unit 4

इकाई 4.

हिन्दी साहित्य का इतिहास : आधुनिक काल

1. मध्यकालीन बोध तथा आधुनिक बोध (संक्रमण की परिस्थितियाँ)

2. आधुनिक हिन्दी कविता की प्रमुख प्रवृत्तियाँ (भारतेन्दु युग, द्विवेदी युग, छायावाद, प्रगतिवाद, प्रयोगवाद, नई कविता)

3 गद्य विधाओं का उद्भव एवं विकास : उपन्यास, कहानी, नाटक, निबंध

References

हिंदी भाषा - धीरेन्द्र वर्मा

हिंदी भाषा की संरचना - भोलानाथ तिवारी

हिंदी साहित्य का इतिहास - आ. रामचन्द्र शुक्ल

हिंदी साहित्य का इतिहास - सं. डॉ. नगेन्द्र

हिन्दी साहित्य के इतिहास पर कुछ नोट्स - डॉ. रसाल सिंह

Additional Resources:

हिंदी साहित्य का अतीत - विश्वनाथ प्रसाद मिश्र

हिंदी का गद्य साहित्य - रामचंद्र तिवारी

हिंदी गद्य : विन्यास और विकास - रामस्वरूप चतुर्वेदी

Teaching Learning Process

व्याख्यान और सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

इतिहास, भाषा और आलोचना से जुड़ी शब्दावली

कोश विज्ञान : शब्दकोश और विश्वकोश (BAPHDSE05) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

कोशविज्ञान की समझ विकसित करना

उसके व्यावहारिक प्रयोग, निर्माण और तकनीकी प्रसार में रुचि विकसित करना

Course Learning Outcomes

कोश की समझ विकसित होगी

विभिन्न कोशों की जानकारी होगी

निर्माण, प्रसार और तकनीक की समझ विकसित होगी

Unit 1

कोश परिचय

*अर्थ और परिभाषा

*उपयोगिता और महत्त्व

*हिंदी कोश के उपयोग के नियम

(वर्णानुक्रम, स्वर की मात्राएँ, अनुस्वार एवं अनुनासिक, संयुक्त व्यंजन वर्ण)

Unit 2

कोश निर्माण

*शब्द संकलन एवं चयन

*प्रविष्टि (वर्तनी, क्रम, व्याकरणिक कोटि और स्रोत)

*शब्द का अर्थ एवं विस्तार

*शब्द प्रयुक्तियाँ

Unit 3

कोश के प्रकार

*कोश : वर्गीकरण के आधार

*विषय के आधार पर (भूगोल कोश, इतिहास कोश, मनोविज्ञान कोश, धर्म कोश आदि)

*भाषा के आधार पर(एकभाषी, द्विभाषी और बहुभाषी)

*समांतर कोश

*पारिभाषिक शब्दावली

Unit 4

प्रमुख कोशों का परिचय

*हिंदी –हिंदी शब्दकोश –बृहत् हिंदी शब्दकोश;ज्ञानमंडल

*अंग्रेजी – हिंदी शब्दकोश –फादर कामिल बुल्के

*हिंदी -- अंग्रेजी शब्दकोश – भोलानाथ तिवारी और महेंद्र कुमार

*विश्वकोश – हिंदी शब्दसागर – नागरी प्रचारिणी सभा

*समांतर कोश – अरविंद कुमार .कुसुम कुमार;नेशनल बुक ट्रस्ट , नई दिल्ली

*ई – कोश

References

कोश विज्ञान -- भोलानाथ तिवारी

हिंदी कोश रचना,प्रकार और रूप –रामचंद्र वर्मा

हिंदी कोश साहित्य –अचलानंद जखमोला

हिंदी साहित्य कोश –धीरेन्द्र वर्मा

Additional Resources:

हिंदी शब्द सागर – नागरी प्रचारिणी सभा , प्रयाग

कोश विज्ञान :सिद्धांत एवं प्रयोग –राम आधार सिंह

कोश निर्माण : प्रविधि एवं प्रयोग –त्रिभुवननाथ शुक्ल

Lexicography : an introduction –howareJackson;routledge publication , London

भारत में कोश विज्ञान पर विशेष – गवेषणा ;अंक 93;जनवरी –मार्च ,2009

वेबलिक

*[www.archive.org\(hindishabdsagar\)](http://www.archive.org(hindishabdsagar))

*www.britannika.org

*www.e.wikipedia.com

*www.encyclopedia.center.com

*www.culturepedia.com

Teaching Learning Process

1 से 3 सप्ताह - इकाई – 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

विशेष अध्ययन : एक प्रमुख साहित्यकार- कबीर (BAPHDSE06) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

- हिन्दी साहित्य के भक्तिकाल, निर्गुण काव्यधारा, संत काव्य-धारा से अवगत करवाना.
- कबीर-काव्य की प्रकृति और संरचना की समझ विकसित करना.
- पाठ्यक्रम में निर्धारित दोहों और पदों के माध्यम से जीवन और समाज के विभिन्न मुद्दों की समझ और सुचिंतित दिशा खोजने का प्रयास करना.

Course Learning Outcomes

इस पाठ्यक्रम के अध्ययन से विद्यार्थी-

- भक्तिकाल की राजनीतिक-सामाजिक-सांस्कृतिक-धार्मिक स्थितियों को समझ पायेंगे.
- कबीर-काव्य की सामाजिक चेतना के माध्यम से विद्यार्थी में सामाजिक समरसता का विकास होगा.
- मानवीय और नैतिक मूल्यों का विकास होगा.

Unit 1

- कबीर का साहित्यिक परिचय
- संतकाव्य की विशेषताएँ

Unit 2

- कबीर की साखियाँ (कुल 12)
- गुरुदेव कौ अंग- 3,7,11
- सुमिरण कौ अंग - 4,9,32
- विरह कौ अंग - 18,22
- चेतावणी कौ अंग - 13,14
- साध साषीभूत कौ अंग - 2
- उपदेस कौ अंग - 9

(कबीर – श्यामसुंदर दास)

Unit 3

- कबीर के पद (कुल 6)
- राग गौड़ी (पद सं. 3,6,89,111,114,117)

(कबीर-श्यामसुंदर दास)

Unit 4

- कबीर की सामाजिक चेतना
- कबीर की भक्ति भावना
- कबीर का रहस्यवाद
- कबीर की भाषा
- कबीर की दार्शनिक चेतना

References

- कबीर-श्यामसुंदर दास
- कबीर- हजारीप्रसाद द्विवेदी
- निर्गुण काव्य में नारी- अनिल राय

Additional Resources:

- भक्ति आन्दोलन के सामाजिक आधार-गोपेश्वर सिंह
- कबीर - विजयेन्द्र स्नातक
- भक्ति का सन्दर्भ-देवीशंकर अवस्थी
- कबीर की चिंता - बलदेव वंशी
- भक्ति काव्य का समाज दर्शन- प्रेमशंकर

Teaching Learning Process

- निर्धारित दोहों और पदों का विद्यार्थियों द्वारा वाचन.
- निर्धारित अंशों पर विचार-विमर्श करते हुए उनके निहितार्थ खोजना.
- दोहों और पदों के कथ्य और संवेदना के स्तर पर विभिन्न पक्षों को वर्तमान की स्थितियों के परिप्रेक्ष्य में देखना.
- कबीर की भाषा की प्रकृति और उसकी प्रभावकारिता को खोजना.
- दोहों और पदों की रिकार्ड सी डी दिखाना/सुनाना.

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

- कबीर-काव्य में उपस्थित सामाजिक, दार्शनिक, मानवीय चेतना और भक्ति-भावना के विश्लेषण के आधार पर.
- महत्वपूर्ण अंशों की व्याख्या के आधार पर.
- कबीर-काव्य की भाषायी कौशल के विश्लेषण के आधार पर

Keywords

- प्रतीक
- उलटबासी
- रहस्यवाद
- माया
- राम
- कुंडलिनी
- इंगला-पिंगला-सुष्मुना
- सिद्ध-नाथ
- भक्ति
- ब्रह्म
- परमात्मा-जीवात्मा

विशेष अध्ययन : एक प्रमुख साहित्यकार- तुलसीदास (BAPHDSE0601) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

भक्तिकाल के महत्वपूर्ण कवि तुलसीदास के साहित्य का अध्ययन-विश्लेषण

Course Learning Outcomes

तुलसीदास के जीवन और साहित्य का आलोचनात्मक अध्ययन

Unit 1

- तुलसीदास का साहित्यिक परिचय
- रामभक्ति शाखा की विशेषता

Unit 2

रामचरितमानस

- (बालकाण्ड : दोहा 201 से 205 तक)
- (सुन्दरकाण्ड : दोहा 3 से 10 तक)
- (गीता प्रेस, गोरखपुर)

Unit 3

विनयपत्रिका

- (पद सं. 100 से 110 तक)
- (गीता प्रेस , गोरखपुर)

Unit 4

तुलसीदास की भक्ति भावना

- तुलसीदास की भाषा
- तुलसीदास की समन्वय चेतना
- "मानस" में राम – सुगीव मैत्री प्रसंग

References

- रामचरितमानस – तुलसीदास
- विनयपत्रिका --तुलसीदास
- लोकवादी तुलसीदास –विश्वनाथ त्रिपाठी
- गोस्वामी तुलसीदास – आचार्य रामचन्द्र शुक्ल
- तुलसीदास काव्य में मीमांसा – उदयभानु सिंह

Additional Resources:

- भक्ति आन्दोलन और सूरदास का काव्य – मैनेजर पांडेय

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा, कविता वाचन

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट, असाइनमेंट

Keywords

ब्रज और अवधी शब्दावली

विशेष अध्ययन : एक प्रमुख साहित्यकार- निराला (BAPHDSE0603) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

महाकवि निराला का जीवन परिचय और साहित्यिक अवदान

उनके परिवेश और कवि के संघर्ष का अध्ययन करना

Course Learning Outcomes

महाकवि निराला के साहित्य का अध्ययन विश्लेषण

कवि के परिवेश की समझ

Unit 1

निराला

छायावाद का सामान्य परिचय

निराला का साहित्यिक परिचय

Unit 2

सरोज स्मृति

वह तोड़ती पत्थर

भिक्षुक

कुकुरमुत्ता

Unit 3

लिली

सुकुल की बीवी

Unit 4

बिल्लेसुर बकरिहा

References

छायावाद – नामवर सिंह

निराला : आत्महंता आस्था – दूधनाथ सिंह

लिली – सूर्यकान्त त्रिपाठी निराला

सुकुल की बीवी – सूर्यकान्त त्रिपाठी निराला

आधुनिक कविता यात्रा – रामस्वरूप चतुर्वेदी

Additional Resources:

आधुनिक साहित्य की प्रवृत्तियाँ – नामवर सिंह

राग विराग – रामविलास शर्मा

निराला की साहित्य साधना - रामविलास शर्मा

Teaching Learning Process

कक्षा व्याख्यान, सामूहिक चर्चा, कविता पाठ

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

साहित्यिक आलोचनात्मक शब्दावली

विशेष अध्ययन : एक प्रमुख साहित्यकार- प्रेमचंद (BAPHDSE0602) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

कथा सम्राट मुंशी प्रेमचंद का परिचय, साहित्य और विश्लेषण

Course Learning Outcomes

प्रेमचंद के साहित्य के विविध आयामों का अध्ययन - विश्लेषण

Unit 1

प्रेमचंद का साहित्यिक परिचय

प्रेमचंद की उपन्यास कला

प्रेमचंद की कहानी कला

Unit 2

सुभागी

बड़े घर की बेटी

सवा सेर गेहूँ

पंच परमेश्वर

सदगति

Unit 3

कर्मभूमि

Unit 4

'कर्बला' नाटक की मूल सवेदना

'कलम का सिपाही' अमृतराय (पृ.सं.299 से 305 तक)

References

प्रेमचंद और उनका युग – रामविलास शर्मा

प्रेमचंद एक विवेचन – इन्द्रनाथ मदान

मानसरोवर (भाग 1 और 2) – प्रेमचंद

कहानी नई कहानी –नामवर सिंह

कर्मभूमि - प्रेमचंद

प्रेमचंद अध्ययन की दिशाएँ - कमल किशोर गोयनका

कलम का सिपाही – अमृतराय

Additional Resources:

प्रेमचंद घर में – शिवरानी देवी

हिंदी गद्य: विन्यास और विकास – रामस्वरूप चतुर्वेदी

हिंदी उपन्यास : अंतर्धारा – रामदरश मिश्र

सृजनशीलता का संकट – नित्यानंद तिवारी

जमाने से दो - दो हाथ – नामवर सिंह

Teaching Learning Process

कक्षा व्याख्यान, समूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट, असाइनमेंट

Keywords

कथा, साहित्य, उपन्यास, कहानी, साहित्यिकता

साहित्य चिंतन (BAPHDSE04)Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

साहित्य सिद्धान्तों का अध्ययन

साहित्यिक आलोचना के निर्माण में विभिन्न अवयवों का अध्ययन

साहित्य की व्याख्या के लिए जरूरी अंगों-उपांगों, साहित्यिक भेदों-उपभेदों का अध्ययन

Course Learning Outcomes

साहित्य और समाज की पारस्परिक अर्थवत्ता और महत्ता के साथ-साथ आलोचनात्मक विवेक का निर्माण

साहित्य की व्याख्या के लिए शास्त्रीय सिद्धांतों का ज्ञान प्राप्त करना

विद्यार्थियों के सैद्धांतिक सोच और समझ के स्तर को समृद्ध करते हुए साहित्य के साथ अन्य कलाओं की समझ विकसित करना

Unit 1

साहित्य का स्वरूप :

- विविध दृष्टिकोण
- साहित्य और समाज
- साहित्य की प्रयोजनीयता

Unit 2

रस :

- परिभाषा
- स्वरूप
- अंग
- भेद

Unit 3

रचनात्मक भूमिका और महत्व की दृष्टि से अध्ययन :

- भाषा सौष्ठव
- शब्दशक्ति
- अलंकार
- प्रतीक
- बिम्ब
- मिथक
- फैंटेसी

Unit 4

रचनात्मक भूमिका और महत्व की दृष्टि से अध्ययन :

- छंद
- लय
- तुक

References

साहित्य सहचर - हजारीप्रसाद द्विवेदी

साहित्य का स्वरूप - नित्यानन्द तिवारी

साहित्य सिद्धान्त - रामअवध द्विवेदी

काव्य के तत्त्व - देवेन्द्रनाथ शर्मा

काव्यभाषा पर तीन निबंध - रामस्वरूप चतुर्वेदी और सत्यप्रकाश मिश्र

काव्यास्वाद और साधारणीकरण - राजेंद्र गौतम

Additional Resources:

हिंदी साहित्य कोश - भाग 1, 2 - संपादक - धीरेन्द्र वर्मा

साहित्य सिद्धांत - रेने वेलेक और ऑस्टीन

Teaching Learning Process

कक्षाओं में पारंपरिक और आधुनिक तकनीकी माध्यमों की सहायता से अध्ययन-अध्यापन

समूह-परिचर्चाएँ

कक्षा में कमजोर विद्यार्थियों की पहचान और कक्षा के बाद उनकी अतिरिक्त सहायता

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

सतत मूल्यांकन

असाइनमेंट के द्वारा आंतरिक मूल्यांकन

समूहिक प्रोजेक्ट के द्वारा मूल्यांकन

सेमेस्टर के अंत में परीक्षा के द्वारा मूल्यांकन

Keywords

साहित्य चिंतन, साहित्य सिद्धान्त, आलोचना, रस, छंद, अलंकार, शास्त्रीय आलोचना, साहित्य और समाज, कलाएं आदि ।

हिंदी का मौखिक साहित्य और उसकी परंपरा (BAPHDSE02) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

भारत के मौखिक साहित्य और लोक-परंपरा का अवलोकन

लोक-जीवन और संस्कृति की जानकारी

पर्यटन और संगीत-नृत्य आदि में आकर्षण विकसित होगा

Course Learning Outcomes

मौखिक साहित्य का परिचय

प्रमुख रूपों का परिचय

संस्कृति और लोक-जीवन व संस्कृति के विश्लेषण की क्षमता

Unit 1

मौखिक साहित्य की अवधारणा : सामान्य परिचय, मौखिक साहित्य और लिखित साहित्य का संबंध

साहित्य के विविध रूप – लोकगीत , लोककथा , लोकगाथाएँ , लोकनाट्य , लोकोक्तियाँ

पहेलियाँ – बुझौवल और मुहावरे हिंदी प्रदेश की जनपदीय बोलियाँ और उनका साहित्य (सामान्य परिचय) मौखिक और समाज

Unit 2

लोकगीत : वाचिक और मुद्रित

संस्कार गीत : सोहर , विवाह, मंगलगीत इत्यादि

सोहर भोजपुरी संस्कार गीत - श्री हंस कुमार तिवारी –बिहार राष्ट्रभाषा परिषद् पृ.8 , गीत संख्या 4

सोहर अवधी –हिंदी प्रदेश कि लोकगीत – कृष्णदेव उपाध्याय पृ.110,111 साहित्य भवन इलाहाबाद

विवाह – भोजपुरी – भारतीय लोकसाहित्य : परंपरा और परिदृश्य – विद्या सिन्हा , पृ.116

ऋतूसंबंधी गीत : बारामासा , होली, चैत , कजरी इत्यादि

-निम्नलिखित पाठ्यपुस्तकों के पृष्ठ

हरियाणा प्रदेश का लोकसाहित्य : शंकर लाल यादव पृ 231

हिंदी परदेश के लोकगीत : कृष्णदेव उपाध्याय, पृ 205

वाचिक कविता : भोजपुरी : पं विद्यानिवास मिश्र , पृ 49

श्रमसंबंधी गीत : कटनी , जंतसर , दँवनी , रोपनी , इत्यादि

कटनी के गीत , अवधी 2 गीत –हिंदी प्रदेश के लोकगीत: पं कृष्णदेव उपाध्याय, पृ 134 135

जंतासरी : भोजपुरी – भारतीय लोकसाहित्य परंपरा और परिदृश्य –विद्या सिन्हा , पृ 140,141

विविध गीत : घुघुती –कुमाउनी: कविता कौमुदी : ग्रामगीत : पं. रामनरेश त्रिपाठी ,

गढ़वाली : कविता कौमुदी : ग्रामगीत , पं . रामनरेश त्रिपाठी , पृ 801 -802

Unit 3

लोककथाएँ एवं लोकगाथाएँ :

विधा के सामान्य परिचय और प्रसिद्ध लोककथाएँ एवं लोकगाथाएँ आल्हा , लोरिक , सारंग – सदावृक्ष , बिहुला

राजस्थानी लोककथा नं - 2 , हिंदी साहित्य का बृहत् इतिहास , पं . राहुल संकृत्यायन, पृ 461 -462

अवधी लोककथा नं . 2, हिंदी साहित्य का बृहत् इतिहास , पं . राहुल संकृत्यायन, पृ 187 -188

Unit 4

लोकनाट्य :

विधा का परिचय ,विविध भाषा क्षेत्रों के विविध नाट्यरूप और शैलियाँ, रामलीला ;रासलीला मालवा का नाच ;राजस्थान का ख्याल ,उत्तर प्रदेश की नौटंकी , भांड ,रासलीला ;बिहार –बिदेसिया ;हरियाणा सांग पाठ :संक्षिप्त पद्मावत सांग (लखमीचंद ग्रंथावली ,संपा पूरनचन्द्र शर्मा ,हरियाणा साहित्य अकादमी ,पंडवानी :तीजन बाई

References

हिंदी प्रदेश के लोकगीत – कृष्णदेव उपाध्याय

हरियाणा प्रदेश का लोकसाहित्य – शंकर लाल यादव

मीट माई पीपल – देवेन्द्र सत्यार्थी

मालवी लोक साहित्य का अध्ययन – श्याम परमार

रसमंजरी – सुचिता रामदीन, महात्मा गाँधी संस्थान,मॉरिशस

हिंदी साहित्य का बृहत् इतिहास, पं . राहुल संकृत्यायन ; सोलहवां भाग

वाचिक कविता :भोजपुरी -- विद्यानिवास मिश्र

भारतीय लोकसाहित्य : परंपरा और परिदृश्य – डॉ. विद्या सिन्हा

कविता कौमुदी :ग्रामगीत – पं .रामनरेश त्रिपाठी

Additional Resources:

हिंदी साहित्य को हरियाणा प्रदेश की देन – हरियाणा साहित्य अकादमी का प्रकाशन

मध्यप्रदेश लोक कला अकादमी की पत्रिका-- चौमासा

Teaching Learning Process

कक्षा व्याख्यान, सामूहिक चर्चा, प्रस्तुति को देखना

1 से 3 सप्ताह - इकाई – 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई – 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट, असाइनमेंट

Keywords

विभिन्न रूप, बोलियाँ, सांस्कृतिक शब्द

हिंदी भाषा का व्यावहारिक व्याकरण (BAPHDSE01)Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

अनुवाद की सैद्धांतिक और व्यावहारिक जानकारी देना

विभिन्न क्षेत्रों में अनुवाद की प्रकृति की जानकारी

Course Learning Outcomes

अनुवाद की सैद्धांतिक और व्यावहारिक जानकारी

विभिन्न क्षेत्रों के अनुवाद का विश्लेषणात्मक अध्ययन

प्रयोगात्मक कार्य

Unit 1

भाषा और व्याकरण

- भाषा की परिभाषा एवं विशेषताएँ
- व्याकरण की परिभाषा, महत्व, भाषा और व्याकरण का अंतःसंबंध
- ध्वनि, वर्ण एवं मात्राएँ

Unit 2

शब्द परिचय

- शब्दों के भेद –तत्सम ,तत्भव, देशज, विदेशज (स्रोत के आधार पर)
- शब्दों की व्याकरणिक कोटियाँ (संज्ञा,सर्वनाम ,क्रिया आदि) (केवल परिभाषा एवं भेद)
- शब्दगत अशुद्धियाँ
- शब्द – निर्माण – उपसर्ग ,प्रत्यय
- शब्द और पद में अंतर

Unit 3

व्याकरण व्यवहार

- लिंग , वचन , कारक ,
- संधि और समास
- मुहावरें एवं लोकोक्तियाँ
- अपठित गद्य

Unit 4

वाक्य परिचय

- वाक्य के अंग –उद्देश्य और विधेय
- वाक्य के भेद (रचना के आधार पर)
- वाक्यगत अशुद्धियाँ
- विराम चिह्न

References

हिंदी भाषा साहित्य का इतिहास –धीरेन्द्र वर्मा

भारतीय पुरालिपि –डॉ.राजबलि पाण्डेय (लोकभारती प्रकाशन)

हिन्दी भाषा का उद्गम और विकास - उदयनारायण तिवारी

हिंदी भाषा की पहचान से प्रतिष्ठा तक – डॉ हनुमानप्रसाद शुक्ला

लिपि की कहानी – गुणाकर मुले

भाषा और समाज – रामविलास शर्मा

Additional Resources:

हिंदी भाषा : संरचना के विविध आयाम –रवीन्द्रनाथ श्रीवास्तव

हिंदी व्याकरण –कामताप्रसाद गुरु

हिंदी शब्दानुशासन – किशोरीदास वाजपेयी

A grammar linguistics of the hindi language –kellog

Hindi linguistics – R.N.shrivastav

Teaching Learning Process

कक्षा व्याख्यान, सामूहिक चर्चा, परियोजना कार्य

1 से 3 सप्ताह - इकाई – 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई – 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट, असाइनमेंट

Keywords

भाषा और अनुवाद की शब्दावली

हिंदी रंगमंच (BAPHDSE03)Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

रंगमंच का सैद्धांतिक और व्यावहारिक ज्ञान देना

हिन्दी रंगमंच के विकास के माध्यम से महत्वपूर्ण विचारकों के विचारों को समझना

Course Learning Outcomes

रंगमंच के विकास के साथ - साथ विभिन्न शैलियों की जानकारी प्राप्त होगी

प्रमुख विचारकों की रंगदृष्टि से अवगत हो पाएंगे

पारंपरिक और आधुनिक रंगमंच की समझ विकसित होगी

भारतबोध विकसित होगा

Unit 1

पारंपरिक रंगमंच: रामलीला, रासलीला, नौटंकी, बिदेसिया, पांडवानी, माच, अंकिया, सांग, ख्याल (सामान्य परिचय)

Unit 2

हिंदी रंगमंच : पारसी थिएटर, भारतेन्दु युगीन रंगमंच, माधव प्रसाद शुक्लयुगीन रंगमंच, पृथ्वी थिएटर

रंग संस्थाएँ : रंग- प्रशिक्षण एवं गतिविधियाँ, राष्ट्रीय नाट्य विद्यालय

रंगमंडल, भारत भवन, भोपाल; भारतेन्दु नाट्य अकादमी, लखनऊ

Unit 3

आधुनिक हिंदी रंगमंच की विविध शैलियाँ : शैलीबद्ध, यथार्थवादी, एक्सप्रेसिस्ट, लोक शैली

Unit 4

प्रमुख रंग व्यक्तित्व और उनकी रंगदृष्टि : झाड़ूराम देवांगन, राधेश्याम कथावाचक,

श्यामा नन्द जालान, सत्यदेव दुबे, भिखारी ठाकुर, ब. व. कारंत एवं इब्राहिम अल्काजी

References

परंपराशील नाट्य – जगदीशचन्द्र माथुर

पारसी हिंदी रंगमंच- लक्ष्मीनारायण लाल

नाट्यसम्राट पृथ्वीराज कपूर – जानकी वल्लभ शास्त्री

आधुनिक हिंदी नाटक और रंगमंच- लक्ष्मीनारायण लाल

समकालीन हिंदी नाटक और रंगमंच – नरेंद्र मोहन

पहला रंग- देवेंद्र राज अंकुर

आधुनिक हिंदी नाटक और रंगमंच- नेमिचन्द्र जैन

लखमीचंद का काव्य वैभव- हरिचन्द्र बंधु

भिखारी ठाकुर: भोजपुरी के भारतेन्दु- भगवत प्रसाद द्विवेदी

Additional Resources:

कंटेम्प्रेरी इंडियन थिएटर: इंटरव्यू विद प्लेराइट्स एण्ड डायरेक्टर्स – संगीत नाटक अकादमी

थिएटर्स आव इंडिपेंडेंस – अपर्णा भार्गव धारवाड़कर

Teaching Learning Process

कक्षा व्याख्यान, समूहिक चर्चा, व्यावहारिक ज्ञान के लिए एन.एस. डी. भ्रमण, ऑनलाइन विडियो

1 से 3 सप्ताह - इकाई – 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई – 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

रंगमंच संबंधी शब्दावली

कम्प्यूटर और हिंदी भाषा (BAPHSEC06) Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

कंप्यूटर की वर्तमान स्थिति की समझ विकसित करना

कंप्यूटर पर हिंदी का व्यावहारिक ज्ञान विकसित करना

Course Learning Outcomes

कंप्यूटर पर हिंदी भाषा के प्रयोग पर बल

सैद्धांतिक और व्यावहारिक ज्ञान विकसित होगा

Unit 1

कम्प्यूटर का विकास और हिंदी

*कम्प्यूटर का परिचय और विकास

*कम्प्यूटर में हिंदी का आरम्भ एवं विकास

*हिंदी के विविध फॉन्ट

*कम्प्यूटर में हिंदी की चुनौतियाँ और संभावनाएँ

Unit 2

हिंदी भाषा और प्रौद्योगिकी

*इंटरनेट पर हिंदी

*यूनिकोड, देवनागरी लिपि और हिंदी भाषा

*हिंदी और वेब डिज़ाइनिंग

*हिंदी की वेबसाइट

Unit 3

हिंदी भाषा, कम्प्यूटर और गवर्नेंस

*राजभाषा हिंदी के प्रचार में कम्प्यूटर की भूमिका

*ई -गवर्नेंस, इंटरनेट

*हिंदी भाषा शिक्षण और ई-लर्निंग

*सरकारी और गैर - सरकारी संस्थाएं

हिंदी भाषा और कम्प्यूटर : विविध पक्ष

*इंटरनेट पर हिंदी पत्र - पत्रिकाएँ

*एसएमएस की हिंदी

*न्यू मीडिया और हिंदी भाषा

*हिंदी के विभिन्न बोर्ड

References

कम्प्यूटर के भाषिक अनुप्रयोग - विजय कुमार मल्होत्रा

कम्प्यूटर और हिंदी - हरिमोहन

हिंदी भाषा और कम्प्यूटर - संतोष गोयल

कम्प्यूटर के डाटा प्रस्तुतिकरण और भाषा सिद्धांत - पी.के.शर्मा

Additional Resources:

मीडिया : भूमंडलीकरण और समाज संपा.संजय द्विवेदी

नए जमाने की पत्रकारिता - सौरव शुक्ल

पत्रकारिता से मीडिया तक - मनोज कुमार

जनसंचार के संदर्भ - जवरीमल्ल पारख

Teaching Learning Process

व्याख्यान, समूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

संबंधित क्षेत्र की शब्दावली

कार्यालयी हिंदी (BAPHSEC03)Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

कार्यालयी भाषा की जानकारी देना

विभिन्न कार्यालयी आवश्यकताओं को चिन्हित करना

Course Learning Outcomes

कार्यालयी भाषा का व्यावहारिक ज्ञान प्राप्त होगा

विभिन्न कार्यालयी पत्राचार के विविध रूप सीख सकेंगे

टिप्पण, प्रारूपण और संक्षेपण आवश्यकताओं की समझ विकसित होगी

Unit 1

कार्यालयी हिंदी का स्वरूप, उद्देश्य तथा क्षेत्र

अभिप्राय तथा उद्देश्य

कार्यालयी हिन्दी का क्षेत्र

सामान्य हिंदी तथा कार्यालयी हिंदी : संबंध तथा अंतर

कार्यालयी हिंदी स्थिति और संभावनाएँ

Unit 2

कार्यालयी हिंदी की शब्दावली

कार्यालयी हिंदी की पारिभाषिक शब्दावली

पदनाम तथा अनुभाग के नाम

मुख्य कार्यालय, क्षेत्रीय कार्यालय और प्रशासनिक अधिकारियों के लिए प्रयुक्त होने वाले संबोधन,

निर्देश आदि

औपचारिक पदावल्याँ / अभिव्यक्तियाँ (सूची विभाग द्वारा तैयार)

Unit 3

कार्यालयी पत्राचार के विविध प्रकार

सामान्य परिचय

कार्यालय से निर्गत पत्र (ज्ञापन, परिपत्र, अनुस्मारक, पृष्ठांकन, आदेश, सूचनाएँ, निविदा)

आवेदन – लेखन

Unit 4

टिप्पण, प्रारूपण और संक्षेपण

टिप्पण का स्वरूप, विशेषताएँ और भाषा शैली

प्रारूपण के प्रकार, भाषा शैली, प्रारूपण की विधि

संक्षेपण के प्रकार, विशेषताएँ और संक्षेपण की विधि

उपर्युक्त सभी इकाइयों पर आधारित व्यावहारिक प्रश्न

References

-प्रयोजनमूलक हिंदी – माधव सोनटक्के

-प्रारूप शासकीय पत्राचार और टिप्पण लेखन विधि - राजेन्द्र प्रसाद श्रीवास्तव

-प्रयोजनमूलक हिंदी की नई भूमिका –कैलाशनाथ पाण्डेय

-प्रयोजनमूलक भाषा और कार्यालयी हिंदी – कृष्ण कुमार गोस्वामी

Additional Resources:

-प्रयोजनमूलक हिंदी :सिद्धांत और प्रयोग –दंगल झाल्टे

Teaching Learning Process

विभिन्न कार्यालयी पत्रों, दस्तावेजों के माध्यम से कार्यालयी भाषा का व्यावहारिक ज्ञान देना

कक्षा व्याख्यान

सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

सभी कार्यालयी शब्द

भाषा शिक्षण (BAPHSEC02)Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

विद्यार्थी भाषा शिक्षण की अवधारणा और महत्व से परिचित हो सकेंगे।

Course Learning Outcomes

विभिन्न भाषाई कौशलों के ज्ञानार्जन के उपरांत विद्यार्थी शिक्षण,मीडिया,अभिनय आदि क्षेत्रों में अपनी प्रतिभा का विकास कर सकेंगे। वे शिक्षण और प्रशिक्षण के क्षेत्र में नई पद्धतियों का अनुसंधान करने की दिशा में अग्रसर होंगे।

Unit 1

भाषा शिक्षण की अवधारणा

- भाषा शिक्षण: अभिप्राय और महत्व
- भाषा शिक्षण के उद्देश्य
- भाषा शिक्षण का राष्ट्रीय सन्दर्भ

- शिक्षण, प्रशिक्षण, अर्जन, अधिगम

Unit 2

भाषा शिक्षण की आधारभूत संकल्पनाएँ

- प्रथम भाषा/ मातृभाषा तथा अन्य भाषा की संकल्पना
- द्वितीय भाषा तथा विदेशी भाषा की संकल्पना
- मातृभाषा और विदेशी भाषा के शिक्षण में अंतर
- विशिष्ट प्रयोजन के लिए भाषा शिक्षण

Unit 3

भाषा शिक्षण की विधियाँ और भाषिक कौशल

- भाषा कौशल- श्रवण, भाषण, वाचन, लेखन
- भाषा का कौशल के रूप में शिक्षण
- मातृभाषा शिक्षण पद्धतियाँ
- अन्य भाषा शिक्षण पद्धतियाँ

Unit 4

भाषा परीक्षण और मूल्यांकन

- भाषा परीक्षण की संकल्पना
- भाषा मूल्यांकन की संकल्पना
- भाषा परीक्षण के प्रकार
- मूल्यांकन के प्रकार

Practical

विद्यार्थी शिक्षक-प्रशिक्षण संस्थानों में जाकर मातृ भाषा और विदेशी भाषा शिक्षण की कक्षाओं का निरीक्षण कर सकते हैं और इसके प्रोजेक्ट तैयार कर सकते हैं।

References

- भाषा शिक्षण-रवीन्द्रनाथ श्रीवास्तव
- अन्य भाषा शिक्षण के कुछ पक्ष- संपादक अमर बहादुर सिंह
- भाषा शिक्षण तथा भाषा विज्ञान- संपादक ब्रजेश्वर वर्मा
- हिन्दी भाषा शिक्षण-भोलानाथ तिवारी

Teaching Learning Process

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

शिक्षण, अर्जन, दक्षता, ज्ञान

भाषाई दक्षता (BAPHSEC04) Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

विद्यार्थियों की भाषायी कुशलता का विकास।

व्यावसायिक एवं कार्यालयी हिंदी के सही प्रयोग का विकास।

विद्यार्थियों में द्रुतवाचन एवं मौन पठन का विकास।

Course Learning Outcomes

भाषायी दक्षता का विकास।

विद्यार्थियों की कार्य कुशलता में वृद्धि।

विषय के संक्षेपण एवं पल्लवन की कुशलता का विकास।

Unit 1

इकाई-1 : भाषायी दक्षता का विकास

- भाषायी दक्षता से तात्पर्य
- भाषायी दक्षता का महत्त्व
- श्रवण और वाचन
- पठन और लेखन

Unit 2

इकाई-2 : भाषायी दक्षता की निर्माण प्रक्रिया

- भाषायी संरचना की समझ और विकास
- भाषा-व्यवहार (भाषिक प्रयोग और शैली)
- भाषायी क्षमता को प्रभावित करने वाले तत्व (आयु, लिंग, शिक्षा, वर्ग)

Unit 3

इकाई-3 : भाषायी दक्षता के प्रायोगिक पक्ष

- भाषायी दक्षता की रणनीति : आकलन, लक्ष्य-निर्धारण, नियोजन के स्तर पर
- शब्द-सामर्थ्य : सामान्य एवं तकनीकी शब्द
- सुनना और बोलना – प्रभावी श्रवण के आयाम, शुद्ध उच्चारण, भाषण, एकालाप, वार्तालाप
- पढ़ना और लिखना – स्वाध्याय और उद्देश्य-केंद्रित पठन, सामान्य लेखन और रचनात्मक लेखन

Unit 4

इकाई-4 : भाषायी दक्षता का व्यावहारिक पक्ष

- किसी एक विषय पर – भाषण, वार्तालाप या टिपण्णी, समूह चर्चा
- किसी एक विषय का – भाव-विस्तार या पल्लवन
- द्रुतवाचन – किसी साहित्यिक कृति पर आधारित

- समीक्षा – पुस्तक-समीक्षा, फिल्म-समीक्षा

References

- भाषा शिक्षण – रवींद्रनाथ श्रीवास्तव
- सृजनात्मक साहित्य – रवींद्रनाथ श्रीवास्तव
- व्यावसायिक हिंदी – दिलीप सिंह
- प्रयोजनमूलक हिंदी – दंगल झाल्टे
- आधुनिक पत्रकारिता – डॉ. अनुज तिवारी

Additional Resources:

- व्यावहारिक हिंदी एवं प्रयोग – डॉ. ओम प्रकाश
- जनमाध्यम प्रौद्योगिकी और विचारधारा – जगदीश्वर चतुर्वेदी

Teaching Learning Process

कक्षा व्याख्यान , सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट असाइनमेंट

रचनात्मक लेखन (BAPHSEC01) Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

- विद्यार्थियों के मौखिक और लिखित अभिव्यक्ति कौशल को विकसित करना.
- उनमें कल्पनाशीलता और रचनात्मकता का विकास करना.
- साहित्य की विविध विधाओं और उनकी रचनात्मक शैली का परिचय कराते हुए लेखन की ओर प्रेरित करना.
- प्रिंट एवं इलेक्ट्रॉनिक माध्यमों के लिए लेखन की प्रवृत्ति को विकसित करना.

Course Learning Outcomes

इस पाठ्यक्रम के अध्ययन के पश्चात् विद्यार्थियों में -

- मौखिक और लिखित अभिव्यक्ति कौशल को विकसित होने में मदद मिलेगी.
- उनमें कल्पनाशीलता और रचनात्मकता का विकास हो सकेगा.
- साहित्य की विविध विधाओं और उनकी रचनात्मक शैली का परिचय होगा जिससे वे स्वयं भी इन विधाओं में लेखन की अग्रसर हो सकेंगे.
- प्रिंट एवं इलेक्ट्रॉनिक माध्यमों के लिए लेखन की ओर भी वे अग्रसर होंगे.

Unit 1

रचनात्मक लेखन: अवधारणा, स्वरूप एवं सिद्धांत

- भाव एवं विचार की रचना में अभिव्यक्ति की प्रक्रिया
- अभिव्यक्ति के विविध क्षेत्र: साहित्य, पत्रकारिता, विज्ञापन, भाषण, लोकप्रिय संस्कृति
- लेखन के विविध रूप: मौखिक-लिखित, गद्य-पद्य, कथात्मक-कथेतर, नाट्य-पाठ्य, बाल-लेखन

Unit 2

रचनात्मक लेखन: आधार और विश्लेषण

- अर्थ निर्मिति के आधार: शब्द और अर्थ की मीमांसा, शब्द के पुराने-नए प्रयोग, शब्द की व्याकरणिक कोटि
- भाषा की भूमिकाएँ: औपचारिक-अनौपचारिक, मौखिक-लिखित, मानक
- भाषिक सन्दर्भ: क्षेत्रीय, वर्ग-सापेक्ष, समूह-सापेक्ष
- रचना-सौष्ठव: शब्द-शक्ति, प्रतीक, बिम्ब, अलंकार, वक्रता

Unit 3

विविध विधाओं की आधारभूत संरचनाओं का व्यावहारिक अध्ययन

- कविता: संवेदना, भाषिक सौष्ठव, छंदबद्ध-छन्दमुक्त, लय, गति, तुक
- कथा-साहित्य: वस्तु, पात्र, परिवेश, कथ्य और भाषा
- नाट्य-साहित्य: वस्तु, पात्र, परिवेश, कथ्य, रंगमंच और नाट्य-भाषा
- विविध गद्य विधाएँ: निबंध, संस्मरण, आत्मकथा, व्यंग्य, रिपोर्टाज, यात्रा वृत्तांत
- बच्चों के लिए लेखन
- नोट: उपरोक्त का परिचय देते हुए इनका अभ्यास भी करवाया जाए.

Unit 4

सूचना-माध्यमों के लिए लेखन

- प्रिंट माध्यम के लिए लेखन : फीचर, यात्रा-वृत्तांत, साक्षात्कार, फिल्म-पुस्तक-नाटक समीक्षा, विज्ञापन
- इलेक्ट्रॉनिक माध्यम के लिए लेखन : विज्ञापन, पटकथा, संवाद
- नोट: उपरोक्त का परिचय देते हुए इनका अभ्यास भी करवाया जाए.

References

1. साहित्य चिंतन: रचनात्मक आयाम- रघुवंश
2. शैली - रामचंद्र मिश्र
3. रचनात्मक लेखन- सं रमेश गौतम
4. कविता क्या है - विश्वनाथ प्रसाद तिवारी
5. कथा-पटकथा - मन्मू भंडारी
6. पटकथा लेखन- मनोहर श्याम जोशी

Additional Resources:

1. कला की जरूरत -अन्स्ट फिशर, अनुवादक - रमेश उपाध्याय
2. साहित्य का सौंदर्यशास्त्र- रवीन्द्रनाथ श्रीवास्तव
3. कविता-रचना प्रक्रिया - कुमार विमल

Teaching Learning Process

- पाठ्यक्रम में निर्धारित विभिन्न रचनात्मक अभिव्यक्तियों से विद्यार्थी का परिचय करवाना.
- विद्यार्थी को उक्त अभिव्यक्तियों के अभ्यास के लिए प्रेरित करना.
- विभिन्न साहित्यकारों के साहित्य का पठन-पाठन करने के लिए प्रेरित करना.
- भाषायी कौशल के विकास के लिए कार्यशालाएँ आयोजित करना.

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

विज्ञापन और हिंदी भाषा (BAPHSEC05) Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

- I. विद्यार्थियों को विज्ञापन के विस्तृत क्षेत्र से परिचित कराना
- II. विज्ञापन भाषा के स्वरूप और विशेषताओं का बोध कराना
- III. विभिन्न माध्यमों के लिए विज्ञापन कॉपी लेखन का अभ्यास कराना

Course Learning Outcomes

- I. विज्ञापन लेखन की दृष्टि से भाषा-दक्षता
- II. विज्ञापन निर्माण की पूरी प्रक्रिया को समझना
- III. विज्ञापन बाजार में विभिन्न माध्यमों की पहुँच और प्रसार क्षमता से परिचित होना
- IV. कॉपी लेखन आदि कार्यों के लिए तैयार होना

Unit 1

इकाई 1 : विज्ञापन : स्वरूप एवं अवधारणा

- विज्ञापन : अर्थ, परिभाषा और महत्त्व
- विज्ञापन के उद्देश्य: आर्थिक, सामाजिक, राजनीतिक
- विज्ञापन के प्रमुख प्रकार
- विज्ञापन के प्रभाव

Unit 2

इकाई 2 : विज्ञापन माध्यम

- विज्ञापन माध्यम चयन के आधार
- प्रिंट, रेडियो और टेलीविजन
- डिजिटल विज्ञापन तथा आउट ऑफ होम विज्ञापन—होर्डिंग, पोस्टर, बैनर, साइन बोर्ड, सोशल मीडिया विज्ञापन--फेसबुक, ट्विटर, यू-ट्यूब, सोशल नेटवर्किंग साइट्स
- अन्य माध्यम

Unit 3

इकाई 3 : विज्ञापन की भाषा

- विज्ञापन की भाषा का स्वरूप एवं विशेषताएँ
- विज्ञापन की भाषा-शैली के विभिन्न पक्ष
- विज्ञापन स्लोगन एवं पंच लाइन
- प्रमुख हिंदी विज्ञापनों की भाषा का विश्लेषण

Unit 4

इकाई 4 : विज्ञापन:काँपी लेखन

- विज्ञापन काँपी के अंग
 - प्रिंट माध्यम: लेआउट के विविध प्रारूप
- वर्गीकृत एवं सजावटी विज्ञापन-निर्माण
- रेडियो जिंगल लेखन
- टेलीविजन विज्ञापन के लिए काँपी लेखन

References

सहायक ग्रन्थ

- Ø जनसंपर्क, प्रचार और विज्ञापन - विजय कुलश्रेष्ठ
- Ø जनसंचार माध्यम : भाषा और साहित्य - सुधीश पचौरी
- Ø डिजिटल युग में विज्ञापन - सुधा सिंह, जगदीश्वर चतुर्वेदी
- Ø ब्रेक के बाद - सुधीश पचौरी

Additional Resources:

- Ø मीडिया की भाषा - वसुधा गाडगिल
- Ø विज्ञापन की दुनिया - कुमुद शर्मा
- Ø विज्ञापन डॉट कॉम - रेखा सेठी
- Ø विज्ञापन: भाषा और संरचना - रेखा सेठी
- Ø विज्ञापन और ब्रांड - संजय सिंह बघेल
- Ø मीडिया और बाज़ार - वर्तिका नंदा
- Ø भारतीय मीडिया व्यवसाय - वनिता कोहली खांडेकर
- Ø संचार क्रांति और बदलता सामाजिक सौंदर्य बोध - कृष्ण कुमार रत्न
- Ø Jethwaney, J. N., & Jain, S. (2012). *Advertising management*. Oxford: Oxford University Press.
- Ø Chunawalla. (2000). *Advertising theory and practice*. Mumbai: Himalaya Publishing House.
- Ø Martin, P., & Erickson, T. (2011). *Social media marketing*. New Delhi: Global Vision Publishing House.

वेबलिंग

- www.adbrands.net
- www.afaqs.com
- www.adgully.com
- www.cnbc.com
- www.exchange4media.com

Teaching Learning Process

1) कक्षाओं में पठन-पाठन पद्धति

2) परिचर्चाएँ

3) समूह में प्रोजेक्ट प्रस्तुति

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

ब्रांड, कॉपी, स्लोगन, डिजिटल, सोशल मीडिया

अनुवाद : व्यवहार और सिद्धांत (BAPHGE01) Generic Elective - (GE) Credit:6

Course Objective(2-3)

अनुवाद के व्यवहार और सिद्धान्त की समझ विकसित करना

विभिन्न क्षेत्रों की मांगों के अनुरूप अनुवाद दक्षता निर्मित करना

Course Learning Outcomes

अनुवाद के विभिन्न क्षेत्रों की आवश्यकता को समझने में मदद मिलेगी

सैद्धांतिक ज्ञान के साथ-साथ व्यावहारिक ज्ञान निर्मित होगा

Unit 1

1. भारत का भाषाई परिदृश्य और अनुवाद
2. अनुवाद का स्वरूप और प्रकार
3. अनुवाद के उपकरण - कोश -ग्रन्थ
4. अनुवाद प्रक्रिया

Unit 2

1. प्रयुक्ति की अवधारण ; विविध प्रयुक्ति क्षेत्र
2. विविध प्रयुक्ति क्षेत्रों से सम्बंधित सामग्री के अनुवाद की सामान्य समस्याएँ

3. विभिन्न प्रयुक्ति क्षेत्रों की पारिभाषिक शब्दावली
4. अनुवाद की व्यावसायिक संभावनाएँ

Unit 3

अनुवाद व्यवहार - 1 (अंग्रेजी से हिंदी तथा हिंदी से अंग्रेजी)

1. सर्जनात्मक साहित्य
2. ज्ञान-विज्ञान और तकनीकी साहित्य
3. सामाजिक विज्ञान

Unit 4

अनुवाद व्यवहार - 2 (अंग्रेजी से हिंदी तथा हिंदी से अंग्रेजी)

1. जनसंचार
2. प्रशासनिक अनुवाद
3. बैंकिंग अनुवाद
4. विधि अनुवाद

Practical

References

1. अनुवाद के भाषिक सिद्धांत - कैटफोर्ड, जे सी सिद्धांत (अनुवाद - रविशंकर दीक्षित) मध्य प्रदेश ग्रन्थ अकादेमी, भोपाल
2. अनुवाद के सिद्धांत - रेड्डी, आर.आर. (अनुवाद- डा. जे. एल. रेड्डी) साहित्य अकादेमी, मंडी हाउस, नयी दिल्ली
3. अनुवाद-सिद्धांत और प्रयोग - गोपीनाथन, जी. लोकभारती प्रकाशन, इलाहाबाद

Additional Resources:

1. अनुवाद विज्ञान-सिद्धान्त और अनुप्रयोग - संपादक- डा. नगेन्द्र, हिंदी माध्यम कार्यान्वय निदेशालय, दिल्ली विश्वविद्यालय
2. अनुवाद सिद्धांत की रूपरेखा - सुरेश कुमार, वाणी प्रकाशन, दिल्ली.

Teaching Learning Process

- 1 से 3 सप्ताह - इकाई - 1
- 4 से 6 सप्ताह - इकाई - 2
- 7 से 9 सप्ताह - इकाई - 3
- 10 से 12 सप्ताह - इकाई - 4
- 13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

अनुवाद, मूल भाषा, संस्कृति, समाज, सम्प्रेषण, अर्थ दर्शन, भाव साम्यता

अस्मितामूलक विमर्श और हिंदी साहित्य (BAPHGE03) Generic Elective - (GE) Credit:6

Course Objective(2-3)

अस्मिताओं का सैद्धांतिक और व्यावहारिक ज्ञान

प्रमुख रचनाओं के अध्ययन के माध्यम से संवेदनात्मक विश्लेषण

Course Learning Outcomes

अस्मितामूलक विमर्श का ज्ञान

विभिन्न अस्मिताओं की समस्याओं और उसके परिवेश को समझना

प्रमुख कृतियों का परिचय

Unit 1

इकाई - 1 : विमर्श की सैद्धांतिकी

क) दलित विमर्श : अवधारणा और आंदोलन, फुले और अम्बेडकर

ख) स्त्री विमर्श : अवधारणाएं और आंदोलन (पाश्चात्य और भारतीय)

रैडिकल, मार्क्सवादी, दलित स्त्रीवाद

यौनिकता, लिंगभेद, पितृसत्ता, समलैंगिकता

ग) आदिवासी विमर्श : अवधारणा और आंदोलन

जल, जंगल, जमीन और पहचान का सवाल

Unit 2

विमर्शमूलक कथा साहित्य :

(1) ओमप्रकाश बाल्मीकि - सलाम

(2) जयप्रकाश कर्दम - मोहरे (तलाश : कहानी संग्रह से)

(3) हरिराम मीणा - धूणी तपे तीर, पृष्ठ संख्या :158-167

Unit 3

विमर्शमूलक कविता :

क) दलित कविता :

(1) हीरा डोम (अछूत की शिकायत)

(2) माता प्रसाद (सोनवा का पिंजरा)

ख) स्त्री कविता :

(1) अनामिका (स्त्रियाँ)

(2) निर्मला पुतुल (क्या तुम जानते हो)

Unit 4

इकाई - 4 विमर्शमूलक अन्य गद्य विधाएँ :

1 प्रभा खेतान, पृष्ठ 28-42 : अन्या से अनन्या तक

2 तुलसीराम : मुर्दहिया (चौधरी चाचा से प्रारम्भ पृष्ठ संख्या 125 से 135)

3 श्यौराज सिंह 'बेचैन' - मेरा बचपन मेरे कंधों पर (दिल्ली : बड़ी दुनिया में छोटे कदम, यहाँ एक मोची रहता था)

References

अम्बेडकर रचनावली - भाग-1

मूक नायक, बहिष्कृत भारत - अम्बेडकर (अनुवादक श्यौराज सिंह 'बेचैन')

गुलामगिरी- ज्योतिबा फुले

ज्योतिबा फुले : सामाजिक क्रांति के अग्रदूत - डॉ नामदेव

दलित साहित्य का सौंदर्यशास्त्र - ओमप्रकाश वाल्मीकि

दलित साहित्य का सौंदर्यशास्त्र - शरण कुमार निम्बाले

दलित आंदोलन का इतिहास - मोहनदास नैमिशराय

हिंदी दलित कथा साहित्य : अवधारणा एवं विधाएँ - रजत रानी 'मीनू'

अस्मितामूलक विमर्श - रजत रानी मीनू

स्त्री उपेक्षिता - सिमोन द बोउवा

उपनिवेश में स्त्री - प्रभा खेतान

औरत होने की सजा - अरविंद जैन

नारीवादी राजनीति -सं. जिनी निवेदिता

स्त्री अस्मिता साहित्य और विचारधारा - सुधा सिंह

स्त्री स्वर : अतीत और वर्तमान - डॉ नीलम, डॉ नामदेव

आदिवासी अस्मिता का संकट - रमणिका गुप्ता

सामाजिक न्याय और दलित साहित्य- श्यौराज सिंह 'बेचैन' (स.)

Additional Resources:

दलित दस्तक

सम्यक भारत

अंबेडकर इन इंडिया

बहुरी नहीं आवना

नेशनल दस्तक (वेब लिंक)

Teaching Learning Process

कक्षा व्याख्यान, सामूहिक चर्चा, फिल्म और डॉक्यूमेंट्री

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

अस्मितामूलक विमर्श से जुड़े तथ्य

जनपदीय साहित्य (BAPHGE02) Generic Elective - (GE) Credit:6

Course Objective(2-3)

बोलियों और जनसंस्कृति का परिचय देना

जनपदीय जीवनशैली और साहित्य को अध्ययन की मुख्यधारा से जोड़ना

Course Learning Outcomes

लोक संस्कृति की समझ विकसित होगी

पर्यटन, साहित्य और बोलियों की जानकारी प्राप्त होगी

लोकसाहित्य के अध्ययन विश्लेषण की जानकारी प्राप्त होगी

Unit 1

जनपदीय साहित्य

जनपदीय साहित्य की अवधारणा, जनपदीय साहित्य के विविध रूप – लोकगीत , लोककथा , लोकगाथाएं , लोकनाट्य , लोकोक्तियाँ , पहेलियाँ – बुझावेल और मुहावरे, हिंदी प्रदेश की जनपदीय बोलियाँ और उनका साहित्य (सामान्य परिचय), मौखिक साहित्य और समाज ।

Unit 2

लोकगीत :वाचिक और मुद्रित

संस्कार गीत :सोहर , विवाह, मंगलगीत इत्यादि

सोहर भोजपुरी :भोजपुरी संस्कार गीत - श्री हंस कुमार तिवारी –बिहार राष्ट्रभाषा परिषद् पृ.8 ,गीत संख्या 4

सोहर अवधी –हिंदी प्रदेश की लोकगीत – कृष्णदेव उपाध्याय पृ.110,111, साहित्य भवन इलाहाबाद

विवाह – भोजपुरी – भारतीय लोकसाहित्य : परंपरा और परिदृश्य – विद्या सिन्हा ,पृ.116

ऋतुसंबंधी गीत :बारामासा, होली, चैत, कजरी इत्यादि !

-निम्नलिखित पाठ्यपुस्तकों के पृष्ठ

हरियाणा प्रदेश का लोकसाहित्य : शंकर लाल यादव पृ 231

हिंदी प्रदेश के लोकगीत : कृष्णदेव उपाध्याय, पृ 205

वाचिक कविता :भोजपुरी :पं विद्यानिवास मिश्र ,पृ 51,49

श्रमसंबंधी गीत : कटनी , जंतसर ,दँवनी, रोपनी , इत्यादि

कटनी के गीत, अवधी 2 गीत –हिंदी प्रदेश के लोकगीत: पं कृष्णदेव उपाध्याय, पृ 134 135

जंतासरी : भोजपुरी – भारतीय लोकसाहित्य परंपरा और परिदृश्य –विद्या सिन्हा ,पृ 140,141

विविध गीत :घुघुती – कुमाउनी:कविता कौमुदी :ग्रामगीत : पं. रामनरेश त्रिपाठी

गढ़वाली :कविता कौमुदी :ग्रामगीत ,पं . रामनरेश त्रिपाठी , पृ 801 -802

Unit 3

लोककथाएँ एवं लोकगाथाएँ : सामान्य परिचय और प्रसिद्ध लोककथाएँ एवं लोकगाथाएँ - आल्हा ,लोरिक ,सारंग सदावृक्ष , बिहुला

राजस्थानी लोककथा नं.2,हिंदी साहित्य का वृहत इतिहास, पंडित राहुल सांकृत्यायन पृ 10 , 11 (सोलहवां भाग)

मालवी लोक कथा नं.2, हिंदी साहित्य का वृहत इतिहास, पंडित राहुल सांकृत्यायन पृ 461 -462

अवधी लोककथा नं. 2 ,हिंदी साहित्य का वृहत इतिहास, पंडित राहुल सांकृत्यायन पृ 187 -188

Unit 4

(क)पाठ : संक्षिप्त लक्कड़हारा सांग लखमीचंद ग्रन्थावली

संपा प्रो पूरनचंद शर्मा, हरियाणा साहित्य अकादमी , चंडीगढ़

(ख) बिदेसिया : भिखारी ठाकुर कृत लोकनाट्य

बिदेसिया, कठपुतली, सांग,(हरियाणा) भांड , ख्याल (राजस्थान), माच (मालवा)

References

हिंदी प्रदेश के लोकगीत –कृष्णदेव उपाध्याय

हरियाणा प्रदेश के लोकसाहित्य - शंकर लाल यादव

मीट माई पीपल – देवेन्द्र सत्यार्थी

मालवी लोकसाहित्य का अध्ययन– श्याम परमार

रसमंजरी - पं.विद्यानिवास मिश्र

हिंदी साहित्य का वृहत इतिहास , पं. राहुल सांकृत्यायन(सोलहवां भाग)

वाचिक साहित्य :भोजपुरी –पं.विद्यानिवास मिश्र

भारतीय लोक साहित्य : परंपरा और परिदृश्य - विद्या सिन्हा

कविता कौमुदी :ग्रामगीत –रामनरेश त्रिपाठी

लखमीचंद का काव्य – वैभव –हरिचंद बंधु

Additional Resources:

सूत्रधार –संजीव

हिंदी साहित्य को हरियाणा प्रदेश की देन-हरियाणा साहित्य अकादमी का प्रकाशन

मध्यप्रदेश लोककला अकादमी की पत्रिका – चौमासा

हिंदी का जनपदीय साहित्य – विद्यानिवास मिश्र

Teaching Learning Process

कक्षा व्याख्यान, समूहिक चर्चा, ऑनलाइन वीडियो

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट असाइनमेंट

Keywords

सभी नाम और शैलियाँ, जनपद, संस्कृति-समाज, बोलियाँ

हिंदी सिनेमा और उसका अध्ययन (BAPHGE04) Generic Elective - (GE) Credit:6

Course Objective(2-3)

सिनेमा के निर्माण और उपभोग या आलोचना की व्यावहारिक समझ विकसित करना

हिन्दी सिनेमा के विकास का अध्ययन

कुछ प्रमुख फिल्मों के माध्यम से सिनेमा में आ रहे बदलाव को समझना

Course Learning Outcomes

सिनेमा की व्यावहारिक और आलोचनात्मक समझ विकसित होगी

सिनेमा के विकास के माध्यम से भारत के मनोरंजन जगत में आ रहे बदलाव को समझ सकेंगे

Unit 1

कला विधा के रूप में सिनेमा और उसकी सैद्धांतिकी

Unit 2

हिंदी सिनेमा : उदभव और विकास

Unit 3

सिनेमा में कैमरे की भूमिका

Unit 4

नयी तकनीकी और सिनेमा – संभावनाएं और चुनौतियाँ

(संदर्भ – मुगले आज, मदर इंडिया, दीवार , पीके)

References

हिंदी सिनेमा का इतिहास – मनमोहन चडढा

सिनेमा, नया सिनेमा - ब्रजेश्वर मदान

सिनेमा : कल,आज और कल – विनोद भारद्वाज

Additional Resources:

हिंदी का मौखिक परिदृश्य – करुणाशंकर उपाध्याय

हिंदी का मौखिक परिदृश्य – कौशल कुमार गोस्वामी

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा, वीडियो क्लिप का अध्ययन और उसे बनाना, कैमरे का कक्षा के बाहर अध्ययन

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

सिनेमाई शब्दावली

आधुनिक भारतीय भाषा - हिंदी : भाषा और साहित्य (हिंदी-क) (BAPMILHA01) Ability-Enhancement Compulsory Course (Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

हिंदी भाषा और साहित्य की सामान्य जानकारी विकसित करना

राष्ट्रभाषा, राजभाषा और संपर्क भाषा के रूप में हिंदी की स्थिति का परिचय देना

विशिष्ट कविताओं के अध्ययन-विश्लेषण के माध्यम से कविता संबंधी समझ विकसित करना

Course Learning Outcomes

हिंदी साहित्य और भाषा के विकास की स्पष्ट समझ विकसित होगी

आधुनिक आवश्यकताओं के अनुरूप राष्ट्रभाषा, राजभाषा और संपर्कभाषा की जानकारी प्राप्त होगी

Unit 1

हिंदी भाषा

क. आधुनिक भारतीय भाषाओं का उद्भव और विकास

ख. हिंदी भाषा का परिचय एवं विकास

ग. राष्ट्रभाषा, राजभाषा और संपर्क-भाषा के रूप में हिंदी

Unit 2

हिंदी साहित्य का इतिहास

क. हिंदी साहित्य का इतिहास (आदिकाल. मध्यकाल) सामान्य परिचय

ख. हिंदी साहित्य का इतिहास (आधुनिक काल) सामान्य परिचय

Unit 3

(क) कबीर - कबीर ग्रंथावली. संपा श्यामसुंदरदास. काशी नागरी प्रचारिणी सभा. उन्नीसवां संस्करण सं 2054 वि.

पृ. 23 दोहा 27, पृ 29. दोहा 20, पृ. 30 दोहा 3 और 4, पृ 35 दोहा 8. पृ 39 दोहा 9

(ख) भूषण - भूषण ग्रंथावली, संपा. आचार्य विश्वनाथ प्रसाद मिश्र, वाणी प्रकाशन, दिल्ली- 1998)

कवित्त संख्या - 409, 411, 412, 413

(ग) बिहारी बिहारी रत्नाकर - संपा . जगन्नाथ दास रत्नाकर बी.ए., प्रकाशन संस्थान. नई दिल्ली सं. 2006

दोहा 1, 10, 13, 32, 38

Unit 4

आधुनिक हिंदी कविता

जयशंकर प्रसाद - हिमाद्रि तुंग श्रृंग से

नागार्जुन - बादल को घिरते देखा है

रघुवीर सहाय - कला क्या है

References

रामचंद्र शुक्ल - हिंदी साहित्य का इतिहास

हजारीप्रसाद द्विवेदी - हिंदी साहित्य की भूमिका

संपा. डॉ. नगेंद्र - हिंदी साहित्य का इतिहास

हिन्दी साहित्य के इतिहास पर कुछ नोट्स - डॉ. रसाल सिंह

Additional Resources:

रामस्वरूप चतुर्वेदी - हिंदी साहित्य और संवेदना का विकास

आचार्य विश्वनाथ प्रसाद मिश्र- भूषण ग्रंथावली

Teaching Learning Process

व्याख्यान, समूहिक चर्चा, वीडियो आदि

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

आधुनिक भारतीय भाषा - हिंदी : भाषा और साहित्य (हिंदी-ख) (BAPMILHB01) Ability-Enhancement Compulsory Course (Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

हिंदी भाषा और साहित्य की सामान्य जानकारी विकसित करना

विशिष्ट कविताओं के अध्ययन-विश्लेषण के माध्यम से कविता संबंधी समझ विकसित करना

Course Learning Outcomes

हिंदी साहित्य और भाषा के विकास की स्पष्ट समझ विकसित होगी

विशिष्ट कविताओं के अध्ययन से साहित्य की समझ विकसित होगी

Unit 1

हिंदी भाषा और साहित्य :

(क) आधुनिक भारतीय भाषाओं का सामान्य परिचय

(ख) हिंदी भाषा का विकास : सामान्य परिचय

(ग) हिंदी साहित्य का इतिहास (आदिकाल, मध्यकाल) : संक्षिप्त परिचय

(घ) हिंदी साहित्य का इतिहास (आधुनिक काल) : संक्षिप्त परिचय

Unit 2

भक्तिकालीन कविता :

(क) कबीर : संपा. श्यामसुंदर दास, कबीर ग्रंथावली, नागरी प्रचारिणी सभा, काशी, उन्नीसवाँ संस्करण, सं. 2054 वि.

पोथी पढ़ि पढ़ि जग मुआ ...

कस्तूरी कुंडलि बसै ...

यह तन विष की बेलरी, गुरु अमृत की खान ...

सात समुंदर की मसि करूँ ...

साधु ऐसा चाहिए ...

सतगुरु हमसँ रीझकर ...

(ख) तुलसी : 'रामचरितमानस' से केवट प्रसंग

Unit 3

रीतिकालीन कविता

(क) बिहारी :

बतरस लालच लाल की ...

या अनुरागी चित्त की ...

सटपटाति-सी ससिमुखी ...

(ख) मीराबाई की पदावली. संपा. आचार्य परशुराम चतुर्वेदी. हिंदी साहित्य सम्मेलन प्रयाग. चौदहवां संस्करण 1892. सन् 1970 ई. पद 1. 4. 5.

Unit 4

आधुनिक कविता

सुभद्रा कुमारी चौहान : 'बालिका का परिचय'

निराला : तोड़ती पत्थर

References

रामचंद्र शुक्ल - हिंदी साहित्य का इतिहास

हजारीप्रसाद द्विवेदी - हिंदी साहित्य की भूमिका

संपा. डॉ. नगेंद्र - हिंदी साहित्य का इतिहास

हिन्दी साहित्य के इतिहास पर कुछ नोट्स - डॉ. रसाल सिंह

Additional Resources:

रामस्वरूप चतुर्वेदी - हिंदी साहित्य और संवेदना का विकास

विश्वनाथ त्रिपाठी - हिंदी साहित्य का सरल इतिहास

Teaching Learning Process

व्याख्यान सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

आधुनिक भारतीय भाषा - हिंदी : भाषा और साहित्य (हिंदी-ग) (BAPMILHC01) Ability-Enhancement Compulsory Course (Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

हिंदी भाषा और साहित्य की सामान्य जानकारी विकसित करना

विशिष्ट कविताओं के अध्ययन-विश्लेषण के माध्यम से कविता संबंधी समझ विकसित करना

Course Learning Outcomes

हिंदी साहित्य और भाषा के विकास की स्पष्ट समझ विकसित होगी

विशिष्ट कविताओं के अध्ययन से साहित्य की समझ विकसित होगी

Unit 1

इकाई - 1 : हिंदी भाषा और साहित्य

(क) हिंदी भाषा का सामान्य परिचय एवं विकास

(ख) हिंदी का भौगोलिक विस्तार

(ग) हिंदी कविता का विकास (आदिकाल ,मध्यकाल) : सामान्य विशेषताएँ

(घ) हिंदी कविता का विकास (आधुनिक काल) : सामान्य विशेषताएँ

Unit 2

इकाई -2 भक्तिकालीन हिंदी कविता

कबीर :

- गुरु गोविन्द दोऊ खड़े ...
- निंदक नियरे राखिये...
- माला फेरत जुग भया...
- पाहन पूजे हरि मिले ...

सूरदास :

- मैया मैं नहिं माखन खायौ...
- ऊधो मन न भए दस-बीस...

Unit 3

इकाई -3 : रीतिकालीन हिंदी कविता

(क) बिहारी :

- मेरी भव बाधा हरौ...
- कनक कनक ते सौ गुनी...
- थोड़े ही गुन रीझते...
- कहत नटत रीझत खिजत...

(ख) घनानंद :

- अति सूधो सनेह को मारग...
- रावरे रूप की रीति अनूप...

Unit 4

इकाई -4 : आधुनिक हिंदी कविता

- मैथिलीशरण गुप्त - नर हो न निराश करो...
- सुमित्रानंदन पन्त - आह! धरती कितना देती है...

References

1. कबीर - हजारी प्रसाद द्विवेदी
2. तुलसी काव्य मीमांसा - उदयभानु सिंह
3. हिन्दी साहित्य के इतिहास पर कुछ नोट्स - डॉ. रसाल सिंह
4. हिन्दी साहित्य का सरल इतिहास - विश्वनाथ त्रिपाठी

Additional Resources:

Additional Resources:

1. बिहारी की वाग्विभूति-विश्वनाथ प्रसाद मिश्र
2. हिंदी साहित्य का इतिहास - रामचंद्र शुक्ल

Teaching Learning Process

सीखने की इस प्रक्रिया में हिंदी साहित्य और हिंदी कविता को मजबूती प्रदान करना है। कालक्रम से विद्यार्थी युगबोध को ठीक से जान सकेंगे। छात्र कविता के माध्यम से उसमें निहित मानवतावादी दृष्टिकोण को बेहतर तरीके से जान सकेंगे। हिंदी भाषा आज तेजी से वैश्वीकृत हो रही है। ऐसे में कविता की भूमिका और भी अधिक महत्वपूर्ण हो जाती है। साहित्य के आरंभ से ही कविता ने समय और समाज को प्रभावित किया है और मानवीय आचरण को संतुलित करने में महत्वपूर्ण भूमिका निभाई है। अतः शिक्षण में हिंदी कविता छात्रों के दृष्टिकोण को और भी अधिक परिपक्व करेगी। प्रस्तुत पाठ्यक्रम को निम्नांकित सप्ताहों में विभाजित किया जा सकता है -

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

साहित्य, कविता, भाव सौंदर्य, शिल्प, इतिहास, विकास

आधुनिक भारतीय भाषा - हिंदी भाषा और संप्रेषण (BAPAECC01) Ability-Enhancement Compulsory Course (Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

- भाषिक सम्प्रेषण के स्वरूप एवं सिद्धांतों से विद्यार्थी का परिचय
- विभिन्न माध्यमों की जानकारी
- प्रभावी सम्प्रेषण का महत्व
- रोजगार सम्बन्धी क्षेत्रों के लिए तैयार करना

Course Learning Outcomes

स्नातक स्तर के छात्रों को भाषायी संप्रेषण की समझ और संभाषण से संबंधित विभिन्न पक्षों से अवगत करवाया जाएगा।

भाषा के शुद्ध उच्चारण, सामान्य लेखन, रचनात्मक लेखन तथा तकनीकी शब्दों से अवगत हो सकेंगे।

भाषा की समृद्धि के लिए वार्तालाप, भाषण, उसके पल्लवन, पुस्तक-समीक्षा, फिल्म-समीक्षा का भी अध्ययन कर सकेंगे।

Unit 1

इकाई -1 - भाषिक सम्प्रेषण : स्वरूप और सिद्धान्त

1 - सम्प्रेषण की अवधारणा और महत्व

2- सम्प्रेषण की प्रक्रिया

3- सम्प्रेषण के विभिन्न मॉडल

4- अभाषिक संप्रेषण

Unit 2

इकाई - 2 सम्प्रेषण के प्रकार

1. मौखिक और लिखित
2. वैयक्तिक, सामाजिक और व्यावसायिक
3. भ्रामक सम्प्रेषण (miscommunication) और प्रभावी संप्रेषण में अंतर
4. सम्प्रेषण में चुनौतियाँ एवं संभावनाएं

Unit 3

इकाई - 3 सम्प्रेषण के माध्यम

1. एकालाप
2. संवाद
3. सामूहिक चर्चा
4. जन संचार माध्यमों पर संप्रेषण : कंप्यूटर-इंटरनेट, ई-मेल, ब्लॉग, वेबसाइट

Unit 4

इकाई - 4 व्यक्तित्व और प्रभावी भाषिक सम्प्रेषण

1. व्यक्तित्व और भाषिक अस्मिता - आयु, लिंग, वर्ग, शिक्षा
2. प्रभावी सम्प्रेषण के गुण - शुद्ध उच्चारण, भाषिक संरचना की समझ, भाषा व्यवहार, शब्द सामर्थ्य, शैली -सुर-लहर, अनुतान, बलाघात
3. प्रभावी व्यक्तित्व के निर्माण में सम्प्रेषण की भूमिका

References

- हिन्दी का सामाजिक संदर्भ- रवीन्द्रनाथ श्रीवास्तव
- संप्रेषण-परक व्याकरण: सिद्धांत और स्वरूप-सुरेश कुमार
- प्रयोग और प्रयोग- वी.आर.जगन्नाथ
- भारतीय भाषा चिंतन की पीठिका-विद्यानिवास मिश्र

Additional Resources:

- कुछ पूर्वग्रह-अशोक वाजपेयी
- भाषाई अस्मिता और हिन्दी-रवीन्द्रनाथ श्रीवास्तव
- रचना का सरोकार-विश्वनाथ प्रसाद तिवारी
- संप्रेषण: चिंतन और दक्षता- डॉ.मंजु मुकुल

Teaching Learning Process

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

हिंदी गद्य : उदभव और विकास (हिंदी-क) (BAPMILHA02)Ability-Enhancement Compulsory Course(Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

हिन्दी गद्य की विभिन्न विधाओं का परिचय देना

विभिन्न कृतियों द्वारा आधुनिक साहित्य की समझ विकसित करना

Course Learning Outcomes

हिन्दी गद्य साहित्य के विकास का परिचय प्राप्त होगा

कृतियों के अध्ययन-विक्षेपण से साहित्यिक समझ विकसित होगी

Unit 1

हिन्दी गद्य का उद्भव और विकास : सामान्य परिचय

हिन्दी गद्य के विभिन्न रूपों का परिचय

Unit 2

प्रेमचंद - जुलूस

मोहन राकेश - मलबे का मालिक

मन्मू भण्डारी - मैं हार गई

Unit 3

रामचन्द्र शुक्ल - उत्साह

हजारी प्रसाद द्विवेदी - अशोक के फूल

विद्यानिवास मिश्र - रहिमन पानी राखिए

Unit 4

यात्रा वृत्तान्त - चीड़ों पर चाँदनी - निर्मल वर्मा

व्यंग्य - भोलाराम का जीव - हरिशंकर परसाई

नाटक - अंधेर नगरी - भारतेन्दु

References

हिन्दी का गद्य साहित्य - रामचन्द्र तिवारी

हिन्दी साहित्य का दूसरा इतिहास - बच्चन सिंह

बलकृष्ण भट्ट के निबंध - सत्यप्रकाश मिश्र

महादेवी - दूधनाथ सिंह

कथेतर - माधव हाड़ा

गद्य की पहचान - अरुण प्रकाश

Additional Resources:

Additional Resources:

www.hindisamay.com

www.gadykosh.com

<http://hanshindimagazine.in>

Teaching Learning Process

व्याख्यान और सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

गद्य, कथा, शिल्प, संरचना

हिंदी गद्य : उद्भव और विकास (हिंदी-ख) (BAPMILHB02)Ability-Enhancement Compulsory Course(Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

हिन्दी गद्य की विभिन्न विधाओं का परिचय देना

विभिन्न कृतियों द्वारा आधुनिक साहित्य की समझ विकसित करना

Course Learning Outcomes

हिन्दी गद्य साहित्य के विकास का परिचय प्राप्त होगा

कृतियों के अध्ययन-विक्षेपण से साहित्यिक समझ विकसित होगी

Unit 1

हिंदी गद्य : उद्भव और विकास

हिंदी गद्य रूपों का सामान्य परिचय

Unit 2

प्रेमचंद – बूढ़ी काकी

चंद्रधर शर्मा गुलेरी – उसने कहा था

भीष्म साहनी - चीफ की दावत

Unit 3

बालमुकुन्द गुप्त – मेले का ऊंट

हरिशंकर परसाई – सदाचार का ताबीज़

धर्मवीर भारती - ठेले पर हिमालय

Unit 4

भारतेंदु – अंधेर-नगरी

महादेवी वर्मा – बिबिया

References

हिन्दी का गद्य साहित्य – रामचंद्र तिवारी

हिंदी साहित्य का दूसरा इतिहास –बच्चन सिंह

Additional Resources:

निबंधो की दुनिया – विजयदेव नारायण साही ;निर्मला जैन /हरिमोहन शर्मा

छायावादोत्तर हिंदी गद्य साहित्य –विश्वनाथ प्रसाद तिवारी

हिंदी रेखाचित्र –हरवंश लाल शर्मा

निबंधो की दुनिया – शिवपूजन सहाय ;निर्मला /अनिल राय

Teaching Learning Process

व्याख्यान और सामूहिक चर्चा

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

कथा, शिल्प, कथा-विन्यास, संरचना, कथा-भाषा

हिंदी गद्य : उदभव और विकास (हिंदी-ग) (BAPMILHC02)Ability-Enhancement Compulsory Course(Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

हिन्दी गद्य की विभिन्न विधाओं का परिचय देना

विभिन्न कृतियों द्वारा आधुनिक साहित्य की समझ विकसित करना

Course Learning Outcomes

हिन्दी गद्य साहित्य के विकास का परिचय प्राप्त होगा

कृतियों के अध्ययन-विश्लेषण से साहित्यिक समझ विकसित होगी

Unit 1

हिंदी गद्य : उद्भव और विकास

हिंदी गद्य – रूपों का संक्षिप्त परिचय (कहानी, निबंध, नाटक, रेखाचित्र/संस्मरण)

Unit 2

प्रेमचंद - दो बैलों की कथा

अमरकान्त - बहादुर

Unit 3

बालकृष्ण भट्ट - साहित्य जनसमूह के हृदय का विकास है

अध्यापक पूर्ण सिंह - सच्ची वीरता

रामवृक्ष बेनीपुरी - गेहूँ बनाम गुलाब

Unit 4

महादेवी वर्मा - घीसा

विष्णु प्रभाकर - वापसी

विश्वनाथ त्रिपाठी - गंगा स्नान करने चलोगे?

References

हिन्दी का गद्य साहित्य - रामचंद्र तिवारी

हिंदी साहित्य का दूसरा इतिहास - बच्चन सिंह

निबंधों की दुनिया - विजयदेव नारायण साहनी; निर्मला जैन / हरिमोहन शर्मा

छायावादोत्तर हिंदी गद्य साहित्य - विश्वनाथ प्रसाद तिवारी

हिंदी रेखाचित्र - हरवंश लाल शर्मा

निबंधों की दुनिया - शिवपूजन सहाय ; निर्मला / अनिल राय

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

शिल्प, कथा, चरित्र, कथा-भाषा

Introduction

Content: आज विश्व विज्ञान और तकनीक की शक्ति से परिचित और संचालित है। भाषा का दायित्व ऐसे काल में और अधिक हो जाता है ताकि उसकी प्रशासन, ज्ञान विज्ञान और प्रौद्योगिकी के क्षेत्र में क्षमता प्रमाणित हो सके। बी.ए. प्रोग्राम प्रयोजनमूलक हिन्दी वर्तमान समय में हिन्दी को व्यावसायिक तथा प्रशासन की भाषा के रूप में स्थापित करने वाला पाठ्यक्रम है। यह पाठ्यक्रम विशेष रूप से विद्यार्थियों को बाजार, विज्ञापन, मीडिया के सभी रूपों इंटरनेट और जनसंपर्क तथा जनसंवाद में कौशल देने हेतु तैयार किया गया है। इस पाठ्यक्रम का उद्देश्य छात्रों को रोजगार की नई संभावनाओं को उपलब्ध कराना है। विद्यार्थी हिन्दी भाषा के अध्ययन के माध्यम से रेडियो एवं प्रिंट पत्रकारिता, सिनेमा, अनुवाद एवं वेब-डिजाइनिंग जैसे विषयों के साथ जुड़कर इन क्षेत्रों में अभिव्यक्ति करने में सक्षम हो सकें तथा व्यावसायिक रूप से समर्थ बन सकें, यही पाठ्यक्रम की शक्ति होगी।

Learning Outcome based approach to Curriculum Planning

>> Aims of Bachelor's degree programme in B.A. (Programme) Prayojanmoolak Hindi

Content: बी.ए. प्रयोजनमूलक हिन्दी का उद्देश्य विद्यार्थी को बाजार के अनुकूल भाषा की प्रयोजनीयता से परिचित कराना है। इस पाठ्यक्रम के उद्देश्य एवं परिणाम निम्न होंगे--

1. हिन्दी भाषा के विविध प्रयोजनमूलक पक्षों से परिचय जिससे शिक्षण एवम प्रशिक्षण के फलस्वरूप छात्र हिन्दी के क्षेत्र में रोजगार की संभावनाओं से परिचित हो पाएँगे।
2. यह पाठ्यक्रम हिन्दी के क्षेत्र में रोजगार की संभावनाओं को ध्यान में रखकर बनाया गया है। इसे पढ़कर विद्यार्थी मीडिया के सभी रूपों जैसे दृश्य-श्रव्य माध्यम यथा सिनेमा, टेलीविजन, रेडियो एवम प्रिंट पत्रकारिता में विभिन्न क्षेत्रों में लिखने तथा कार्यक्रम निर्माण में सक्षम हो सकेंगे।
3. अनुवाद एवं कम्प्यूटर पर हिन्दी का प्रयोग इस पाठ्यक्रम की मुख्य विशेषताएँ हैं। वेब डिजाइनिंग तथा इंटरनेट पर हिन्दी का प्रयोग भी यह पाठ्यक्रम सिखाता है। जनसंपर्क एवम विज्ञापन लेखन इसकी अन्य विशेषताएँ हैं।
4. छात्रों की कल्पनाशीलता एवं रचनात्मकता को यह पाठ्यक्रम नए आयाम देता है। खास तौर पर उन्मुक्त कल्पना तथा रचनात्मकता के साथ-साथ विशेष कार्यक्रमों के लिए कंटेंट लिखने का कौशल प्रदान करता है।

Graduate Attributes in Subject

>> Disciplinary knowledge

Content: प्रयोजनमूलक हिन्दी द्वारा तकनीकी एवं कंप्यूटर ज्ञान, सूचना प्रौद्योगिकी, वाणिज्य आदि विषयों का अन्योन्याश्रित ज्ञान विकसित होगा

Graduate Attributes in Subject

>> Communication Skills

Content: पाठ्यक्रम के अध्ययन से लेखन कौशल व संवाद कौशल का विकास होगा।

Graduate Attributes in Subject

>> Critical thinking

Content: प्रयोजनमूलक हिन्दी के अध्ययन से विद्यार्थियों में विशेष आलोचनात्मक दृष्टि का विकास होगा।

Graduate Attributes in Subject

>> Problem solving

Content: प्रयोजनमूलक हिन्दी के अध्ययन से विद्यार्थियों में कार्यालयी एवं भाषायी समस्या हल करने की विशेष योग्यता विकसित होगी ।

Graduate Attributes in Subject

>> Research-related skills

Content: प्रयोजनमूलक हिन्दी के अध्ययन से विद्यार्थियों में शोधपरक दृष्टि का विकास होगा ।

Graduate Attributes in Subject

>> Reflective thinking

Content: प्रयोजनमूलक हिन्दी के अध्ययन से संवाद और लेखन क्षमता विकसित होगी ।

Graduate Attributes in Subject

>> Information/digital literacy

Content: प्रयोजनमूलक हिन्दी के अध्ययन से तकनीकी व डिजिटल माध्यमों से विशेष परिचय प्राप्त होगा ।

Graduate Attributes in Subject

>> Moral and ethical awareness/reasoning

Content: प्रयोजनमूलक हिन्दी के अध्ययन से व्यावहारिक नैतिकता व सत्यनिष्ठा जैसे विशेष मूल्य विद्यार्थियों में विकसित होंगे ।

Graduate Attributes in Subject

>> Multicultural competence

Content: प्रयोजनमूलक हिन्दी के अध्ययन से विद्यार्थियों में बहु-सांस्कृतिक मूल्य व उसके साथ कार्य करने के विशेष गुण विकसित होंगे ।

Qualification Description

Content: 10+2 या समकक्ष

Programme Learning Outcome in course

Content: 1. प्रशिक्षण के फलस्वरूप छात्र हिन्दी के क्षेत्र में रोजगार की संभावनाओं से परिचित हो पाएँगे।

2. मीडिया के सभी रूपों जैसे दृश्य-श्रव्य माध्यम, सिनेमा, टेलीविजन, रेडियो एवं प्रिंट पत्रकारिता में विभिन्न क्षेत्रों में लिखने तथा कार्यक्रम निर्माण में सक्षम हो सकेंगे।

3. अनुवाद एवं कम्प्यूटर पर हिन्दी का प्रयोग इस पाठ्यक्रम की मुख्य विशेषताएँ हैं। वेब डिजाईनिंग तथा इंटरनेट पर हिन्दी का प्रयोग भी यह पाठ्यक्रम सिखाता है।

4. जनसंपर्क एवं विज्ञापन लेखन की क्षमता विकसित होगी।

Teaching-Learning Process

Content: • सामूहिक चर्चा-परिचर्चा

- विज्ञापन का व्यावहारिक रूप से अध्ययन
- रेडियो एवं टेलीविजन पर कार्यक्रम लेखन एवं प्रस्तुति की व्यावहारिक जानकारी
- प्रिंट मीडिया हेतु समाचार, फीचर तथा विविध स्तंभों के लिए लेखन का व्यावहारिक प्रशिक्षण
- कम्प्यूटर का व्यावहारिक प्रशिक्षण
- अनुवाद का व्यावहारिक प्रशिक्षण
- सेमिनार एवं कार्यशालाओं का आयोजन
- विविध संचार माध्यमों के कार्यालयों का शैक्षिक परिभ्रमण
- आशु प्रस्तुति

Assessment Methods

Content: मूल्यांकन के लिए निम्नांकित प्रविधियों का उपयोग किया जाएगा--

- लिखित परीक्षा
- परियोजना कार्य
- सर्वेक्षण
- कक्षा में किसी समाचार अंश को विश्लेषित करना
- समूह में किसी विषय पर चर्चा करना
- फीडबैक प्राप्त करना
- पीपीटी प्रेजेंटेशन करवाना
- हिंदी भाषा का अभ्यास करवाना
- हिंदी भाषा के व्यावहारिक मूल्यों पर आधारित परियोजना कार्य

- दिए गए पाठों का माध्यम के अनुसार रूपांतरण का अभ्यास
- विविध माध्यमों के लिए लेखन का अभ्यास
- विज्ञापन निर्माण की प्रक्रिया का अभ्यास

प्रयोजनमूलक हिंदी : अनुवाद और अनुवाचन (BAPPHCC03)Core Course - (CC) Credit:6

Course Objective(2-3)

प्रयोजनमूलक हिन्दी की स्थिति का अध्ययन

अनुवाद और अनुवाचन से संबंधित सैद्धांतिक और व्यावहारिक क्षमता विकसित करना

Course Learning Outcomes

अनुवाद और अनुवाचन से संबंधित सैद्धांतिक और व्यावहारिक क्षमता विकसित होगी

रोजगारपरक अध्ययन का विकास

Unit 1

प्रयोजनमूलक हिंदी और अनुवाद का अंतःसंबंध

प्रयोजनमूलक हिंदी की अवधारणा और क्षेत्र

अनुवाद की अवधारणा और क्षेत्र

प्रयोजनमूलक हिंदी और अनुवाद

Unit 2

अनुवाद : प्रविधि और प्रक्रिया

अनुवाद प्रक्रिया के चरण

अंग्रेजी-हिंदी व्यावहारिक अनुवाद : समस्या और सीमाएँ

अनुवाद के उपकरण एवं साधन

Unit 3

तत्काल भाषांतरण और अनुवाद

तत्काल भाषांतरण : अवधारणा, स्वरूप और महत्व

तत्काल भाषांतरण की प्रक्रिया एवं क्षेत्र

तत्काल भाषांतरण और अनुवाद में साम्य-वैषम्य

Unit 4

हिंदी के विविध क्षेत्र और व्यावहारिक अनुवाद

प्रशासनिक हिंदी और अनुवाद

शब्दावली, टिप्पणी, प्रयुक्ति, विभिन्न पत्र, पदनाम, अनुभाग नाम, संक्षिप्तक्षर आदि के अनुवाद

बैंक, बीमा, वित्त और वाणिज्य क्षेत्र में अनुवाद

शब्दावली और अनुवाद

अनुच्छेदों, प्रयुक्तियों आदि के अनुवाद

विधि क्षेत्र में अनुवाद

विधि शब्दावली का अनुवाद

विधि सामग्री का अनुवाद

सामाजिक एवं सांस्कृतिक क्षेत्र में अनुवाद

खान-पान की शब्दावली और अनुवाद

रिश्ते-नातों की शब्दावली और अनुवाद

पर्व-उत्सवों तथा संस्कारों आदि की भाषा और अनुवाद

मुहावरों-लोकोक्तियों के अनुवाद

संचार माध्यम और अनुवाद (प्रिंट तथा इलेक्ट्रॉनिक माध्यमों का संदर्भ)

समाचार लेखन, वाचन और अनुवाद

विज्ञापन-निर्माण और अनुवाद प्रक्रिया

आँखों देखा हाल, उद् घोषणा और अनुवाद

मीडिया की अन्य सामग्री और अनुवाद

साहित्यिक अनुवाद

काव्यानुवाद

गद्यानुवाद

References

1. अनुवाद कला सिद्धांत और प्रयोग, कैलाशचन्द्र भाटिया
2. अनुवाद प्रक्रिया और स्वरूप, कैलाशचन्द्र भाटिया
3. अनुवाद विज्ञान और संप्रेषण, हरिमोहन
4. अनुवाद शास्त्र : व्यवहार से सिद्धांत की ओर, हेमचन्द्र पांडे

5. सर्जनात्मक साहित्य का अनुवाद, सुरेश सिंहल

Additional Resources:

अनुवाद प्रक्रिया, रीतारानी पालीवाल

अनुवाद सिद्धांत और समस्याएं, रवीन्द्रनाथ श्रीवास्तव

अनुवाद और रचना का उत्तर जीवन, रमण सिन्हा

भाषांतरण कला – एक परिचय, मधु धवन

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा और क्षेत्र अध्ययन

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

प्रयोजनमूलक हिन्दी संबंधी पारिभाषिक शब्दावली

हिंदी अनुप्रयोग : तकनीकी संसाधन एवं उपकरण (BAPPHCC04) Core Course - (CC) Credit:6

Course Objective(2-3)

तकनीकी क्षेत्र का व्यावहारिक ज्ञान देना

कंप्यूटर, इंटरनेट और कोश आदि की क्षमता विकसित करना

Course Learning Outcomes

रोजगारपरक तकनीकी क्षेत्र जैसे कंप्यूटर, इंटरनेट और कोश विज्ञान आदि की क्षमता का व्यावहारिक ज्ञान विकसित होगा

Unit 1

(क) कम्प्यूटर परिचय

कम्प्यूटर की विकास यात्रा

कम्प्यूटर की कार्यप्रणाली

कम्प्यूटर के विभिन्न घटक

कम्प्यूटर की संरचना (हार्डवेयर और सॉफ्टवेयर की भूमिका)

(ख) भाषाई कम्प्यूटर

यूनीकोड पूर्व

यूनीकोड की वर्तमान स्थिति

भाषाई कम्प्यूटर का भविष्य

हिंदी लेखन, प्रकाशन व वेब प्रकाशन के आवश्यक औजार (वर्ड प्रोसेसिंग, डाटा प्रोसेसिंग, फॉण्ट प्रबंधन, विविध तकनीक)

Unit 2

इंटरनेट का इतिहास और बदलता स्वरूप

इंटरनेट के बौद्धिक, निजी, सामुदायिक समूहों का परिचय

हिंदी विकीपीडिया का इस्तेमाल और उसकी विकास प्रक्रिया का अध्ययन

एनकोडिंग, फ़ाइल शेयरिंग, फ़ाइल कन्वर्जन

साइबर क्राइम, कानून तथा आचार-संहिताएँ

Unit 3

प्रायोगिक कार्य और इंटरनेट

एम. एस. ऑफिस का अध्ययन (हिंदी के विभिन्न कुंजीपटलों के संदर्भ में)

हिंदी में एक्सल शीट, पावर प्वाइंट का निर्माण तथा पेज मेकर में कार्य

ब्लॉग – प्रकाशन, अपलोडिंग, डाउनलोडिंग, इंटरनेट पर सामग्री-सृजन, यू-ट्यूब

विभिन्न कम्प्यूटर मशीनों पर कार्य

Unit 4

कोश

कोश : प्रयोजन तथा महत्व

कोश प्रयोग विधि

कोश के प्रकार – सामान्य कोश, विश्वकोश, समान्तर कोश, मुहावरा लोकोक्ति कोश, तकनीकी कोश आदि

References

1. कम्प्यूटर एक परिचय, सं. संतोष चौबे

2. एम एस ऑफिस – विज्ञान एवं प्रौद्योगिकी विभाग, भारत सरकार

Additional Resources:

कम्प्यूटर के भाषिक अनुप्रयोग, विजय कुमार मल्होत्रा इंटरनेट का संक्षिप्त इतिहास, ब्रूस स्टर्लिंग

कम्प्यूटर और हिंदी, हरिमोहन

समान्तर कोश, अरविन्द कुमार

तकनीकी सुलझनें, बालेन्दु शर्मा दधीच

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट असाइनमेंट

Keywords

प्रयोजनमूलक हिन्दी संबंधी पारिभाषिक शब्दावली

हिंदी भाषा : अनुप्रयोग के क्षेत्र (BAPPHCC01)Core Course - (CC) Credit:6

Course Objective(2-3)

पाठ्यक्रम का उद्देश्य भाषा के विविध व्यावहारिक एवं प्रायोगिक पक्षों को ध्यान में रखते हुए भाषा के व्यावहारिक तथ्यों से अवगत करने हेतु छात्रों को रोजगारपरक उपभोक्ता बाजार की पहचान एवं कार्यान्वयन करना ही मुख्य उद्देश्य रहा है। बाजार और व्यवसाय ने देशों की सीमाएं लांघ दी हैं। अतः ऐसे में भाषा का मजबूत होना आवश्यक है। सशक्त भाषा के बिना किसी राष्ट्र की उन्नति संभव नहीं है। बाजारवाद में भाषा की पकड़ रखने वाले कर्मियों की नितांत आवश्यकता है। इसीलिए राजभाषा, मानक भाषा, विधि क्षेत्र में, विज्ञापन में, खेलकूद आदि विभिन्न क्षेत्रों में हिंदी के उपयोगिता को ध्यान में रखते हुए यह पाठ्यक्रम निर्धारित किया गया है। इस पाठ्यक्रम का उद्देश्य छात्रों को सैद्धांतिक एवं व्यावहारिक ज्ञान देना रहा है।

Course Learning Outcomes

इस पाठ्यक्रम को पढ़ने- पढ़ाने की दिशा में निम्नलिखित परिणाम सामने आएंगे :-

1. इस पाठ्यक्रम के माध्यम से सीखने-सिखाने की प्रक्रिया में हिंदी भाषा व्यावहारिक एवं व्यवसाय के अनुरूप रूपों की विस्तृत जानकारी प्राप्त की जा सकेगी।
2. भाषा के सैद्धांतिक रूप के साथ साथ व्यावहारिक पक्ष को भी जाना जा सकेगा।
3. उच्च शैक्षिक स्तर पर हिंदी भाषा किस प्रकार महत्वपूर्ण भूमिका निभा सकती है, इससे संबंधित परिणाम को प्राप्त किया जा सकेगा।
4. छात्र अपनी भाषा को सीखने की प्रक्रिया में भाषागत मूल्यों को व्यावहारिक रूप से भी जान सकेंगे।
5. आज शिक्षा का व्यवसाय से भी संबंध है। अनेक चुनौतियों का सामना सशक्त भाषा के माध्यम से ही किया जा सकता है। यह पाठ्यक्रम वर्तमान संदर्भों के अनुकूल स्थापित हो सकेगा।

Unit 1

1. भाषा के विविध आयाम

- सामान्य भाषा – सम्प्रेषणमूलकता, भाषिक रूपों की विविधता, अर्थ की एकरूपता लक्षण और व्यंजना का रूढ़ प्रयोग
- रचनात्मक भाषा – अनुभूति की प्रधानता, अर्थ की विशिष्टता एवं विविधता, भाषा शैली की विविधता, सर्जनात्मक प्रयोग
- सीमित कोड, विस्तृत कोड की अवधारणा
- प्रयोजनमूलक भाषा – मानक भाषा की अवधारणा, अर्थ की सुनिश्चितता, सम्प्रेषणमूलकता, पारिभाषिक शब्दावली का प्रयोग

Unit 2

2. प्रयोजनमूलक हिंदी के क्षेत्र : (क) राजभाषा के रूप में हिंदी

- राजभाषा का अर्थ एवं महत्व
- प्रशासनिक भाषा का स्वरूप
- विधि क्षेत्र में हिंदी
- पारिभाषिक शब्दावली – हिंदी की प्रकृति और पारिभाषिक शब्द की निर्माण – प्रक्रिया

Unit 3

3. प्रयोजनमूलक हिंदी के क्षेत्र (ख) व्यावसायिक क्षेत्र में हिंदी

- व्यावसायिक क्षेत्र की भाषा – बैंक, बीमा, मीडिया
- विज्ञापन एवं बाजार की हिंदी
- प्रस्तुति - कलाओं में हिंदी
- खेलकूद में हिंदी

Unit 4

4. प्रयोजनमूलक हिंदी के क्षेत्र (ग) शिक्षा तथा विज्ञान के क्षेत्र में हिंदी

- शिक्षा - माध्यम के रूप में हिंदी
- वैज्ञानिक क्षेत्र में हिंदी
- मानविकी - अध्यापन में हिंदी का प्रयोग
- वाणिज्य - अध्यापन में हिंदी का प्रयोग

References

1. भाषा स्वरूप और संरचना – हेमचंद्र
2. मानक हिंदी : संरचना एवं प्रयोग – रामप्रकाश
3. प्रयोजनमूलक हिंदी : सिद्धांत एवं प्रयोग – दंगल झाल्टे

Additional Resources:

1. व्यावहारिक राजभाषा कोश – दिनेश चमोला
2. प्रयोजनमूलक हिंदी – रघुनन्दन प्रसाद शर्मा

Teaching Learning Process

पाठ्यक्रम को ठीक प्रकार से संचालित करने हेतु सिद्धांत के अतिरिक्त 'व्यावहारिकता' पर अधिक बल देना चाहिए। पी.पी.टी (power point presentation) तथा दृश्य-श्रव्य माध्यम इत्यादि के द्वारा प्रभावी बनाया जा सकता है। सीखने की प्रक्रिया में इस पाठ्यक्रम में हिंदी भाषा दक्षता को मजबूती देना है। छात्र हिंदी भाषा में नयापन और वैश्विक माध्यम की निर्माण प्रक्रिया में सहायक बन सकें। अपनी भाषा में व्यवहार कुशलता एवं निपुणता प्राप्त कर सकें। प्रस्तुत पाठ्यक्रम को निम्नांकित सप्ताहों में विभाजित किया जा सकता है -

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

‘सम्प्रेषण’, ‘व्यावहारिक’ ‘प्रयोजन’, ‘राजभाषा’, ‘प्रशासनिक’, ‘पारिभाषिक’, ‘शब्दावली’, ‘आयाम’

हिंदी भाषा : कार्यालयी लेखन (BAPPHCC02)Core Course - (CC) Credit:6

Course Objective(2-3)

कार्यालयी हिन्दी भाषा का व्यावहारिक ज्ञान विकसित करना

कार्यालयी आवश्यकताओं और व्यावहारिक शब्दावली से परिचित कराना

Course Learning Outcomes

कार्यालयी हिन्दी का व्यावहारिक ज्ञान होगा

कार्यालय के कंटेंट और शब्दावली से परिचय होगा

Unit 1

कार्यालयी भाषा : सामान्य परिचय

कार्यालय : अवधारणा एवं परिचय

कार्यालयी कार्य पद्धति

कार्यालयी भाषा : परिभाषा, अवधारणा और संरचना

कार्यालयी भाषा की विशेषताएं

कार्यालय की आचार-संहिता

Unit 2

कार्यालयी पत्र

आधुनिक युग में कार्यालयी पत्र का स्वरूप और महत्व

कार्यालयी पत्रों की प्रमुख विशेषताएं, कार्यालयी पत्र के प्रकार

कार्यालय में प्राप्त पत्रों का अध्ययन, टिप्पण और सुझाव

पत्रोत्तर और नए पत्रों का लेखन (प्रारूपण)

Unit 3

कार्यालयी पत्रों की लेखन-विधि

सरकारी पत्रों के प्रमुख अंग

कार्यालयी पत्र-लेखन के विभिन्न चरण

प्रारूपण, टिप्पण

प्रेस-विज्ञप्ति, कार्यालय ज्ञापन, कार्यालय आदेश, प्रतिवेदन-लेखन

अन्य कार्य – नोटशीट, फाईलिंग आदि

कार्यालयी प्रयुक्तियाँ : अवधारणा एवं महत्व

विशिष्ट कार्यालयी शब्दावली : 100 (अंग्रेजी-हिंदी)

विशिष्ट कार्यालयी शब्दावली : 100 (हिंदी-अंग्रेजी)

References

1. प्रारूपण शासकीय पत्राचार और टिप्पण लेखन विधि, राजेन्द्र प्रसाद श्रीवास्तव
2. प्रयोजनमूलक भाषा और कार्यालयी हिंदी, कृष्ण कुमार गोस्वामी

Additional Resources:

सरकारी कार्यालयों में हिंदी का प्रयोग, गोपीनाथ श्रीवास्तव

विशिष्ट पत्र-लेखन, रूपचंद्र गौतम

कार्यालयी हिंदी, हरिबाबू कंसल

आजीविका साधक हिंदी, पूरनचंद टंडन

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

कार्यालयी शब्दावली

मनोरंजन उद्योग और हिंदी (BAPPHDSE01) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

मनोरंजन-उद्योग की स्थिति का अध्ययन : क्षेत्र और विस्तार

सिनेमा और हिंदी गीत, धारावाहिकों और रियलिटी-शो में प्रयुक्त हिंदी

Course Learning Outcomes

भारतीय मनोरंजन-उद्योग की स्थिति का अध्ययन

हिन्दी सिनेमा और हिंदी गीतों की समझ

धारावाहिकों और रियल्टी-शो में प्रयुक्त हिंदी की स्थिति को जानना

Unit 1

1. मनोरंजन की भाषा के रूप में हिंदी

मनोरंजन की अवधारणा और स्वरूप

मनोरंजन और भाषा की संप्रेषणीयता

मनोरंजन की भाषा और विभिन्न क्षेत्रीय भाषाओं का सम्मिश्रण

Unit 2

2. रेडियो और हिंदी भाषा

एफ. एम. चैनलों की हिंदी

आकाशवाणी के अन्य चैनलों की हिंदी

रेडियो समाचारों की भाषा

रेडियो के अन्य कार्यक्रमों में प्रयुक्त हिंदी

Unit 3

3. इंटरनेट और हिंदी भाषा

एस. एम. एस. की हिंदी

यू-ट्यूब और हिंदी

ट्विटर की हिंदी – वाट्सअप की हिंदी

ब्लॉग और फेसबुक में प्रयुक्त हिंदी

Unit 4

4. मनोरंजन-उद्योग में हिंदी-प्रयोग

मनोरंजन-उद्योग के विभिन्न क्षेत्र और विस्तार

सिनेमा और हिंदी

ऐतिहासिक-पौराणिक, सामाजिक धारावाहिकों और रियल्टी-शो में प्रयुक्त हिंदी

फ़िल्मी गीतों की हिंदी (रोमांटिक, देशभक्ति, समूह-गीत और आइटम गीत)

References

उत्तर-आधुनिक मीडिया तकनीक, हर्षदेव

नयी संचार प्रौद्योगिकी पत्रकारिता, कृष्ण कुमार रत्न

Additional Resources:

पटकथा कैसे लिखें, राजेन्द्र पांडे

मीडिया समग्र-खण्ड, प्रो. जगदीश्वर चतुर्वेदी

हिंदी सिनेमा का सफरनामा, जय सिंह

Teaching Learning Process

व्याख्यान, सामूहिक परिचर्चा, फिल्म आदि विधाओं का प्रदर्शन

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट, असाइनमेंट

Keywords

मनोरंजन जगत की शब्दावली

विज्ञान, तकनीक, प्रौद्योगिकी और हिंदी (BAPPHDSE04) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

प्रत्येक भाषा की अपनी एक वैज्ञानिकता होती है। हिंदी भाषा भी इससे अछूती नहीं। लेकिन हिंदी को भाषा वैज्ञानिक दृष्टि से समृद्ध बनाने और इसे रोजगारपरक बनाने के लिए इसे सूचना-प्रौद्योगिकी और आज की तकनीक से जोड़ना आवश्यक है। इस पाठ्यक्रम का उद्देश्य हिंदी भाषा को इसी वैज्ञानिकता से जोड़ने और उसे बाजार की भाषा बनाने से है। जिससे इसको पढ़ने - लिखने वाले छात्र इसकी तकनीक को समझकर इसे समयोपयोगी बना सके।

Course Learning Outcomes

इसको पढ़ने के बाद छात्र को सूचना -प्रौद्योगिकी की भाषा का ज्ञान हो सकेगा। तकनीक के क्षेत्र में प्रयुक्त शब्दावली का व्यावहारिक ज्ञान प्राप्त हो सकेगा।

Unit 1

1. एक भाषा के रूप में हिंदी.
2. हिंदी भाषा का वैज्ञानिक अध्ययन.
3. सूचना-प्रौद्योगिकी और हिंदी.
4. तकनीक में हिंदी का उपयोग.
5. हिंदी भाषा के विभिन्न वैज्ञानिक उपकरण.

Unit 2

1. विज्ञान की भाषा और हिंदी.
2. तकनीक की भाषा और हिंदी.
3. सूचना-प्रौद्योगिकी और हिंदी.
4. सोशल मीडिया के विभिन्न उपकरण.
5. सोशल मीडिया में हिंदी.

Unit 3

1. भाषा का बृहत्तर उपयोग.- फेसबुक से लेकर ट्विटर तक.
2. टेलीविजन की भाषा.

3. एफ. एम. रेडियो की हिंगलिश भाषा.

4. हिंदी का अँग्रेजी के साथ मिश्रण.

5. आज की हिंदी

References

1. प्रायोगिक हिंदी- संपादक- प्रो. रमेश गौतम, ओरियंट ब्लैकस्वान, प्रकाशन, दिल्ली.

2. प्रयोजनमूलक हिन्दी: सिद्धान्त और प्रयोग- दंगल झाल्टे

Additional Resources:

राजभाषा शब्दकोश- हरदेव बाहरी

भाषा और प्रौद्योगिकी - डॉ. विनोद कुमार प्रसाद

Teaching Learning Process

60 प्रतिशत सैध्यान्तिकी और 40 प्रतिशत प्रायोगिक. उदाहरण के लिए ब्लॉग बनाना, सोशल मीडिया प्लेटफार्म पर लिखना, ऑनलाइन कंटेंट लिखना, वेबसाइट पेज बनाना, अपना हिंदी का यू.आर.एल. सृजित करना आदि.

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

विज्ञान, तकनीक, प्रौद्योगिकी, भाषा, समाज

सृजनात्मक लेखन : सिद्धान्त और व्यवहार (BAPPHDSE03) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

1. विद्यार्थियों को सृजनात्मक लेखन के विस्तृत क्षेत्र से परिचित कराना
2. सृजनात्मक भाषा के स्वरूप और विशेषताओं का बोध कराना
3. साहित्यिक एवं व्यावसायिक लेखन का अभ्यास कराना

Course Learning Outcomes

1. सृजनात्मक लेखन की पूरी प्रक्रिया को समझना
2. सृजनात्मक लेखन के विविध रूपों से परिचित होना
3. सृजनात्मक लेखन की दृष्टि से भाषा-दक्षता
4. बाज़ार की माँग के अनुसार लेखन कार्य के लिए तैयार होना

Unit 1

सृजनात्मक लेखन : सामान्य परिचय

- सृजनात्मक लेखन : अर्थ, स्वरूप और महत्व
- सृजनात्मक लेखन के उद्देश्य
- सृजनात्मक लेखन के प्रमुख प्रकार : साहित्यिक एवं व्यावसायिक

Unit 2

सृजनात्मक लेखन की प्रक्रिया

- विषय बोध
- गवेषणा (रिसर्च)
- सृजन की विविध विधाएँ
- उद्देश्य के अनुसार विधा का निश्चय

Unit 3

भाषिक योग्यता का विकास

- भाषा की सृजनात्मकता
- सृजनात्मक भाषा के विविध पक्ष: शब्द शक्तियाँ, अलंकरण, सादृश्य-विधान, मानवीकरण, मुहावरे, लोकोक्तियाँ, भाषिक कोड, कोड मिश्रण आदि
- साहित्यिक लेखन के लिए भाषा की विशेषताएँ
- व्यावसायिक लेखन के लिए भाषा की विशेषताएँ

Unit 4

सृजनात्मक लेखन : अभ्यास

- साहित्यिक लेखन : कविता, कहानी, विधागत अंतरण (जैसे-कथा से संवाद)
- मीडिया लेखन : फिल्म एवं पुस्तक समीक्षाएँ, विज्ञापन, लेख, फीचर, सम्पादकीय
- इन्टरनेट के लिए लेखन : ब्लॉग एवं वेबसाइट

References

1. रचनात्मक लेखन, सं. रमेश गौतम
2. रचनात्मक लेखन, हरीश अरोड़ा, अनिल कुमार सिंह
3. संचार भाषा हिंदी, सूर्य प्रसाद दीक्षित

Additional Resources:

बदलता समाज मनोविज्ञान और हिंदी, पूरनचंद टंडन, सुनील तिवारी

वर्तमान संदर्भ में हिंदी, मुकेश अग्रवाल

Teaching Learning Process

- कक्षाओं में पठन-पाठन पद्धति
- परिचर्चाएँ

समूह में प्रोजेक्ट प्रस्तुति

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

पारिभाषिक शब्दावली

हिंदी के विविध रूप (BAPPHDSE02) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

1. हिन्दी भाषा के राष्ट्रीय और अंतर्राष्ट्रीय स्वरूप की जानकारी के साथ-साथ प्रशासन, मीडिया, साहित्य और सूचना के क्षेत्रों में प्रयुक्त हिन्दी के विविध रूपों को समझने का अवसर मिलता है।
2. सूचना प्रौद्योगिकी के युग में हिन्दी भाषा की वैश्विक उपस्थिति और शिक्षण

Course Learning Outcomes

- हिन्दी भाषा के क्षेत्र विस्तार, राष्ट्रीय और अंतर्राष्ट्रीय स्थिति की जानकारी होगी
- राजभाषा, राष्ट्रभाषा की अवधारणा और हिन्दी में रोजगार के विकल्पों की जानकारी होगी

Unit 1

1. हिंदी का क्षेत्रगत विस्तार

- भाषा के रूप में हिंदी का विकास और उसके विविध अनुप्रयोग
- साहित्य एवं संचार की भाषा के रूप में हिंदी का विस्तार
- प्रशासनिक भाषा एवं राजभाषा के रूप में हिंदी
- हिंदी और हिंदी इतर भाषा-भाषी क्षेत्रों में हिंदी का स्वरूप

Unit 2

2. हिंदी इतर भाषा-भाषी क्षेत्रों में हिंदी का स्वरूप

- स्वाधीनता आन्दोलन के दौर में हिंदी इतर भाषा-भाषी क्षेत्रों में हिंदी
- हिंदी इतर क्षेत्रों में हिंदी के अनुप्रयोग
- भूमंडलीकरण, हिंदी इतर क्षेत्र और हिंदी भाषा
- रोजगार की स्थितियाँ, हिंदी इतर क्षेत्र और हिंदी भाषा

Unit 3

3. हिंदी भाषी राज्यों में हिंदी

- हिंदी का जनपदीय और राष्ट्रीय सन्दर्भ
- हिंदी और क्षेत्रीय बोलियों का अन्तर्संबंध

- राष्ट्रभाषा एवं संपर्क भाषा के रूप में हिंदी
- साहित्य, संचार एवं मनोरंजन के क्षेत्र में हिंदी

Unit 4

4. हिंदी का अन्तरराष्ट्रीय सन्दर्भ

- हिंदी का वैश्विक विस्तार
- अंतर्राष्ट्रीय हिंदी साहित्य का परिचय
- अंतर्राष्ट्रीय स्तर पर हिंदी शिक्षण
- वैश्विक स्तर पर प्रकाशित हिंदी की प्रमुख ई-पत्र-पत्रिकाएँ

References

1. हिंदी का विकास और स्वरूप, भाटिया कैलाशचंद्र
2. हिंदी और उसकी उपभाषाएँ, वर्मा विमलेशकांति
3. भाषा और समाज, शर्मा रामविलास
4. भाषाई अस्मिता और हिंदी, श्रीवास्तव रवीन्द्रनाथ
5. हिंदी भाषा, तिवारी भोलानाथ

Additional Resources:

1. भाषा पत्रिका
2. गवेषणा पत्रिका
3. केन्द्रीय हिन्दी संस्थान

Teaching Learning Process

सामूहिक चर्चा एवं व्याख्यान

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

- विकास
- अनुप्रयोग
- साहित्य
- संचार
- प्रशासनिक
- राजभाषा
- भाषा-भाषी

पारिभाषिक शब्दावली एवं कोश विज्ञान (BAPPHSEC04) Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

पारिभाषिक शब्दावली एवं कोश विज्ञान का परिचय

निर्माण प्रसार और प्रयोग का व्यावहारिक ज्ञान देना

Course Learning Outcomes

पारिभाषिक शब्दावली एवं कोश विज्ञान का परिचय, निर्माण, प्रसार और प्रयोग का व्यावहारिक ज्ञान प्राप्त होगा

Unit 1

1. पारिभाषिक शब्दावली

स्वरूप, अवधारणा एवं विशेषताएँ

वैज्ञानिक एवं तकनीकी शब्दावली आयोग का परिचय

विभिन्न क्षेत्र – मानविकी, वाणिज्य, विधि, विज्ञान आदि

अनुप्रयोग की उपादेयता

Unit 2

2. पारिभाषिक शब्दावली निर्माण के संप्रदाय एवं सिद्धांत

पारिभाषिक शब्दावली का इतिहास

पारिभाषिक शब्दावली की निर्माण-प्रक्रिया

पारिभाषिक शब्दावली की एकरूपता

पारिभाषिक शब्दावली के उपयोग की प्रविधि

Unit 3

3. कोश : अवधारणा एवं प्रकार

अभिप्राय और परिभाषा

उपयोगिता और महत्व

कोश : वर्गीकरण के आधार

भाषाकोश और भाषेतर कोश

Unit 4

4. कोश निर्माण की प्रक्रिया

शब्द संकलन एवं चयन, वर्तनीक्रम

व्याकरणिक कोटि और स्रोत

प्रविष्टि के आधार

शब्द का अर्थ, प्रयोग एवं विस्तार

References

कोश विज्ञान, भोलानाथ तिवारी

हिंदी कोश रचना: प्रकार और रूप, रामचंद्र वर्मा

हिंदी शब्द सागर, नागरी प्रचारिणी सभा, प्रयाग

Additional Resources:

कोश विज्ञान : सिद्धांत और प्रयोग, रामआधार सिंह

कोश निर्माण : प्रविधि एवं प्रयोग, त्रिभुवननाथ शुक्ल

पारिभाषिक शब्दावली की विकासयात्रा, गार्गी गुप्त

'अनुवाद' त्रैमासिक (कोश विशेषांक) अंक - 94-95

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

कोशविज्ञान व अन्य पारिभाषिक शब्दावली

लेखन कौशल : विस्तार एवं संभावनाएं (BAPPHSEC01) Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

विद्यार्थियों के लिए पाठ्यक्रम में हिंदी भाषा संबंधी व्यावहारिक जानकारी देना अत्यंत आवश्यक है। पूरी दुनिया ने वैश्वीकरण के युग में प्रवेश कर लिया है। बाज़ार और व्यवसाय ने देशों की सीमाएं लांघ दी हैं। अतः ऐसे में भाषा का मजबूत होना आवश्यक है। यह पाठ्यक्रम बाज़ारवाद और भूमंडलीकरण की वैश्विक गति के बीच से ही हिंदी भाषा और कंप्यूटर के माध्यम से ही राष्ट्रीय प्रगति को भी सुनिश्चित करेगा। क्योंकि सशक्त भाषा के बिना किसी राष्ट्र की उन्नति संभव नहीं है। यह पाठ्यक्रम वर्तमान संदर्भों के अनुकूल है। साथ ही इस पाठ्यक्रम का आधुनिक रूप रोजगारपरक भी है। कंप्यूटर एवं अन्य साधनों को हिंदी से जोड़ना विद्यार्थियों को व्यावहारिक पहलू से अवगत करा सकेगा।

Course Learning Outcomes

इस पाठ्यक्रम को पढ़ने- पढ़ाने की दिशा में निम्नलिखित परिणाम सामने आएंगे :-

- विद्यार्थी हिंदी को व्यावहारिक रूप से सीख कर आत्मविश्वास से पूर्ण अनुभव करेगा।
- हिंदी भाषा में इंटरनेट और वेबसाइट्स का प्रयोग कर सकेगा।
- उच्च शैक्षिक स्तर पर हिंदी भाषा किस प्रकार महत्वपूर्ण भूमिका निभा सकती है, इससे संबंधित परिणाम को प्राप्त किया जा सकेगा।
- राजभाषा के रूप में हिंदी की प्रगति को सुनिश्चित किया जा सकेगा।
- भाषा के सैद्धांतिक रूप के साथ साथ व्यावहारिक पक्ष को भी जाना जा सकेगा।
- आज शिक्षा का व्यवसाय से भी संबंध है। अनेक चुनौतियों का सामना सशक्त भाषा के माध्यम से ही किया जा सकता है। यह पाठ्यक्रम वर्तमान संदर्भों के अनुकूल स्थापित हो सकेगा।
- छात्र अपनी भाषा को सीखने की प्रक्रिया में भाषागत मूल्यों को व्यावहारिक रूप से भी जान सकेंगे।

Unit 1

1. लेखन कौशल के आयाम

- लेखन कौशल : व्यवहार के विभिन्न क्षेत्र – प्रेस, रेडियो, टेलीविजन एवं मल्टी मीडिया
- प्रूफ रीडिंग एवं सम्पादन – समाचार फीचर सम्पादकीय, वार्ता, स्तम्भ एवं साक्षात्कार में प्रूफ रीडिंग एवं सम्पादन
- रेडियो एवं टेलीविजन – उच्चारण की शुद्धता, वॉइस मॉड्युलेशन, वाचन प्रक्रिया, रेडियो के लिए समाचार, वार्ता, रेडियो रूपक आदि, टेलीविजन के लिए समाचार वाचन कार्यक्रम संयोजन
- मल्टी मीडिया में हिंदी भाषिक अनुप्रयोग मोबाइल, वीडियो गेम, टैबलेट, आईपैड, ई-बुक रीडर

Unit 2

2. लेखन कौशल के सर्जनात्मक रूप

- कविता, कहानी, रिपोर्टाज एवं संवाद
- व्यावसायिक लेखन, भाषण, गीत, स्लोगन, होर्डिंग्स, विज्ञापन
- बच्चों के लिए मनोरंजनपरक, साहित्यिक लेखन और खेल संबंधी लेखन
- विज्ञापन कथा और यात्रा साहित्य लेखन की प्रक्रिया

Unit 3

3. लेखन कौशल के आधार – अनुकूल परिस्थितियाँ, विषय का ज्ञान

- लेखन कौशल प्रक्रिया – विषय वस्तु का चयन
- ज्ञान एवं अनुभव के आधार पर लेखन
- विज्ञापन कथा और यात्रा साहित्य और यात्रा साहित्य का निर्माण और लेखन कार्य
- लेखन कार्य का प्रूफ – शोधन एवं सम्पादन

Unit 4

4. अंतिम प्रारूप मूल्यांकन

- लेखन संबंधी व्यावहारिक कार्य
- कविता लेखन, कहानी लेखन
- विज्ञापन लेखन, स्लोगन लेखन
- साक्षात्कार की तैयारी

References

1. रचनात्मक लेखन – संपा. रमेश गौतम
2. हिंदी प्रयोजनमूलक हिंदी और अनुवाद – डॉ. पूरनचंद टंडन
3. टेलीविजन लेखन – असगर वजाहत और प्रभात रंजन

Additional Resources:

1. टेलीविजन की भाषा – हरीशचंद्र बर्णवाल
2. हिंदी भाषा – हरदेव बाहरी

Teaching Learning Process

सीखने की प्रक्रिया में इस पाठ्यक्रम में हिंदी भाषा दक्षता को मजबूती देना है। छात्र हिंदी भाषा में नयापन और वैश्विक माध्यम की निर्माण प्रक्रिया में सहायक बन सकें। अपनी भाषा में व्यवहार कुशलता एवं निपुणता प्राप्त कर सकें। प्रस्तुत पाठ्यक्रम को निम्नांकित सप्ताहों में विभाजित किया जा सकता है -

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

लेखन कौशल, मल्टी मीडिया, प्रूफ रीडिंग, सम्पादन, वॉईस मॉड्युलेशन, वाचन प्रक्रिया, वार्ता, रेडियो रूपक, टैबलेट, आईपैड, ई-बुक रीडर, रिपोर्टाज

वेब पत्रकारिता (BAPPHSEC02) Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

हिन्दी की वेब पत्रकारिता की समझ

नए क्षेत्रों में कार्य की क्षमता

वेब कंटेंट लेखन

Course Learning Outcomes

हिन्दी वेब पत्रकारिता की स्थिति और आवश्यकताओं को समझना

नए अवसरों और चुनौतियों को जानना

Unit 1

वेब पत्रकारिता : परिचय

इंटरनेट पत्रकारिता और भारतीय समाज

वेब पत्रकारिता – परिभाषा, इतिहास, संचार माध्यम के रूप में वेब पत्रकारिता

न्यू मीडिया के रूप में वेब पत्रकारिता – उपयोगिता, शक्ति एवं सीमाएँ

भूमंडलीकृत संचार-क्रान्ति और हिंदी पत्रकारिता

Unit 2

वेब पत्रकारिता : अंतर्वस्तु निर्माण

वेब पत्रकारिता सामग्री का एकत्रीकरण

वेब कंटेंट लेखन-प्रक्रिया (विषय एवं भाषा)

वेब समाचार निर्माण एवं सम्पादन

वेब कंटेंट का ले-आउट, डिज़ाइन एवं प्रस्तुति

Unit 3

हिंदी पत्रकारिता के प्रमुख वेब पोर्टल : एक परिचय

प्रमुख हिंदी पत्र-पत्रिकाएँ और उनके वेब पोर्टल

सोशल मीडिया के रूप में वेब पत्रकारिता

ब्लॉग लेखन : फेसबुक, ट्विटर और विविध पत्रिकाएँ

सोशल मीडिया का प्रभाव

Unit 4

वेब पत्रकारिता : व्यावहारिक कार्य

किसी एक हिंदी अखबार के वेब पोर्टल की भाषा का अध्ययन

किसी एक ऑनलाइन समाचार की केस स्टडी

किन्हीं दो प्रमुख हिंदी वेब पोर्टलों की विषय-वस्तु का तुलनात्मक विश्लेषण

किसी प्रमुख ऑनलाइन पत्रिका के सामाजिक प्रभाव का सर्वेक्षण एवं उसका विश्लेषण

References

1. डिजिटल ब्रॉडकास्टिंग जर्नलिज्म, जितेन्द्र शर्मा
2. Communication, Technology and development, I.P. Tiwari

Additional Resources:

Net Media and Communication, Jagdish Chakrawarty

Internet Journalism in India, Om Gupta

Mass Media and Information Technology, J.K. Singh

Teaching Learning Process

सामूहिक चर्चा, वेब अध्ययन, लेब और व्याख्यान

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

वेब जगत की शब्दावली

हिंदी शिक्षण (BAPPHSEC03) Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

- हिंदी भाषा शिक्षण की प्रकृति, आवश्यकता और उसके सामाजिक एवं राष्ट्रीय महत्व को बताना व सामान्य और विशिष्ट प्रयोजन के लिए भाषा शिक्षण की भूमिका निर्धारित करना ।
- हिंदी भाषा शिक्षण की विविध विधियों को व्याख्यायित करना एवं चुनौतियों को बताना ।
- हिंदी गद्य और पद्य शिक्षण के संबंध में विद्यार्थियों को जानकारी प्रदान करना ।
- भाषा शिक्षण के परीक्षण और मूल्यांकन के महत्व विद्यार्थियों को बताना ।

- हिंदी कौशल से सम्बंधित विद्यार्थियों को जानकारी उपलब्ध कराना जिससे विद्यार्थी हिंदी भाषा के चारों कौशलों की जानकारी प्राप्त कर सकें ।

Course Learning Outcomes

इस पाठ्यक्रम को पढ़ने- पढ़ाने की दिशा में निम्नलिखित परिणाम सामने आएंगे :-

1. विद्यार्थी इस पाठ्यक्रम द्वारा भाषा का की सामाजिक भूमिका को समझ सकेगा तथा भारत राष्ट्र में हिंदी भाषा के महत्व को जान सकेगा ।
2. विद्यार्थी प्रथम भाषा, मातृभाषा तथा अन्य भाषाओं के महत्व को भी जान सकेंगे जिसके द्वारा उनमें राष्ट्र के प्रति आस्था उत्पन्न होगी ।
3. किसी भी भाषा के ज्ञान हेतु श्रवण, भाषण, वाचन, लेखन इन चारों कौशलों का सामान्य ज्ञान होना अति आवश्यक है । इस पाठ्यक्रम द्वारा विद्यार्थी हिंदी शिक्षण के इन चारों कौशलों का सामान्य ज्ञान प्राप्त कर सकेंगे ।
4. विद्यार्थी हिंदी साहित्य के गद्य और पद्य पक्ष के महत्व को समझ सकेंगे जिसके परिणामस्वरूप उनमें हिंदी साहित्य लेखन एवं पठन के प्रति रुचि विकसित हो सकेगी ।
5. भाषा परीक्षण और मूल्यांकन द्वारा भाषा के व्यावहारिक पहलू को देखा जा सकेगा ।

Unit 1

1. भाषा शिक्षण की अवधारणा

- भाषा शिक्षण : अभिप्राय तथा उद्देश्य
- हिंदी शिक्षण का राष्ट्रीय, सामाजिक और भाषिक सन्दर्भ
- प्रथम भाषा, मातृभाषा तथा अन्य भाषा (द्वितीय एवं विदेशी) की संकल्पना
- सामान्य और विशिष्ट प्रयोजन के लिए भाषा शिक्षण

Unit 2

2. हिंदी भाषा शिक्षण

- हिंदी की भाषिक संरचना की समझ
- व्याकरण, शब्द, वाक्य, अर्थ
- लेखन, वार्तालाप, संक्षेपण, पल्लवन, टिप्पण, प्रारूपण, अपठित गद्यांश
- हिंदी भाषायी कौशल (श्रवण, भाषण, वाचन, लेखन)

Unit 3

3. हिंदी साहित्य शिक्षण

- साहित्य शिक्षण की विधि
- साहित्य शिक्षण की चुनौतियां और पाठ
- पद्य शिक्षण
- गद्य शिक्षण

Unit 4

4. भाषा – परीक्षण और मूल्यांकन

- भाषा परीक्षण की संकल्पना
- भाषा – मूल्यांकन की संकल्पना
- भाषा परीक्षा के विविध प्रकार
- मूल्यांकन के प्रकार

References

1. भाषा शिक्षण- रवीन्द्रनाथ श्रीवास्तव
2. अन्य भाषा – शिक्षण के कुछ पक्ष – संपा. अमर बहादुर सिंह
3. भाषा – शिक्षण- भोलानाथ तिवारी

4. भाषा : स्वरूप और संरचना- हेमचंद्र पांडे

Additional Resources:

1. अनुप्रयुक्त भाषाविज्ञान – संपा. रवीन्द्रनाथ श्रीवास्तव, भोलानाथ तिवारी, कृष्ण कुमार गोस्वामी
2. हिंदी भाषा की रूप संरचना – भोलानाथ तिवारी
3. हिंदी : शब्द-अर्थ-प्रयोग – हरदेव बाहरी
4. भाषा –शिक्षण –लक्ष्मीनारायण शर्मा

Teaching Learning Process

कौशल संवर्द्धक पाठ्यक्रम (Skill Enhancement Course) को ठीक प्रकार से संचालित करने हेतु 'सिद्धांत पक्ष' के साथ-साथ 'प्रायोगिक पक्ष' पर भी ध्यान देना आवश्यक है। पी.पी.टी (power point presentation) तथा दृश्य-श्रव्यसंबंधी इत्यादि साधनों के द्वारा पाठ्यक्रम को प्रभावी बनाया जा सकता है जिसके माध्यम से विद्यार्थी हिंदी भाषा के शिक्षण में व्यवहार कुशलता एवं निपुणता अर्जित कर सकें। प्रस्तुत पाठ्यक्रम को निम्नांकित सप्ताहों में विभाजित किया जा सकता है -

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

'शिक्षण', 'अवधारणा', 'अनुप्रयुक्त', 'कौशल', 'स्वरूप', 'परीक्षण', 'मूल्यांकन', 'प्रारूपण', 'टिप्पण', 'संकल्पना', 'संक्षेपण', 'प्रयोजन', 'पल्लवन', 'प्रारूपण',

कम्प्यूटर और हिंदी (BAPPHGE01) Generic Elective - (GE) Credit:6

Course Objective(2-3)

हिन्दी में कंप्यूटर पर काम करने की क्षमता विकसित करना

विभिन्न समस्याओं संभावनाओं से परिचित कराना

Course Learning Outcomes

कंप्यूटर पर हिन्दी से संबन्धित रोजगार के लिए तैयार होना

व्यावहारिक ज्ञान होना

Unit 1

1. भाषा और प्रौद्योगिकी : एक अंतर्संबंध

कम्प्यूटर और भारतीय भाषाएँ

कम्प्यूटर और हिंदी : चुनौतियाँ एवं संभावनाएँ

कम्प्यूटर में हिंदी के विभिन्न प्रयोग

हिंदी के विभिन्न सॉफ्टवेयर

Unit 2

2. कम्प्यूटर और हिंदी

हिंदी फॉण्ट का अनुप्रयोग : यूनिकोड से पूर्व एवं उसके पश्चात

देवनागरी लिपि का स्वरूप एवं विकास

हिंदी कीबोर्ड का स्वरूप एवं विकास

हिंदी वेब डिजाइनिंग, हिंदी वेबसाइट्स और हिंदी ई-पोर्टल

Unit 3

3. कम्प्यूटर, हिंदी लेखन एवं प्रकाशन

हिंदी ई-पत्र-पत्रिकाएँ (विषय वस्तु एवं भाषिक विश्लेषण)

हिंदी ब्लॉग लेखन

हिंदी विकीपीडिया लेखन

कम्प्यूटर और हिंदी विज्ञापन लेखन

Unit 4

4. कम्प्यूटर एवं हिंदी के अन्य आयाम

ऑन-लाइन सेवाएँ और हिंदी

ई-लर्निंग और हिंदी

ई-गवर्नेंस एवं राजभाषा हिंदी की स्थिति

कम्प्यूटरकृत हिंदी भाषा का अध्ययन

References

कम्प्यूटर : एक परिचय, सं. संतोष चौबे

इंटरनेट, शशि शुक्ला

इंटरनेट का संक्षिप्त इतिहास, (ब्रूस स्टर्लिंग) दीवान-ए-सराय 01, वाणी प्रकाशन

Additional Resources:

वाक : अंक (तीन) वाणी प्रकाशन

कम्प्यूटर के भाषिक प्रयोग, विजय कुमार मल्होत्रा

तकनीकी सुलझनें, बालेन्दु शर्मा दधीचि

Teaching Learning Process

कम्प्यूटर लेब, कक्षा व्याख्यान, सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

कम्प्यूटर शब्दावली

जनमाध्यम और हिंदी (BAPPHGE04) Generic Elective - (GE) Credit:6

Course Objective(2-3)

हिन्दी जनमाध्यमों की स्थिति, संभावनाएं और चुनौतियों का अध्ययन

Course Learning Outcomes

व्यावसायिक पत्रकारिता की जानकारी

जनमत की महत्ता, सत्ता के सरोकार की समझ विकसित होगी

Unit 1

1. हिंदी जनमाध्यम : परिचय, अवधारणा और सिद्धांत

जनमाध्यमों का स्वरूप और प्रकार

जनमाध्यमों की कार्यशैली, उद्देश्य और अपेक्षाएँ

आधुनिक परिप्रेक्ष्य में जनमाध्यम सैद्धांतिकी

प्रोपेगैण्डा, जनमाध्यम और बाजार

Unit 2

2 हिंदी जनमाध्यम : स्वरूप विस्तार

स्वतंत्रता पूर्व जनमाध्यमों का परिचय (विभिन्न समाचार पत्रों और रेडियो के संदर्भ में)

व्यावसायिक पत्रकारिता का विस्तार (हिंदी पत्र-पत्रिकाएँ तथा श्वेत-श्याम टेलीविज़न)

खबरिया चैनल और केबल नेटवर्किंग

हिंदी जनमाध्यम और स्वामित्व का प्रश्न

Unit 3

3. जनमत-निर्माण में जनमाध्यम की भूमिका

‘जन’ की अवधारणा

जनमत की महत्ता

जनमत और सत्ता के सरोकार

जनमत, प्रचार और प्रभाव

Unit 4

4. जनमाध्यम और हिंदी

ग्रामीण क्षेत्र और हिंदी जनमाध्यम - (रिपोर्टिंग, समाचार, फीचर, लाइव-टैश्य, साक्षात्कार)

रोजगार और कृषि संबंधी हिंदी के समाचार पत्र और चैनल

स्थानीय समस्याएँ, संसदीय प्रतिनिधित्व

सांस्कृतिक पत्रकारिता और हिंदी

References

जनमाध्यम सैद्धांतिकी, जगदीश्वर चतुर्वेदी, सुधा सिंह

मॉस कम्युनिकेशन, डेनिस मैक्वेल

Additional Resources:

जनमाध्यम, पीटर गोल्डिंग

सूचना समाज, अर्मांड मै. लार्ड

द प्रॉसेस एंड एफेक्ट्स ऑफ मॉस कम्युनिकेशन, विलवर

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा और जनमाध्यमों के प्लैटफॉर्म का अवलोकन

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

जनमाध्यमों की शब्दावली

विज्ञापन, बाज़ार और हिंदी (BAPPHGE02) Generic Elective - (GE) Credit:6

Course Objective(2-3)

- I. विद्यार्थियों को विज्ञापन के विस्तृत क्षेत्र से परिचित कराना
- II. विज्ञापन भाषा के स्वरूप और विशेषताओं का बोध कराना
- III. विभिन्न माध्यमों के लिए विज्ञापन कॉपी लेखन का अभ्यास कराना

Course Learning Outcomes

- I. विज्ञापन लेखन की दृष्टि से भाषा-दक्षता

- II. विज्ञापन निर्माण की पूरी प्रक्रिया को समझना
- III. विज्ञापन बाज़ार में विभिन्न माध्यमों की पहुँच और प्रसार क्षमता से परिचित होना
- IV. कॉपी लेखन आदि कार्यों के लिए तैयार होना

Unit 1

इकाई 1 : विज्ञापन : परिचय

- विज्ञापन : अर्थ, परिभाषा और महत्व
- विज्ञापन के उद्देश्य: आर्थिक, सामाजिक, राजनीतिक
- विज्ञापन के प्रमुख प्रकार
- विज्ञापन और बाज़ार का अंतःसंबंध

Unit 2

इकाई 2 : विज्ञापन: माध्यम एवं कॉपी लेखन

- विज्ञापन कॉपी के अंग: शीर्षक, उपशीर्षक, बॉडी कॉपी, चित्र, ट्रेडमार्क, लेआउट, स्लोगन
- प्रिंट माध्यम: लेआउट के विविध प्रारूप
- वर्गीकृत एवं सजावटी विज्ञापन-निर्माण
- रेडियो जिंगल लेखन
- टेलीविज़न विज्ञापन के लिए कॉपी लेखन

Unit 3

इकाई 3 : विज्ञापन लेखन एवं भाषा-शैली

- विज्ञापन की भाषा का स्वरूप एवं विशेषताएँ
- विज्ञापन की भाषा-शैली के विभिन्न पक्ष

प्रिंट, इलेक्ट्रॉनिक और ई-विज्ञापनों की भाषा

विभिन्न माध्यमों में विज्ञापन की शैली

Unit 4

इकाई - 4 विज्ञापन संबंधी व्यवहारिक कार्य

- प्रिंट मीडिया के किसी एक विज्ञापन की भाषा का विश्लेषण
- रेडियो के एक विज्ञापन की भाषा का विश्लेषण
- टेलीविज़न के एक विज्ञापन की भाषा का विश्लेषण

References

सहायक ग्रन्थ

- Ø जनसंपर्क, प्रचार और विज्ञापन - विजय कुलश्रेष्ठ
- Ø जनसंचार माध्यम : भाषा और साहित्य - सुधीश पचौरी
- Ø डिजिटल युग में विज्ञापन - सुधा सिंह, जगदीश्वर चतुर्वेदी
- Ø ब्रेक के बाद - सुधीश पचौरी
- Ø मीडिया की भाषा - वसुधा गाडगिल

Ø विज्ञापन की दुनिया - कुमुद शर्मा

Ø विज्ञापन डॉट कॉम - रेखा सेठी

Additional Resources:

Additional Resources:

Ø विज्ञापन: भाषा और संरचना - रेखा सेठी

Ø विज्ञापन और ब्रांड - संजय सिंह बघेल

Ø मीडिया और बाज़ार - वर्तिका नंदा

Ø भारतीय मीडिया व्यवसाय - वनिता कोहली-खांडेकर

Ø संचार क्रांति और बदलता सामाजिक सौंदर्य बोध - कृष्ण कुमार रत्न

Ø Jethwaney, J. N., & Jain, S. (2012). *Advertising management*. Oxford: Oxford University Press.

Ø Chunawalla. (2000). *Advertising theory and practice*. Mumbai: Himalaya Publishing House.

Ø Martin, P., & Erickson, T. (2011). *Social media marketing*. New Delhi: Global Vision Publishing House.

वेबलिंग

- www.adbrands.net
- www.afaqs.com
- www.adgully.com
- www.cnbc.com
- www.exchange4media.com

Teaching Learning Process

1) कक्षाओं में पठन-पाठन पद्धति

2) परिचर्चाएँ

3) समूह में प्रोजेक्ट प्रस्तुति

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

ब्रांड, कॉपी, स्लोगन, डिजिटल, सोशल मीडिया

हिंदी में कार्टून, डबिंग और ग्राफिक बाल कथाएँ (BAPPHGE03) Generic Elective - (GE) Credit:6

Course Objective(2-3)

छात्रों को हिंदी में कार्टून, डबिंग और ग्राफिक बाल कथाएँ, पाठ्यक्रम पढ़ाने का उद्देश्य उनकी रचनात्मकता, बौद्धिकता और सहजबोध को विकसित करना है।
हास्य, व्यंग्य और ज्ञान के विषयों को कार्टून, डबिंग और ग्राफिक्स के माध्यम से भली प्रकार और रुचिपूर्वक छात्रों के समक्ष रखा जा सकता है।
ऐतिहासिक, पौराणिक तथा सामाजिक सन्दर्भों को बखूबी इस पेपर में पढ़ाया जा सकता है।

Course Learning Outcomes

कार्टून डबिंग ग्राफिक की स्थिति का अध्ययन

रोजगारपरक कार्यक्रम

नई संभावनाओं और चुनौतियों को समझना

Unit 1

1. कार्टून : स्वरूप और अवधारणा

हिंदी कार्टून की विकास यात्रा : सामान्य परिचय

हिंदी के समाचार पत्रों में कार्टून का प्रयोग, स्थान आकार और कथ्य

कार्टून की अंतर्वस्तु का विश्लेषण और हिंदी के महत्वपूर्ण कार्टूनिस्ट

कार्टून के प्रकार और महत्व

Unit 2

डबिंग

हिंदी में डबिंग : आवश्यकता और स्वरूप

हिंदी सिनेमा और डबिंग

हिंदी के कार्टून चैनल और डबिंग कार्यक्रम

हिंदी में ज्ञान-विज्ञान के कार्यक्रमों में डबिंग

Unit 3

3 ग्राफिक बाल-कथाओं का स्वरूप और विकास

हिंदी की ग्राफिक बाल कथाओं का स्वरूप और विकास

ग्राफिक कथाएँ और बाल-मनोरंजन, सूचना तथा भाषा-निर्माण

हिंदी की प्रमुख ग्राफिक बाल पत्रिकाएँ

अंतर्वस्तु विश्लेषण

Unit 4

4. रचना-प्रक्रिया एवं व्यावहारिक कार्य

विभिन्न समाचार पत्रों में प्रकाशित कार्टून का विवेचन और दिए गए विषय पर कार्टून निर्माण

किसी डब कार्यक्रम की भाषा का विश्लेषण

किसी सिनेमा या धारावाहिक की डबिंग की समीक्षा

ज्ञान-विज्ञान के डव कार्यक्रमों में परिवेश, संस्कृति और भाषा की समीक्षा

References

डिस्टॉर्टेड मिरर, आर. के. लक्ष्मण

ब्रशिंग अप द इयर्स : ए कार्टूनिस्ट हिस्ट्री ऑफ़ इण्डिया, आर. के. लक्ष्मण

फोटोशॉप एलिमेंट-2 (स्पेशल इफेक्ट), अल्वार्ड

Additional Resources:

फोटोशॉप-6, स्टीव रोमानिलो

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा, कार्टून डबिंग लेब

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

कार्टून डबिंग ग्राफिक शब्दावली

आधुनिक भारतीय भाषा - हिंदी : भाषा और साहित्य (हिंदी-क) (BAPPHMILA01)Ability-Enhancement Compulsory Course(Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

हिंदी भाषा और साहित्य की सामान्य जानकारी विकसित करना

राष्ट्रभाषा, राजभाषा और संपर्क भाषा के रूप में हिंदी की स्थिति का परिचय देना

विशिष्ट कविताओं के अध्ययन-विक्षेपण के माध्यम से कविता संबंधी समझ विकसित करना

Course Learning Outcomes

हिंदी साहित्य और भाषा के विकास की स्पष्ट समझ विकसित होगी

आधुनिक आवश्यकताओं के अनुरूप राष्ट्रभाषा, राजभाषा और संपर्कभाषा की जानकारी प्राप्त होगी

Unit 1

हिंदी भाषा

क. आधुनिक भारतीय भाषाओं का उद्भव और विकास

ख. हिंदी भाषा का परिचय एवं विकास

ग. राष्ट्रभाषा, राजभाषा और संपर्क-भाषा के रूप में हिंदी

Unit 2

हिंदी साहित्य का इतिहास

क. हिंदी साहित्य का इतिहास (आदिकाल. मध्यकाल) सामान्य परिचय

ख. हिंदी साहित्य का इतिहास (आधुनिक काल) सामान्य परिचय

Unit 3

(क) कबीर - कबीर ग्रंथावली. संपा श्यामसुंदरदास. काशी नागरी प्रचारिणी सभा. उन्नीसवां संस्करण सं 2054 वि.

पृ. 23 दोहा 27, पृ 29. दोहा 20, पृ. 30 दोहा 3 और 4, पृ 35 दोहा 8. पृ 39 दोहा 9

(ख) मीराबाई की पदावली. संपा. आचार्य परशुराम चतुर्वेदी. हिंदी साहित्य सम्मेलन प्रयाग. चौदहवां संस्करण 1892. सन् 1970 ई. पद 1. 4. 5. 6.

(ग) बिहारी बिहारी रत्नाकर - संपा . जगन्नाथ दास रत्नाकर बी.ए., प्रकाशन संस्थान. नई दिल्ली सं. 2006 दोहा 381. 435. 438. 439.491

Unit 4

आधुनिक हिंदी कविता

जयशंकर प्रसाद - हिमाद्री तुंग श्रृंग से

नागार्जुन - बादल को घिरते देखा है

दिनकर - मेरे नगपति मेरे विशाल

References

रामचंद्र शुक्ल - हिंदी साहित्य का इतिहास

हजारीप्रसाद द्विवेदी - हिंदी साहित्य की भूमिका

संपा. डॉ. नगेंद्र - हिंदी साहित्य का इतिहास

हिंदी साहित्य के इतिहास पर कुछ नोट्स - रसाल सिंह

Additional Resources:

रामस्वरूप चतुर्वेदी - हिंदी साहित्य और संवेदना का विकास

हिन्दी साहित्य का दूसरा इतिहास - बच्चन सिंह

Teaching Learning Process

व्याख्यान, समूहिक चर्चा, वीडियो आदि

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

राजभाषा , राष्ट्रभाषा, संपर्क भाषा, इतिहास, काव्य, साहित्यिकता, मध्यकालीनता आधुनिकता आदि

आधुनिक भारतीय भाषा - हिंदी : भाषा और साहित्य (हिंदी-ख) (BAPPHMILB01) Ability-Enhancement Compulsory Course (Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

हिन्दी भाषा और साहित्य के विकास का अध्ययन

प्रमुख साहित्यकारों की रचनाओं का अध्ययन - विश्लेषण

Course Learning Outcomes

हिन्दी भाषा और साहित्य के विकास का परिचय

प्रमुख साहित्यकारों की रचनाओं का अध्ययन - विश्लेषण

Unit 1

इकाई-1 : हिंदी भाषा और साहित्य

- आधुनिक भारतीय भाषाओं का सामान्य परिचय
- हिंदी का उद्भव : सामान्य परिचय
- हिंदी साहित्य का इतिहास : संक्षिप्त परिचय (आदिकाल, मध्यकाल)
- हिंदी साहित्य का इतिहास : संक्षिप्त परिचय (आधुनिक काल)

Unit 2

इकाई- 2 : भक्तिकालीन कविता

1. कबीर : कबीर ग्रंथावली : संपा. श्यामसुंदर दास, नागरी प्रचारिणी सभा, काशी ; उन्नीसवाँ संस्करण ; सं. 2054 वि.

- पोथी पढ़ि पढ़ि जग मुआ
- कस्तूरी कुंडली बसै.....
- यह तन विष की बेलरी, गुरु अमृत की खान....
- सात समुद्र की मसि करूँ....
- साधु ऐसा चाहिए
- सतगुरु हमसूँ रीझकर....

2. तुलसी : 'रामचरितमानस' से केवट प्रसंग

Unit 3

इकाई-3 : रीतिकालीन कविता

(क) बिहारी :

- बतरस लालच लाल की

- याँ अनुरागी चित्त की
- सटपटाति-सी ससिमुखी

(ख) भूषण :

- इंद्र जिमि जंभ पर
- साजि चतरंग सैन

Unit 4

इकाई-4 : आधुनिक कविता

- सुभद्रा कुमारी चौहान – ‘बालिका का परिचय’
- निराला – वर दे वीणावादिनी

References

सहायक ग्रंथ :

1. हिंदी साहित्य का इतिहास – रामचंद्र शुक्ल
2. कबीर – हजारीप्रसाद द्विवेदी
3. तुलसी काव्य-मीमांसा – उदयभानु सिंह
4. बिहारी की वाग्विभूति – विश्वनाथ प्रसाद मिश्र
5. निराला साहित्य साधना – रामविलास शर्मा

Additional Resources:

हिन्दी साहित्य और संवेदना का विकास - रामस्वरूप चतुर्वेदी

हिन्दी का लोक : कुछ रस , कुछ रंग - डॉ. रसाल सिंह

Teaching Learning Process

कक्षा व्याख्यान, सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट, असाइनमेंट

Keywords

साहित्य और भाषा की शब्दावली

आधुनिक भारतीय भाषा - हिंदी : भाषा और साहित्य (हिंदी-ग) (BAPPHMILC01)Ability-Enhancement Compulsory Course(Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

- हिन्दी भाषा और साहित्य का परिचय
- प्रमुख रचनाएँ और उनका विश्लेषण

Course Learning Outcomes

- हिन्दी भाषा और साहित्य की जानकारी प्राप्त होगी
- प्रमुख रचनाएँ और उनकी विश्लेषण क्षमता विकसित होगी

Unit 1

हिंदी भाषा और साहित्य

- हिंदी भाषा का सामान्य परिचय
- हिंदी का भौगोलिक विस्तार
- हिंदी साहित्य का इतिहास : आदिकालीन और मध्यकालीन प्रवृत्तियाँ
- हिंदी साहित्य का इतिहास : आधुनिककालीन प्रवृत्तियाँ

Unit 2

भक्तिकालीन कविता

गुरु गोविन्द दोऊ खड़े

निंदक नियरे राखिए

कबीर संगति साधु की

माला फेरत जुग भया

पाहन पूजै हरि मिले

बृच्छ कबहूँ न फल भखैं

सूरदास

मैया मै नहिं माखन खायौ

ऊर्धो मन न भए दस – बीस

Unit 3

बिहारी

मेरी भाव बाधा हरौ...

कनक कनक ते सौ गुनी ...

थोड़े ही गुन रीझते

कहत नटत रीझत खिझत...

घनानंद

अति सूधो सनेह को मारग ...

रावरे रूप की रीती अनूप

Unit 4

मैथिलीशरण गुप्त – नर हो न निराश करो

सुमित्रानंदन पंत –आह धरती कितना देती है

References

- हिंदी साहित्य का इतिहास –रामचंद्र शुक्ल
- कबीर - हजारी प्रसाद द्विवेदी
- तुलसीदास काव्य – मीमांसा –उदयभानु सिंह
- हिंदी साहित्य के इतिहास पर कुछ नोट्स - रसाल सिंह

Additional Resources:

- हिन्दी साहित्य का दूसरा इतिहास - बच्चन सिंह
- हिन्दी साहित्य और संवेदना का विकास - रामस्वरूप चतुर्वेदी
- बिहारी की वाग्विभूति –विश्वनाथ प्रसाद मिश्र
- निराला साहित्य साधना – रामविलास शर्मा

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट असाइनमेंट

Keywords

साहित्यिक शब्दावली

हिंदी गद्य : उद्भव और विकास (हिंदी-क) (BAPPHMILA02)Ability-Enhancement Compulsory Course(Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

हिन्दी गद्य साहित्य का उद्भव और विकास का परिचय

प्रमुख रचनाएँ : विश्लेषण

Course Learning Outcomes

गद्य साहित्य का परिचय प्राप्त होगा

विशिष्ट रचनाएँ और विश्लेषण की क्षमता विकसित होगी

Unit 1

हिन्दी गद्य का उद्भव और विकास : सामान्य परिचय

हिन्दी गद्य के विभिन्न रूपों का परिचय

Unit 2

प्रेमचंद - नमक का दारोगा

जयशंकर प्रसाद - पुरस्कार

मोहन राकेश - मलबे का मालिक

मन्सू भण्डारी - मैं हार गई

Unit 3

बालकृष्ण भट्ट - साहित्य जन समूह के हृदय का विकास है

आचार्य रामचन्द्र शुक्ल - उत्साह

हजारी प्रसाद द्विवेदी - अशोक के फूल

विद्यानिवास मिश्र - रहिमन पानी राखिए

Unit 4

संस्मरण - घीसा - महादेवी वर्मा

व्यंग्य - भोलाराम का जीव - हरीशंकर परसाई

यात्रा - विद्रोह की पगडंडी : मीरां के देश में एक नास्तिक- पंकज बिष्ट

नाटक - जिस लाहौर नई देख्या - असगर वजाहत

References

हिन्दी का गद्य साहित्य - रामचन्द्र वर्मा

हिन्दी साहित्य का दूसरा इतिहास - बच्चन सिंह

बालकृष्ण भट्ट के निबंध - सत्यप्रकाश मिश्र

महादेवी - दूधनाथ सिंह

Additional Resources:

आंखिन देखि - कमला प्रसाद

खरामा - खरामा - पंकज बिष्ट

कथेतर - माधव हाड़ा

गद्य की पहचान - अरुण प्रकाश

Teaching Learning Process

कक्षा व्याख्यान, सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट, असाइनमेंट

Keywords

गद्य साहित्य से संबन्धित शब्दावली

हिंदी गद्य : उदभव और विकास (हिंदी-ख) (BAPPHMILB02) Ability-Enhancement Compulsory Course (Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

- 10 वीं कक्षा तक हिंदी पढ़े विद्यार्थियों को हिंदी गद्य साहित्य के विकास की जानकारी देना

Course Learning Outcomes

- व्यक्तित्व विकास में सहायक
- अभिव्यक्ति क्षमता का विकास

Unit 1

- हिंदी गद्य का उद्भव और विकास
- हिंदी के मुख्य गद्य रूपों का सामान्य परिचय (

उपन्यास , कहानी, नाटक, निबंध, संस्मरण, आत्मकथा, रेखाचित्र)

Unit 2

- प्रेमचंद- बूढ़ी काकी
- जयशंकर प्रसाद- गुंडा
- चन्द्रधर शर्मा गुलेरी- उसने कहा था

Unit 3

- बालमुकुंद गुप्त - मेले का ऊंट
- भारतेन्दु - वैष्णवता और भारतवर्ष
- हरिशंकर परसाई - भोलाराम का जीव

Unit 4

- भारतेन्दु - अंधेर नगरी
- महादेवी वर्मा - बिबिया

References

- ♦ हिंदी का गद्य साहित्य - रामचंद्र तिवारी
- ♦ हिंदी साहित्य का दूसरा इतिहास- बच्चन सिंह
- ♦ निबंधों की दुनिया- विजयदेव नारायण साही, निर्मल जैन

Additional Resources:

♦ निबंधों की दुनिया - शिवपूजन सहाय, निर्मल जैन/ अनिल राय

♦ छायावादोत्तर हिंदी गद्य साहित्य - विश्वनाथ प्रसाद तिवारी

♦ हिंदी रेखाचित्र - हरवंश लाल शर्मा

www.gadykosh.com

www.hindisamay.com

<http://hanshindimagazine.in>

Teaching Learning Process

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

- लिखित परीक्षा

- आंतरिक मूल्यांकन पद्धति

Keywords

गद्य, विकास, इतिहास, उपन्यास, कहानी, निबंध, नाटक, रंगमंच, रंगकर्म,

हिंदी गद्य : उद्भव और विकास (हिंदी-ग) (BAPPHMILC02) Ability-Enhancement Compulsory Course (Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

- हिन्दी गद्य की विभिन्न विधाओं का परिचय देना
- विभिन्न कृतियों द्वारा आधुनिक साहित्य की समझ विकसित करना

Course Learning Outcomes

- हिन्दी गद्य साहित्य के विकास का परिचय प्राप्त होगा
- कृतियों के अध्ययन-विश्लेषण से साहित्यिक समझ विकसित होगी

Unit 1

- हिंदी गद्य : उद्भव और विकास
- हिंदी गद्य - रूपों का संक्षिप्त परिचय (कहानी, निबंध, नाटक, रेखाचित्र/संस्मरण)

Unit 2

- प्रेमचंद - ईदगाह
- भीष्म साहनी - चीफ की दावत

Unit 3

- बालकृष्ण भट्ट - ज़बान
- शरद जोशी - होना कुछ नहीं का

- शिवपूजन सहाय - गाँव की अनिवार्य आवश्यकताएँ

Unit 4

- महादेवी वर्मा - गिल्लू
- विष्णु प्रभाकर - वापसी
- विश्वनाथ त्रिपाठी - गंगा स्नान करने चलोगे? (गाँव स्नान करने चलोगे' पुस्तक से अंश)

References

- हिन्दी का गद्य साहित्य - रामचंद्र तिवारी
- हिंदी साहित्य का दूसरा इतिहास - बच्चन सिंह
- निबंधों की दुनिया : विजयदेव नारायण साही - निर्मला जैन / हरिमोहन शर्मा

Additional Resources:

- छायावादोत्तर हिंदी गद्य साहित्य - विश्वनाथ प्रसाद तिवारी
- हिंदी रेखाचित्र - हरवंश लाल शर्मा
- निबंधों की दुनिया - शिवपूजन सहाय ; - निर्मला / अनिल राय

Teaching Learning Process

व्याख्यान, सामूहिक चर्चा

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट असाइनमेंट

Keywords

हिन्दी भाषा और साहित्य की शब्दावली

हिंदी भाषा योग्यता संवर्धक पाठ्यक्रम (एम.आई.एल.) (BAPPHAECC01) Ability-Enhancement Compulsory Course (Only meant for Language Department/ EVS for Department of Environmental Studies) - (AECC) Credit:4

Course Objective(2-3)

भाषिक सम्प्रेषण के स्वरूप एवं सिद्धांतों से विद्यार्थी का परिचय

विभिन्न माध्यमों की जानकारी

प्रभावी सम्प्रेषण का महत्त्व

रोजगार सम्बन्धी क्षेत्रों के लिए तैयार करना

Course Learning Outcomes

प्रभावी सम्प्रेषण का महत्त्व समझने के साथ-साथ विद्यार्थी रोजगार के विभिन्न क्षेत्रों हेतु लेखन, वाचन, पठन में भी सक्षम हो सकेंगे।

Unit 1

भाषिक सम्प्रेषण: स्वरूप और सिद्धांत

सम्प्रेषण की अवधारणा और महत्त्व

सम्प्रेषण की प्रक्रिया

सम्प्रेषण के विभिन्न मॉडल

सम्प्रेषण की चुनौतियाँ

Unit 2

सम्प्रेषण के प्रकार

मौखिक और लिखित

वैयक्तिक, सामाजिक और व्यावसायिक

भ्रामक सम्प्रेषण

सम्प्रेषण की बाधाएँ और रणनीति

प्रभावी सम्प्रेषण

Unit 3

सम्प्रेषण के माध्यम

एकालाप और संलाप

संवाद

सामूहिक चर्चा

मशीनी माध्यम: ई-मेल, सोशल मीडिया, एस.एम्.एस., इंटरनेट, फीडबैक

Unit 4

मौखिक और लिखित सम्प्रेषण

बोलना : वाद-विवाद, भाषण, समाचार, वॉयस ओवर, आशु प्रस्तुति

लिखना: पत्र लेखन, अनुच्छेद लेखन, पल्लवन, निबन्ध

पढ़ना: उच्चारण, वाक्य गठन, कविता पठन, नाट्यांश पठन

समझना: कथन, विश्लेषण, व्याख्या, अन्वय

References

हिन्दी का सामाजिक संदर्भ- रवीन्द्रनाथ श्रीवास्तव

संप्रेषण-परक व्याकरण: सिद्धांत और स्वरूप-सुरेश कुमार

प्रयोग और प्रयोग- वी.आर.जगन्नाथ

भारतीय भाषा चिंतन की पीठिका-विद्यानिवास मिश्र

संप्रेषण: चिंतन और दक्षता- डॉ.मंजु मुकुल

Additional Resources:

कुछ पूर्वग्रह -अशोक वाजपेयी

भाषाई अस्मिता और हिन्दी-रवीन्द्रनाथ श्रीवास्तव

रचना का सरोकार-विश्वनाथ प्रसाद तिवारी

Teaching Learning Process

1 से 3 सप्ताह - इकाई - 1

4 से 6 सप्ताह - इकाई - 2

7 से 9 सप्ताह - इकाई - 3

10 से 12 सप्ताह - इकाई - 4

13 से 14 सप्ताह सामूहिक चर्चा, विशेष व्याख्यान एवं आंतरिक मूल्यांकन संबंधी गतिविधियाँ

Assessment Methods

टेस्ट और असाइनमेंट

Keywords

भाषाविज्ञान की शब्दावली, सम्प्रेषण

दिल्लीविश्वविद्यालय
UNIVERSITY OF DELHI

B.A. History Programme

(Effective from Academic Year 2019-20)



Revised Syllabus as

approved by

Academic Council

Date:

No:

Executive Council

Date:

No:

Applicable for students registered with Regular Colleges, Non Collegiate Women's Education Board and School of Open Learning

List of Contents	Page No.
Preamble	3
1. Introduction	4
2. Learning Outcome-based Curriculum Framework in B.A. History Programme	4
Nature and Extent of the B.A. History Programme	5
Aims of Bachelor Degree History Programme	5
3. Graduate Attributes in B.A. History Programme	6
4. Qualification Descriptors for Graduates in B.A. History Programme	7
5. Programme Learning Outcomes in B.A. History Programme	7
6. Structure of B.A. History Programme	8
6.1. Credit Distribution for B.A. History Programme	9
Semester-wise Distribution of Courses.	11
7. Courses for B.A. History Programme	13
7.1. Course Learning Objective	15
7.2. Course Learning Outcomes	16
7.3. Course Teaching-Learning Process	18
7.4. Assessment Methods	19
8. Keywords	19

Preamble

The objective of any programme at Higher Education Institute is to prepare their students for the society at large. The University of Delhi envisions all its programmes in the best interest of their students and in this endeavour it offers a new vision to all its Under-Graduate courses. It imbibes a Learning Outcome-based Curriculum Framework (LOCF) for all its Under Graduate programmes.

The LOCF approach is envisioned to provide a focused, outcome-based syllabus at the undergraduate level with an agenda to structure the teaching-learning experiences in a more student-centric manner. The LOCF approach has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice. The Under-Graduate Programmes will prepare the students for both, academia and employability.

Each programme vividly elaborates its nature and promises the outcomes that are to be accomplished by studying the courses. The programmes also state the attributes that it offers to inculcate at the graduation level. The graduate attributes encompass values related to well-being, emotional stability, critical thinking, social justice and also skills for employability. In short, each programme prepares students for sustainability and life-long learning.

The new curriculum of B.A. History Programme offers students access to recent historiography in the field organised in a pedagogical form that is accessible and interesting. It is structured for students in an inter-disciplinary programme providing them with a concise and thorough introduction to the discipline of History and remaining sensitive to the cognate discipline that they are also studying. It seeks to provide multiple points of intersection with disciplines in the Humanities and the Social Sciences, communicating modes by which a historical sensibility can enrich analysis and problem solving. The B.A. Programme is flexible to their needs and works with the objective of trying to achieve observable intellectual outcomes through its three year duration.

The University of Delhi hopes that the LOCF approach of the B.A. History Programme will help students in making an informed decision regarding the goals that they wish to pursue in further higher education and more generally in life.

1 Introduction to BA History Programme:

The Department of History is one of the founding departments of the University of Delhi and its Honours and Programme courses are regarded as the strongest in the country. It is a source of some pride that almost all reputed Departments of History in the World have teachers and students that received instruction in History at the University of Delhi.

We believe that History is a discipline which instructs students on how to read and process information on people, societies, cultures, events and places that are far removed in time and space from our own experience. Knowledge of this past is critical in understanding the ways in which our world is connected and responds to its history in sometimes overt and at other times more complex ways that is missed by most people.

2. Learning Outcome based Curriculum Framework in BA History Programme

The B.A. History Programme is organised to provide the greatest flexibility to its students. There are Core Disciplinary papers that provide the fundamental knowledge in the discipline of history and in the study of the History of India and the World. The programme is otherwise envisaged to provide a large amount of choice so that students can tailor their education on the basis of their interests. These provide not just skills in history but also a vital skill in other disciplines as well. The B.A. History Programme course is interdisciplinary keeping in mind that specialisation in History is the key to access cognate skills from other disciplines. With its mix of Core, Discipline Specific

Electives and Skill Enhancement Courses it provides multiple points where students can participate in inter-disciplinary reflections on cross-cutting themes.

2.1 Nature and Extent of the Programme:

The duration of the BA History Programme is three academic years. Each academic year is divided into two semesters. The B.A. History Programme therefore spans six semesters. Each semester is for the duration of sixteen weeks.

The teaching and learning modalities in the B.A. History Programme will involve theory classes (lectures) of one hour each and tutorial classes. The curriculum will be taught through formal lectures with the aid, wherever the teacher feels the need, of power-point presentations, audio and video tools. There are additional requirements in certain courses for documentaries, cinema, field and archival work, visits to museums, class reports, discussions and project work. These are built into the teaching and assessment of many courses.

2.2 Aims of Bachelor Degree Programme in BA History Programme

At a general level, our courses are structured with the **objective** of giving requisite information about different aspects of the past to students, to teach them how to parse this information, instruct them on how historians research, frame an argument and debate details that have significance to how we understand the past and the present. In the B.A. Programme these details are carefully parsed so that students can follow the narrative within particular papers and themes without feeling over-burdened. The care in framing these courses is evident in that the objective of guiding students into the foundations of the discipline remains undiluted. The expected **outcome** is to provide students with a sense of how interconnected our present is with the past and how learning about the past provides them with the skills to understand the present. To facilitate this understanding, our courses, class room instruction and assignments give students the ability to think and reach their own conclusions. Our tutorial discussions,

written assignments, class room presentations, field-work projects, consolidate their ability to analyse, research and process information.

3. Graduate Attributes in BA History Programme:

On completion of the course students are expected to have acquired the skills of critical thinking, rational enquiry, effective communication, and exploring the relationship between the past and the present while remaining sensitive to the larger historiographical debates that are important in the study of human society. The attributes expected from the graduates of B.A. History Programme are:

- 1) Knowledge of multiple perspectives through which significant developments in the history of the Indian subcontinent from earliest times up to the period after independence.
- 2) Familiarity with the significant patterns of development in certain parts of the modern and early modern world as well as certain non-Indian ancient societies.
- 3) Ability to carefully read a complex historical narrative, evaluate its deployment of evidence, and understand its argument as well as critically analyse the same
- 4) Ability to identify patterns of change and continuity with regards to issues of contemporary significance over long durations as well as across diverse geo-cultural zones
- 5) Greater ability to distinguish between that which is historical -- that is time-place-context driven, hence changeable and challengeable -- from that which is not.
- 6) Sensitivity to gender and social inequities as well as acquaintance with the historical trajectories of these issues

7) Greater respect for basic human values and ideals of equality, freedom, respect for diversity, and other constitutional values

8) Skill of picking up disparate sets of information from varied sources and weaving them into a coherent argument with a view to reveal identifiable patterns of development

9) Capability to assume leadership roles and apply the above mentioned analytical abilities in various other non-familiar contexts.

10) Possess knowledge of the values and beliefs of multiple cultures so as to effectively engage in a multi cultural society and interact with diverse groups.

4. Qualification Descriptors for Graduates in BA History Programme:

Upon successful completion of the course, the students receive a degree in the B.A. History Programme. The curriculum includes majors in Core Courses (CCs), of which four Core Courses are in the discipline of History while the remaining are from other subjects in which the B.A. Programme student is enrolled. A student of B.A. History Programme would also need to complete two Discipline Specific Elective Courses (DSEs) in History, and two Inter-disciplinary Generic Electives offered by cognate disciplines. Each of the Core Courses, Discipline Specific Elective Courses and Generic Elective Courses are of six credits each. The B.A. History Programme also includes minors in four discipline-centred Skill Enhancement Courses, with each of these four courses carrying four credits. BA Programme students of non-history stream and students of B.Com Programme can also opt for the History courses specifically designed in lieu of M.I.L. These courses are of six credits and are offered in the first/second and third/fourth Semester.

Thus, it is an undergraduate degree that initiates the student into essentials of the discipline of history on the one hand, and exposes her/him to the rigors of a couple of other cognate disciplines of her/his choice.

5. Programme Learning Outcomes for Graduates in BA History Programme

B.A. Programme graduates of this department are expected to branch out into different paths seeking spheres of knowledge and domains of professional work that they find fulfilling. They will be able to demonstrate knowledge of major historical work and the ability to provide an overview of scholarly debates relating to History. This will establish a platform over which the student can pursue higher studies in History. It is expected that besides the skills specific to the discipline, these wider life skills of argumentation and communication, attitudes and temperaments, and general values inherent in a discipline that studies human beings in their social context, in all its complexity, ultimately enable learners to live rich, productive and meaningful lives. The list below provides a synoptic overview of possible career paths provided by an undergraduate training in history:

Teaching	Administration
Research	Social Work
Politics	Law
Journalism	Management
Media	Policy Making
Performing Arts	Human Resource Development
International Relations	

6. Structure of BA History Programme:

The programme consists of six and four credit courses. The six credit courses will comprise of theory classes (five credits) and tutorials (one credit). The four credit courses will comprise solely of theory classes. Each credit is equivalent to one hour of class-room instruction per week

To acquire a degree in B.A. Programme with History a student must study twelve Core Courses (CC), of which four are in the discipline of History. The four Core Courses in History are spread over semester 1, 2, 3 and 4; with one Core Course offered in each of the four semesters. The Core Courses are six credits each.

The student also needs to take two Discipline Specific Elective Courses (DSE) in History. DSE papers are elective and out of the six such papers offered by the History Department, students have to select any two – one each in semesters 5 and 6. DSE courses are of six credits each.

Students are also required to take two interdisciplinary Generic Electives (GE) courses. GE papers are elective, and students can opt for any two such Generic Elective Courses offered in cognate disciplines by the different departments in their colleges. They have to opt for one such Generic Elective Course in semester 5 and another Generic Elective Course in semester 6. The Department of History offers six Generic Elective Courses of six credits each. From these students can opt for two Generic Elective Courses.

Students are expected to take four discipline centred Skill Enhancement Courses (SEC), of which two Skill Enhancement Courses can be in History. Skill Enhancement Courses are offered in semester 3, 4, 5 and 6. There are eight Skill Enhancement Courses offered by the Department of History over these four semesters and students can opt for any two. The Skill Enhancement Courses are of four credits each.

Additionally they must also take two Ability Enhancement Compulsory Courses (AECC), one each in semesters 1 and 2. The AECC papers are of four credits each. Please note that AECC papers are not in History. The two courses are: AECC 1, English/ Hindi/ Urdu Communication, and AECC 2, Environmental Sciences.

BA Programme students of non-history stream and students of B.Com Programme can also opt for the History courses specifically designed in lieu of M.I.L. These courses are of six credits and are offered in the first/second and third/fourth Semester.

6.1 Credit distribution for B.A. History Programme

CORE COURSES			
Semester	Course Code	Name of the Course	Credits
I		History of India from earliest times up to c. 300 CE.	5+1
II		History of India c. 300-1200	5+1
III		History of India c. 1200-1700	5+1
IV		History of India c. 1700-1950	5+1

DSE PAPERS			
Semester	Course Code	Name of the Course	Credits
V DSE I		Europe from the Middle Ages to the Renaissance (7th to 16th century) Or	5+1

		Economy and Politics: Histories of Capitalism and Colonialism-I Or	
		Issues in twentieth Century World History I	
VI DSE II		History of Europe 1500-1848 Or	5+1
		Economy and Politics: Histories of Capitalism and Colonialism II Or	
		Issues in Twentieth Century World History II	

GE PAPERS			
Semester	Course Code	Name of the Course	Credits
V GE I		Women in Indian History Or	5+1
		Gender in Modern World Or	
		Culture and Everyday Life in India	
V GE II		Nature in Human History Or	5+1
		Investigating Inequalities Or	
		Delhi Through the Ages	
SEC PAPERS			
III SEC I		Heritage and Tourism Or	4
		Introduction to Art in the Indian Subcontinent	
IV SEC II		History and Archaeology Or	4

		Archives and Museum	
V SEC III		Popular Culture Or	4
		Language, Literature and Region in Early Modern Times	
VI SEC IV		Understanding Text, Rituals and Orality in Indian History Or	4
		Radio and Cinema in India: A Social History	

AECC PAPERS			
Semester	Course Code	Name of the Course	Credits
I AECC I		English / Hindi/ MIL Communication Or Environmental Science	4
II AECC II		English / Hindi/ MIL Communication Or Environmental Science	4

6.2. BA Program Semester-wise Distribution of Courses

Semester	Core Courses	Discipline Selective Courses	GE	SEC	Ability Enhancement Courses
1	History of India from earliest times up to c. 300 CE				English / Hindi/ Communication Or Environmental Science
	Second Discipline				
	English/ Hindi/MIL-I (Communicating Culture: Tellings, Representations and Leisure)				

2	History of India c. 300 to 1200				English / Hindi/ MIL Communication Or Environmental Science
	Second Discipline				
	English/ Hindi/MIL-I (Communicating Culture: Tellings, Representations and Leisure)				
3	History of India c. 1200-1700			Choice of SEC I papers	
	Second Discipline				
	English/ Hindi/MIL-II (History of Inequalities)				
4	History of India c. 1700-1950			Choice of SEC II papers	
	Second Discipline				
	English/ Hindi/MIL-II (History of Inequalities)				
5		Choice of DSE I-A papers	Choice of GE I papers	Choice of SEC III papers	
		Choice of DSE I-B papers			
6		Choice of DSE II-A papers	Choice of GE II papers	Choice of SEC IV papers	
		Choice of DSE II-B papers			

7. Courses for BA History Programme

Core Courses:

CC I: History of India from earliest times up to c. 300 CE

CC II: History of India, c. 300 to 1200

CC III: History of India, c. 1200-1700

CC IV: History of India, c. 1700-1950

Discipline Specific Electives:

DSE I: Europe from the Middle Ages to the Renaissance (7th to the 16th century)

DSE II: Economy and Politics: Histories of Capitalism and Colonialism -I

DSE III: Issues in Twentieth Century World History -I

DSE IV: History of Europe 1500-1848

DSE V: Economy and Politics: Histories of Capitalism and Colonialism-II

DSE VI: Issues in Twentieth Century World History - II

Generic Electives

GE I: Women in Indian History

GE II: Gender in the Modern World

GE III: Culture and Everyday Life in India

GE IV: Nature in Human History

GE V: Investigating Inequalities

GE VI: Delhi through the Ages

Skill Enhancement Courses

SEC I: Heritage and Tourism

SEC II: Introduction to Art in the Indian Subcontinent

SEC III: History and Archaeology

SEC IV: Archives and Museum

SEC V: Popular Culture

SEC VI: Language, Literature and Region in Early Modern Times

SEC VII: Understanding Text, Rituals and Orality in Indian History

SEC VIII: Radio and Cinema in India: A Social History

In Lieu of MIL: (Also offered to students of B.Com. programme)

In Lieu I: Communicating Culture: Tellings, Representations and Leisure

In Lieu II: History of Inequalities

7.1 Course Learning Objective

The three year undergraduate History Programme offered by the Department of History in various colleges of the University of Delhi aims to familiarise students with significant developments in the history of South Asia and certain other parts of the world, through different time periods. While the primary focus remains on the Indian subcontinent, students also study about other parts of the world, European as well as non-European. The course aims to make the students challenge the idea of history as seamless, or historical knowledge as fixed/finished product that the textbooks at the school level create. It seeks to expose the students to various problems and conflicts that are an inherent part of the historical exercise of reconstructing the past. The purpose is to sensitize students to the existence and desirability of multiple perspectives through which knowledge about past is constructed. Probably the most important goal is to enable students to cultivate a historically sensitive way of thinking with due regard to time, place, context and roles of human agencies involved. Thus, the students are encouraged to think critically, analyze different perspectives and actively process information about the past rather than become passive recipients of singular historical knowledge. In the process of helping them achieve the above goals, we hope to enable them to engage critically with the major strands of historical scholarship in the field, available in secondary texts. By the end of the three years of the B.A. programme, students would have obtained a fundamental grounding in some of the important issues that crop up in a historian's reading and interpretation of primary sources. Certain thematic courses like those on gender and environment are designed to sensitise students to contemporary concerns and equip them with the theoretical foundations so that they can formulate and pose relevant questions to the sources.

In the course of their engagement with historical material, we also aim to equip students with an 'appropriate' vocabulary of the discipline, such that they may be able to articulate their own complex ideas regarding various themes in History. It is our attempt that students achieve this objective through systematic reading and class lectures and through feedback on their written work – essays, project/research papers,

etc. as well as in the oral form – presentations, debates, discussions, etc. It is our intention to train students to formulate cogent arguments, presenting the necessary evidence to establish these, all based on a training in the rigorous methods of the discipline of History.

Besides these objectives regarding the intellectual development of the pupil, the larger goals of this programme are those that are common to any other educational programme, particularly in the field of humanities and social sciences. These are goals such as developing a sense of active citizenship, making responsible political choices and democratic conduct in public life. The programme also aims to enable them to intervene meaningfully in debates regarding matters of public concern, while developing the ability to generate public opinion on the same. The objective is also to inculcate a humanitarian spirit within learners, such that they may develop empathy and compassion, while being discerning critical thinkers, all at the same time.

Graduates of the B.A. Programme do branch out to different spheres of knowledge, and domains of professional work, besides pursuing higher studies within the discipline. It is expected that besides the skills specific to the discipline, these wider life skills of argumentation and communication, attitudes and temperaments, would ultimately enable learners to live rich, productive and meaningful lives.

7.2 Course Learning Outcomes

After completing the undergraduate programme in B.A. Programme with History, the student is expected to –

A. Construct historical narratives

- Describe significant developments within the historical contexts, covered in the syllabus,
- Identify and analyse the significance of historical changes that take place within a society or culture,
- Explain the patterns of such transitions,

- Assess patterns of continuities within such historical contexts.

B. Formulate arguments based on a historiographical engagement

- Formulate, sustain, and justify a historical argument,
- Support and establish such arguments with historical evidence drawn mainly from secondary sources,
- Situate historical arguments within a larger scholarly narrative,
- Explain that while chronology and knowledge of the basic facts of history are necessary, the study of history involves critical evaluation and processing of those facts to arrive at coherent interpretations of the past,
- Exhibit a familiarity with ‘the historian’s craft’ – methods and rigours of the discipline.

C. Engage with scholarly writings and presentations

- Abstract the main arguments/concepts/ideas embedded in scholarly writings in History,
- Comprehend, and explain the structure of arguments and claims made in such writings,
- Note the empirical evidence used to establish such claims.

D. Answer questions, write essays and research papers

- Synthesize arguments and facts culled from scholarly writings,
- Articulate a persuasive and well-structured historical argument on the basis of such synthesis,
- Employ multiple forms of evidence in this historical argument,
- Formulate relevant and meaningful historical questions,
- Write clear, cogent, and well – researched essays and academic papers, to make an argument based on appropriate evidence about a selected topic or question in history, avoiding plagiarism,
- Use proper citations and footnotes within formal written assignments,

- Deliver presentations based on such well – researched material orally as well,
- Participate in debates and other forms of verbal historical discussion.

E. Work collaboratively

- Make presentations,
- Listen attentively to presentations made by peers,
- Participate in discussion and ask thoughtful questions,
- Provide formal feedback to peers in the course of such discussion,
- Learn the formal protocol of academic engagement in a seminar and conference.

7.3 Course Teaching-Learning Process

The pedagogic methods adopted for the B.A. History Programme involves direct lectures, tutorial discussions, as well as technology-supported presentations. We believe that education is interactive and all sessions between students and teachers are based upon reciprocity and respect.

1) The lectures (of one hour each) delivered to one whole class at a time systematically deal with the themes of the syllabus. This constitutes the core of the teaching-learning process. The students are provided with bibliographic references and encouraged to go through at least some readings so that they could be more interactive and ask more relevant questions in the class.

2) For tutorials, the class is divided up into smaller groups of eight to ten students who interact with the respective teacher once every week for each course. Teaching in the tutorial sessions is customized to the specific needs of the individual students, where the latter can raise a series of questions ranging from what s/he could not follow in the class, the everyday implications of what the teacher said in the lectures or what the student read in a prescribed reading, and so forth. Indeed, tutorial discussions are a crucial and indispensable part of the teaching learning process of B.A. History Programme offered in colleges. This is the site where the teachers and students are able to establish a more relaxed relationship that go a long way in creating the ideal

atmosphere for free and fearless exchange of ideas and information. Tutorials are also the place where a teacher may keep an eye over the social dynamics among the students and ensure that nobody feels marginalized or side-lined in the class due to gender, region, class or any other reason.

3) Wherever needed, teachers use audio-video based technological devices (e.g. Power Point) to make their presentations more effective. Some courses require that students see a documentary or feature film and course themes are structured so that discussions of these will further nuance the critical engagement of students with ideas introduced in their textual materials.

7.4 Assessment Methods

Graded assessment of all papers is broadly carried out in two forms:

- a) There is an end of semester [theory] examination which covers the entire syllabus. Students are asked ten questions and are required to answer five in three hours. The end of semester examination comprises 75% of the final grade.
- b) The second assessment is through internal evaluation of term papers, presentations, exams, and project work which is carried out throughout the term and comprises 25% of the final grade.

8 Keywords

History, History of India, World History, History of Europe, History of Ancient India, History of Medieval India, History of Modern India, Political History, Social History, Economic History, Cultural History, Archaeology, Gender, Art, Anthropology, Languages, Literatures, Environment Studies, Cinema, Music, Documentaries, Radio, Fieldwork, Museums, Archives, Chronicles, Inscriptions, Monuments, Coinage, Heritage, Historiography, Historical Analysis, Interdisciplinary studies, Caste, Class, Religion, Agrarian Economy, Maritime Trade, Taxation, Ideology, Antiquity, Early Medieval, Early Modern, Modernity, Periodisation, Women, Masculinity, Peasantry,

Merchants, Kingship, Feudalism, Reformation, Despotism, Absolutism, Renaissance,
Enlightenment, Humanism, Capitalism, Colonialism, Imperialism, Fascism,
Democracy,

Discipline Core Courses

Core Course I
History of India from the earliest times up to c. 300 CE

Course Objectives:

This course explores various stages and processes of Indian history from prehistoric period to early historic centuries. It examines the historiographical shifts pertaining to what is termed as ‘Ancient/early’ India. Underlining the pan-Indian historical changes, it also focuses on regional diversities. The varied experiences in the Indian subcontinent can be seen in archaeological cultures and questions concerning literacy, nature of state formation and attendant cultural growth.

Learning Outcomes:

On successful completion of this course, students will be able to:

- Delineate changing perceptions on ‘Ancient/early’ India.
- Explain the importance of archaeological sources for study of proto-history and recognize the belated growth of literacy.
- Distinguish between civilization and culture, particularly in the context of first ever civilization in the Indian subcontinent.
- Outline the key features of the first ever empire under the Mauryas.
- Locate the shift of historical focus from Gangetic belt to newer areas.
- Discuss the processes of assimilations of people and ruling houses from outside the Indian subcontinent into the mainstream.

Course Content:

- I. Interpreting Ancient India; survey of sources**
- II. Prehistoric Cultures:** Palaeolithic, Mesolithic, Neolithic; rock art
- III. Harappan Civilization:** Origin and extent, town planning, economy, society and religion, decline and continuity. Chalcolithic cultures
- IV. Vedic Culture:** polity, economy, society and religion. Beginnings of the iron age; Megalithic cultures
- V. Post-Vedic Period:** material and social changes, Mahajanapadas and the rise of Magadha, Buddhism and Jainism: doctrines; spread
- VI. The Mauryan Empire:** state and administration, society, economy, Ashoka’s Dhamma, decline, art and architecture

VII. **The Far South:** Tamilakam; polity, economy and society

VIII. **Post-Mauryan age with special reference to Satavahanas and Kushanas:** polity, economy, society, culture

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I. In this Unit the students shall be introduced to the varied sources used for writing history of ancient India. Key interpretations stemming from historians' use of such sources shall be discussed. **(Teaching Time: 2 weeks approx.)**

- Thapar, Romila. (2002). *Early India from the Origins to AD 1300*. New Delhi: Penguin.
- रोमिला ,थापर. (2008). प्रारम्भसे :पूर्वकालीनभारत 1300 ,हिंदीमाध्यमकार्या न्वयनिदेशालय .तक .ई दिल्लीविश्वविद्यालय,.
- Singh, Upinder. (2013). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th century*. New Delhi: Pearson.
- उपिन्दर ,सिंह. (2016). पाषाणकालसे :प्राचीनएवमपूर्वमध्यकालीनभारतकाइतिहास 12.वीशताब्दीतक पियरसन :नईदिल्ली.
- श्रीमाली .एम .एवमके .एन .डी ,झा. (2000). :दिल्ली .प्राचीनभारतकाइतिहास पुनर्मुद्रन ,दिल्लीविश्वविद्यालय ,हिंदीमाध्यमकार्यान्वयनिदेशालय.
- Sharma, R. S. (1995). *Perspectives in Social and Economic History of Early India*. New Delhi: Munshiram Manoharlal.
- एस .आर ,शर्मा. (2000). :दिल्ली .प्रारम्भिकभारतका आर्थिकऔरसामाजिकइतिहास दिल्लीविश्वविद्यालय ,हिंदीमाध्यमकार्यान्वयनिदेशालय.

Unit II. This Unit shall familiarize the students with the essential features of early human societies and help them distinguish between various subsistence patterns and material cultures of these societies. **(Teaching Time: 2 weeks approx.)**

- Jain, V. K. (2006). *Pre and Protohistory of India*. New Delhi: D.K. Printworld.
- के.वी ,जैन. (2008). नईदिल्ली .एकअवलोकन :भारतकाप्रा गैति हासऔरआद्यइतिहास: D.K. Printworld.
- Singh, Upinder. (2013). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th century*. New Delhi: Pearson.
- उपिन्दर ,सिंह. (2016). पाषाणकालसे :प्राचीनएवमपूर्वमध्यकालीनभारतकाइतिहास 12.वीशताब्दीतक पियरसन :नईदिल्ली.
- Allchin, Bridget and Raymond Allchin. (1997). *Origins of a Civilization: The Prehistory and Early Archaeology of South Asia*. New Delhi: Viking.

Unit III. This Unit shall introduce students to one of the earliest urban civilizations in Asia of the Indian subcontinent. The unit shall also provide an overview of other material cultures. **(Teaching Time: 2 weeks approx.)**

- Ratnagar, Shereen.(2001). *Understanding Harappa: Civilization in the Greater Indus Valley*. New Delhi: Tulika.
- Allchin, Bridget and Raymond Allchin. (1997). *Origins of a Civilization: The Prehistory and Early Archaeology of South Asia*. New Delhi: Viking.
- उपिन्दर ,सिंह. (2016). पाषाणकालसे :प्राचीनएवमपूर्वमध्यकालीनभारतकाइतिहास 12.वीशताब्दीतक पियरसन :नईदिल्ली.
- औरसंकटाप्रसादशुक्ल .के .के ,थपलियाल. (2003). ,उत्तरप्रदेशहिंदीसंस्था न :लखनऊ .सिन्धुसभ्यता संशोधितएवमपरिवर्धितसंस्करण.
- Jain, V. K. (2006). *Pre and Protohistory of India*. New Delhi: D.K. Printworld (Chapter on Chalcolithic Cultures).
- के .वी ,जैन. (2008). नईदिल्ली .एकअवलोकन :भारतकाप्रा गैति हासऔरआद्यइतिहास: D.K. Printworld (ताम्रपाषाणसेसम्बंधितअध्याय)

Unit IV. This Unit shall provide the students a detailed overview of the evolving cultural traditions, socio-economic structures and political formations in the northern Indian subcontinent. The Unit shall also discuss the advent of material cultures and communities that developed the use of iron technology in the northern and southern parts of the subcontinent. **(Teaching Time: 2 weeks approx.)**

- Sharma, R. S. (1995). *Perspectives in Social and Economic History of Early India*. New Delhi: Munshiram Manoharlal.
- एस .आर ,शर्मा. (2000). :दिल्ली .प्रारम्भिकभारतका आर्थिकऔरसामाजिकइतिहास दिल्लीविश्वविद्यालय ,हिंदीमाध्यमकार्यान्वयनिदेशालय.
- Jha, D. N. (2004). *Early India: A Concise History*. Delhi: Manohar.
- Chakravarti, Ranabir. (2010). *Exploring Early India Up to C. AD 1300*. New Delhi: MacMillan.
- रणवीर ,चक्रवर्ती. (2012). ओरिएंटलब्लैकस्वान :नईदिल्ली ,आदिकाल :भारतीयइतिहास.
- Jain, V. K. (2006). *Pre and Protohistory of India*. New Delhi: D.K. Printworld.
- के .वी ,जैन. (2008). नईदिल्ली .एकअवलोकन :भारतकाप्रा गैति हासऔरआद्यइतिहास: D.K. Printworld.

Unit V. This unit shall familiarize the students with major social transformations that unfolded from roughly c. 600 BCE to c. 200 BCE. **(Teaching Time: 2 weeks approx.)**

- R. S. Sharma. (1983). *Material Culture and Social Formations in Ancient India*. New Delhi: Macmillan.
- Jha, D. N. (2004). *Early India: A Concise History*. Delhi: Manohar.
- Thapar, Romila. (2002). *Early India from the Origins to AD 1300*. New Delhi: Penguin.
- रोमिला , थापर. (2008). प्रारम्भसे :पूर्वकालीनभारत 1300 ,हिंदीमाध्यमकार्यान्वयनिदेशालय :दिल्ली .तक .ई दिल्लीविश्वविद्यालय.
- श्रीमाली .एम .एवमके .एन .डी , झा. (2000) ,हिंदीमाध्यमकार्यान्वयनिदेशालय :दिल्ली .प्राचीनभारतकाइतिहास पुनर्मुद्रन ,दिल्लीविश्वविद्यालय.

Unit VI. This Unit shall introduce students to the evolving administrative framework, social structure, economy and cultural life of one of the earliest empires of the Indian subcontinent. **(Teaching Time: 2 weeks approx.)**

- Thapar, Romila. (2012). *Ashoka and the Decline of the Mauryas*, third edition, New Delhi: Oxford University Press.
- रोमिला , थापर. (2005). ग्रंथशिल्पी ;दिल्ली ,अशोकऔरमौर्यसाम्राज्यकापतन.
- Chakravarti, Ranabir. (2010). *Exploring Early India Up to C. AD 1300*. New Delhi: MacMillan.
- रणबीर ,चक्रवर्ती. (2012). ओरिएंटलब्लैकस्वान :नईदिल्ली.आदिकाल :भारतीयइतिहास.

Unit VII. This Unit shall familiarize the students with important social transformations and cultural traditions that developed within communities settled the southern reaches of the Indian subcontinent. **(Teaching Time: 2 weeks approx.)**

- Karashima, Noborou (Ed.). (2014). *A Concise History of South India*. New Delhi: Oxford University Press.
- Singh, Upinder. (2013). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th century*. New Delhi: Pearson.
- उपिन्दर ,सिंह. (2016). पाषाणकालसे :प्राचीनएवमपूर्वमध्यकालीनभारतकाइतिहास 12.वीशताब्दीतक पियरसन :नईदिल्ली.

Unit VIII. This Unit shall discuss the key features of polities and material life that emerged in the period c. 100 BCE to c. 300 CE, using the case studies of the Satavahanas and Kushanas. **(Teaching Time: 2 weeks approx.)**

- Sharma, R.S. (2015). *Aspects of Political Ideas and Institutions in Ancient India*. Delhi: Motilal Banarasidas.
- एस.आर ,शर्मा. (1990). ,राजकमलप्रकाशन :नईदिल्ली ,प्राचीनभारतमेराजनीतिकविचरएवमसंस्थाए दूसरासंस्करण.

- Chakravarti, Ranabir. (2010). *Exploring Early India Up to C. AD 1300*. New Delhi: MacMillan.
- रणबीर ,चक्रवर्ती. (2012). ओरिएंटलैकस्वान :नईदिल्ली.आदिकाल :भारतीयइतिहास.

Suggested Readings:

- Basham, A.L. (1967). *The Wonder That Was India*. New Delhi: Rupa & Co.
- Thapar, Romila. (2013) *Cultural Pasts: Essays in Early Indian History*. New Delhi: Oxford University Press.
- Kosambi, D. D. (1975). *An Introduction to the Study of Indian History*. New Delhi: Popular Prakashan.
- Ray, H. P. (1986). *Monastery and Guild: Commerce under the Satavahanas*. New Delhi: Oxford University Press.
- Chakrabarti, Dilip K. (2006). *The Oxford Companion to Indian Archaeology: The Archaeological Foundations of Ancient India, Stone Age to AD 13th Century*. New Delhi: Oxford University Press.
- Lahiri, Nayanjot. (2002). *The Decline and Fall of the Indus Civilization*. New Delhi: Permanent Black.
- Ray, Niharranjan. (1975). *Maurya and Post-Maurya Art: A Study in Social and Formal Contrasts*. New Delhi: Indian Council of Historical Research.
- Moorti, Udayaravi S. (1994). *Megalithic Culture of South India*. Varanasi: Ganga Kaveri.
- Gurukkal, Rajan. (1995). "The Beginnings of the Historic Period: The Tamil South" in Romila Thapar (Ed.), *Recent Perspectives of Early Indian History*. Bombay: Popular Prakashan.

Teaching Learning Process:

Classroom teaching should be supported by group discussions or group presentations on specific themes/readings. Adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of

the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords: Prehistory, Chalcolithic, Megalithic, *Mahajanapadas*, Empire, *Dhamma*, *Tamilakam*

Core Course II

History of India, c. 300 to 1200

Course Objectives:

This course broadly covers from the last phase of early historic centuries to the early medieval. Considered as a watershed, Gupta period was known for beginnings of some historical changes that were likely to dominate the next five-six centuries. This course aims to underline and analyze how these changes in the all Indian provide important bases understanding transition to medieval period. This period of transition, called 'early medieval' seeks to examine regional manifestations.

Learning Outcomes: On successful completion of this Course, the students will be able to:

- Identify the historical importance of the accelerated practice of land grants issued by ruling houses.
- Delineate changes in the realm of polity and culture; *puranic* religion; the growth of vernacular languages and newer forms of art and architecture.
- Contextualize the evolution and growth of regional styles of temple architecture and the evolving role of these temples as centers of socio-economic and political activities.

Course Content:

Unit-I: Survey of the sources

Unit-II: The Guptas and Vakatakas: State and administration, economy, society, religion, literature, art

Unit-III: Changes in the post-Gupta period, characterizing early medieval India

Unit-IV: Vardhanas, Pallavas and Chalukyas: political and cultural developments

Unit-V: Rashtrakutas, Palas and Pratiharas: The tripartite struggle

Unit-VI: Emergence of Rajput states in Northern India: Socio-economic foundations

Unit-VII: The Cholas: State and administration, economy and culture

Unit-VIII: The Arabs, the Ghaznavids in the northwest, trans-regional exchange

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit-I. In this Unit the students shall be introduced to the varied sources used for writing history of ancient India from c. 300 CE onwards. Key interpretations stemming from historians' use of such sources shall be discussed. **(Teaching Time: 2 weeks approx.)**

- Sharma, R.S. (1995). "An analysis of land grants and their value for economic history" in *Perspectives in Social and Economic History of Early India*. New Delhi: Munshiram Manoharlal.
- शर्मा .एस .आर. (2000). :दिल्ली .प्रारम्भिक भारतका आर्थिक और सामाजिक इतिहास भूमिअनुदानसे सम्बंधित अध्याय) दिल्ली विश्वविद्यालय ,हिंदी माध्यम कार्यान्वयन निदेशालय)
- Chopra, P. N. (Ed.). (1973). "Source Material of Indian History" (relevant section). in *The Gazetteer of India, Vol. Two: History and Culture*. New Delhi: Publications Division.
- Singh, Upinder. (2013). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th century*. New Delhi: Pearson.
- उपिन्द्र सिंह. (2016). पाषाणकाल से प्राचीन एवम पूर्व मध्यकालीन भारतका इतिहास 12:नई दिल्ली .वी शताब्दी तक पियरसन

Unit II. This Unit shall introduce students to the evolving state formation, administrative framework, social structure, economy and cultural life of two important and vast empires that emerged in the mid-third century CE. **(Teaching Time: 2 weeks approx.)**

- Chakravarti, Ranabir. (2010). *Exploring Early India Up to C. AD 1300*. New Delhi: Macmillan.
- रणवीर ,चक्रवर्ती. (2012). ओरिएंटलैकस्वान :नई दिल्ली.आदिकाल :भारतीय इतिहास.
- Sharma, R.S. (2015). *Aspects of Political Ideas and Institutions in Ancient India*. Delhi: Motilal Banarasidas.
- एस.आर .शर्मा. (1990). ,राजकमल प्रकाशन :नई दिल्ली .प्राचीन भारत मे राजनीतिक विचार एवम संस्थाएं दूसरा संस्करण.
- Jha, D. N. (2004). *Early India: A Concise History*. Delhi: Manohar.

Unit III. This Unit shall introduce students to the evolving state formation and socio-economic transformations that debated by historians and used to distinguish the early medieval period in the Indian subcontinent. **(Teaching Time: 2 weeks approx.)**

- Chattopadhyaya, B. D. (1994). "Introduction." *The Making of Early Medieval India*. New Delhi: Oxford University Press.
- Sharma, R. S. (2001). *Early Medieval Indian Society: A Study in Feudalization*. Delhi: Orient Longman.
- एस .आर .शर्मा. (2009). :नई दिल्ली .पूर्व मध्य कालीन भारत का सामंती समाज और संस्कृति राजकमल प्रकाशन.
- Champakalakshmi, R. and B. D. Chattopadhyaya. (1995). Chapters on state and economy In Romila Thapar (Ed.), *Recent Perspectives of Early Indian History*. Bombay: Popular Prakshan.

Unit IV. This Unit shall provide an overview of important political developments between the 8th to 10th centuries CE. **(Teaching Time: 2 weeks approx.)**

- Devahuti, D. (1999). *Harsha: A Political Study*. New Delhi: Oxford University Press, third edition.

- Harle, J.C. (1994). *The Art & Architecture of the Indian Subcontinent*. PLACE: Yale University Press.
- Sharma, R.S. (2005). *India's Ancient Past*. New Delhi: Oxford University Press.
- Karashima, Noborou (ed.). (2014). *A Concise History of South India*. New Delhi: Oxford University Press.

Unit V. This Unit shall introduce students to the evolving state formation of post-Gupta polities. **(Teaching Time: 2 weeks approx.)**

- Mazumdar, R. C. (1952). 'Chapter 5' *Ancient India*. Delhi: Motilal Banarsidas, Book III.
- श्रीमाली .एम .एवमके .एन .डी ,झा. (2000). ,हिंदीमाध्यमकार्यान्वयनिदेशालय :दिल्ली .प्राचीनभारतकाइतिहास पुनर्मुद्रन ,दिल्लीविश्वविद्यालय.
- Thapar, Romila. (2002). *Early India from the Origins to AD 1300*. New Delhi: Penguin.
- रोमिला ,थापर. (2008). प्रारम्भसे .पूर्वकालीनभारत 1300 ,हिंदीमाध्यमकार्यान्वयनिदेशालय :दिल्ली .तक .ई दिल्लीविश्वविद्यालय
- Chakravarti, Ranabir. (2010). *Exploring Early India Up to C. AD 1300*. New Delhi: Macmillan.
- रणबीर ,चक्रवर्ती. (2012). ओरिएंटलब्लैकस्वान :नईदिल्ली.आदिकाल :भारतीयइतिहास.

Unit VI. This Unit shall introduce students to another important case study of state formation in the medieval period. The nature of evolving Rajput polity, social structure and economic developments shall be discussed. **(Teaching Time: 2 weeks approx.)**

- Chattopadhyaya, B. D. (1994). *The Making of Early Medieval India*. New Delhi: Oxford University Press (Chapter on origins of the Rajput).
- श्रीमाली .एम .एवमके .एन .डी ,झा. (2000). ,हिंदीमाध्यमकार्यान्वयनिदेशालय :दिल्ली .प्राचीनभारतकाइतिहास पुनर्मुद्रन ,दिल्लीविश्वविद्यालय.
- Singh, Vipul. (2009). *Interpreting Medieval India, Vol. I*. New Delhi: Macmillan.

Unit VII. This Unit shall introduce the students to another important case study of state formation in the medieval period in southern reaches of the Indian subcontinent. The nature of evolving Chola polity, social structure, economy and cultural developments shall be discussed. **(Teaching Time: 2 weeks approx.)**

- Singh, Upinder. (2013). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th century*. New Delhi: Pearson.
- उपिन्दर ,सिंह. (2016). पाषाणकालसे .प्राचीनएवमपूर्वमध्यकालीनभारतकाइतिहास 12:नईदिल्ली .वीशताब्दीतक पियरसन
- Karashima, Noborou (Ed.). (2014). *A Concise History of South India*. New Delhi: Oxford University Press.
- Thapar, Romila. (2002). *Early India from the Origins to AD 1300*. New Delhi: Penguin.
- रोमिला ,थापर. (2008). प्रारम्भसे .पूर्वकालीनभारत 1300 ,हिंदीमाध्यमकार्यान्वयनिदेशालय :दिल्ली .तक .ई दिल्लीविश्वविद्यालय

Unit VIII. This Unit shall provide students a detailed overview of transregional exchange that unfolded with the growing presence of the Arabs and Ghaznavids in the northwest region. **(Teaching Time: 2 weeks approx.)**

- Avari, Burjor. (2013). *Islamic Civilization in South Asia: A History of Muslim Power and Presence in the Indian Subcontinent*. London: Routledge (Ch.2).
- Maclean, Derryl N. (1989). *Religion and Society in Arab Sind*. Leiden: E.J. Brill.
- Flood, Barry Finbarr. (2009). *Objects of Translation: Material Culture and Medieval 'Hindu-Muslim' Encounter*. Delhi: Permanent Black (Ch.1, "The Mercantile Cosmopolis" and Ch.2, "Cultural Cross-Dressing")
- Anooshahr, Ali. (2018). "The Elephant and Sovereign: India circa 1000 CE". *Journal of Royal Asiatic Society*. Series 3, pp. 615-44.

Suggested Readings:

- Basham, A. L. (1991). *The Origins and Development of Classical Hinduism*. Delhi: Oxford University Press.
- Chakrabarti, Ranabir. (2007). *Trade and Traders in Early India*. New Delhi: Manohar.
- Champakalakshmi, R. (2010). *Trade, Ideology and Urbanisation: South India 300 BC-AD 1300*. New Delhi: Oxford University Press.
- Dutt, Sukumar. (1988). *Buddhist Monks and Monasteries in India: Their History and Their Contribution to Indian Culture*. Delhi: Motilal Banarasidas.
- Goyal, S.R. (1986). *Harsha and Buddhism*. Meerut: Kusumanjali Prakashan, 1986.
- Huntington, Susan. (1985). *The Art of Ancient India: Buddhist, Hindu, Jain*. New York: Weatherhill.
- Kulke, Hermann (Ed.). (1997). "Introduction". in *The State in India 1000-1700*. New Delhi: Oxford University Press. (Oxford in India Readings: themes in Indian History Series).
- Mazumdar, R. C. (1964). *History and Culture of the Indian People, Vol. IV, Age of Imperial Kanauj*. Bombay: Bhartiya Vidya Bhawan, second edition.
- Stein, Burton. (1980). *Peasant, State and Society in Medieval South India*. Delhi: Oxford University Press, 1980.
- Subbarayalu, Y. (1982). "The Chola State." *Studies in History* vol. 4 no.2, pp.265-306.
- Veluthat, Kesavan. (2012). *The Political Structure of South India*. Delhi: Orient Longman. (second revised edition),

Teaching Learning Process:

Classroom teaching should be supported by group discussions or group presentations on specific themes/readings. Adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting

audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Gupta age, early medieval, tripartite struggle, Rajputs, Cholas, Arabs, Ghaznavids, transregional exchange

Core Course III

History of India, c. 1200-1700

Course Objective:

This course provides an analytical study of the history of India from 1200 to 1700 CE. It introduces students to a thematic study of the main aspects of the period, delineating major transitions, changes and developments that include the establishment of the Delhi Sultanate, the Mughal state, Vijayanagara and Rajput polities, encompassing political, administrative, cultural and economic aspects. Through select regional case studies the course also underlines the interconnectedness of the subcontinental region in its transition to the Early Modern period.

Learning Outcomes:

After the successful completion of this Course, the students will be able to:

- Identify the major political developments in the History of India during the period between the thirteenth and the seventeenth century.
- Outline the changes and continuities in the field of culture, especially with regard to art, architecture, bhakti movement and Sufi movement.
- Discuss the economic history of the period under study in India especially, where agrarian production and its implications are concerned.
- Delineate the development of trade and urban complexes during this period.

Course Outline:

Unit I. Foundation, expansion and consolidation of the Sultanates of Delhi c.13th to 15th century: Expansion; *Iqta* system; administrative reforms; nobility

Unit II. Regional political formations: Vijayanagara

Unit III. Foundation, expansion and consolidation of the Mughal State, c.16th to 17th century: Expansion and consolidation; Rajputs; *Mansabdari* and *Jagirdari*; imperial ideology; reassessing Aurangzeb

Unit IV. 17th century transitions: Marathas; Sikhs

Unit V. Art and architecture in medieval India: Qutb complex; Vijayanagara (Hampi); Fatehpur Sikri; Mughal miniature painting

Unit VI. Society, culture and religion: Bhakti -- Kabir and Mira Bai; Sufism – Nizamuddin Auliya and Sufism in popular literature from the Deccan: *Chakki-Nama* and *Charkha-Nama*.

Unit VII. Economy and integrated patterns of exchange: Rural and urban linkages; maritime trade and non-agrarian production

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I: This unit would have taught students about the politics, political economy and administrative transitions under the various Sultanate regimes. **(Teaching Time: 3 weeks approx.)**

- Jackson, P. (2003). *The Delhi Sultanate: A Political and Military History*. Cambridge: Cambridge University Press.
- Ray Chaudhuri, T and I. Habib (Ed.). (1982). *The Cambridge Economic History of India, Vol.1: c1200-1750*. Delhi: Orient Longman, pp. 45-101.
- Habib, I. (2003). *Madhyakalin Bharat ka Arthik Itihas ek Sarvekshan*. Delhi: Rajkamal.
- Habib, I. (Ed.). (1981-2003). *Madhyakalin Bharat*, 7 volumes. Delhi; Rajkamal.
- Verma, H.C. (ed.). (2003). *Madhyakalin Bharat, Bhag 1&2*, Delhi: Hindi Madhyam Karyanvan Nideshalaya, Delhi University.
- Kumar, Sunil. (2014). “*Bandagi and Naukari: Studying Transitions in Political Culture and Service under the North Indian Sultanates, 13th-16th centuries*” in Francesca Orsini and Samira Sheikh, (Eds.), *After Timur Left: Culture and Circulation in fifteenth century North India*. Delhi: Oxford University Press, pp. 60-108.

Unit II: This unit introduces students to recent historiography on the politics, society and economy of the Vijayanagara state. While learning about the historical details of the Vijayanagara state they will also be introduced to the role of rituals and cultural representations in the reproduction of power in the Vijayanagara state. **(Teaching Time: 2 weeks approx.)**

- Stein, Burton. (1989). *The New Cambridge History of India I.1, Vijayanagara* Cambridge: Cambridge University Press.
- Fritz, John M. (1986). “Vijayanagara: Authority and Meaning of a South Indian Imperial Capital”. *American Anthropologist, New Series*, vol. 88 no.1, pp. 44-55
- Sinopoli, Carla. (2003). *Political Economy of Craft Production: Crafting empire in South India c.1350-1650*. Cambridge: Cambridge University Press. (“The South Asian State” and “Vijayanagara: The Historical Setting”)

- Wagoner, Phillip B. (1996). "Sultan among Hindu Kings: Dress, Titles, and the Islamicization of Hindu Culture at Vijayanagara". *Journal of Asian Studies*, vol.55 no.4, pp. 851-80.

Unit III: This unit will teach students about the complex political, cultural and social world constructed under the Mughal regime. It will also introduce students to the diverse ways in which Mughal imperial ideology came to be constructed and also to the various historiographical debates on Aurangzeb. **(Teaching Time: 3 weeks approx.)**

- Alam, M., and S. Subrahmanayam. (1998). *The Mughal State 1526-1750*. Delhi: Oxford University Press.
- Richards, J F. (1996). *The New Cambridge History of India: The Mughal Empire*. Cambridge: Cambridge University Press.
- Ray Chaudhuri, T. and I. Habib. (Eds.). (1982). *The Cambridge Economic History of India, Vol.1: c1200-1750*. Delhi: Orient Longman, pp. 163-192.
- Bhargava, Meena. ed. (2010). *Exploring Medieval India: Sixteenth to the Eighteenth centuries*, Delhi: Orient Blackswan.
- Habib, I. (Ed.). (1997). *Akbar and his India*, Delhi: Oxford University Press.
- Habib, I. (Ed.). (2016). *Akbar aur Tatkalin Bharat*, Delhi: Rajkamal Prakashan Samuh.
- Verma, H.C. (Ed.). (2003). *Madhyakalin Bharat, Bhag 1&2*, Delhi: Hindi Madhyam Karyanvan Nideshalaya, Delhi University.
- Ali, M. Athar. (1996). *Mughal Nobility under Aurangzeb*, Delhi: Oxford University Press.
- Habib, I. (1999). *The Agrarian System of Mughal India, 1554-1707*. Delhi: Oxford University Press.
- Trushke, Audre. (2017). *Aurangzeb: The Man and the Myth*, Delhi: Penguin.
- Butler-Brown, Katherine. (2007). "Did Aurangzeb Ban Music? Questions for the historiography of his reign," *Modern Asian Studies* vol. 41 no.1, pp. 77-120.

Unit IV: In this unit students will learn about the emerging political formations in the Deccan and the Punjab plains. Through a study of the Marathas and Sikhs they would develop a better understanding of how the competition for resources in the seventeenth century contributed to the emergence of a new body of elites with political aspirations. **(Teaching Time: 2 weeks approx.)**

- Gordon, S. (1993). *The New Cambridge History of India: The Marathas, 1600-1818*. Cambridge: Cambridge University Press.
- Wink, Andre. (1986). *Land and Sovereignty in India: Agrarian Society and Politics under the Eighteenth Century Maratha Svarajya*. Delhi: Orient Longman, pp. 51 – 65.
- Grewal, J.S. (1986). *The New Cambridge History of India: The Sikhs*. Delhi: Cambridge University Press.

- Singh, Chetan. (1991). *Region and Empire: Punjab in the Seventeenth Century*. Delhi: Oxford University Press.

Unit V: This unit introduces students to the architectural and painting traditions in the medieval period. The student will learn the political and artistic contributions of patrons, painters, architects and artisans in the development of artistic representations of this period. This will be achieved through a series of case studies of a mosque (the Qutb Complex), imperial cities (Fatehpur Sikri and Hampi) and Mughal miniature paintings. **(Teaching Time: 2 weeks approx.)**

- Asher, Catherine B. (1992). *The New Cambridge History of India, The Architecture of Mughal India, Part 1, Vol. 4*, Cambridge: Cambridge University Press, pp. 39-98 (Ch.3, “The Age of Akbar”)
- Koch, Ebba. (2001). *Mughal Art and Imperial Ideology: Collected Essays*. Delhi: Oxford University Press. pp. 1-11 & 130-162.
- Desai, Vishaka N. (1990). “Painting and politics in Seventeenth Century North India: Mewar, Bikaner and the Mughal Court.” *Art journal* vol. no.4, pp.370-378.
- Verma, Som Prakash. (2009). *Interpreting Mughal Painting: Essays on Art, Society, and Culture*. Delhi: Oxford University Press.

Unit VI: This unit would have taught students about the cultural traditions in the medieval period with special reference to Kabir and Mirabai, and Nizam al-Din Auliya and popular mystic literature from the South. **(Teaching Time: 2 weeks approx.)**

- Charlotte Vaudeville. (2007). *A Weaver named Kabir*. Delhi: Oxford University Press.
- Schomer, Karine and W.H. McLeod. (Eds.). (1987). *The Sants Studies in Devotional Traditions in India*. Delhi, Motilal Banarasidas.
- Hess, Linda. (1983). "The Cow is Sucking at the Calf's Teat: Kabir's Upside-Down Language." *History of Religions* vol. 22, pp. 313-37.
- Hawley, John Stratton. (2005). *Three Bhakti Voices, Mira Bai, Kabir and Surdas in their Times*. Delhi: Oxford University Press.
- Manushi (1989). *Special Issue*. Nos. 50-51-52 (Jan-June). (Madhu Kishwar, Ruth Vanita and Parita Mukta articles on Mirabai.)
- Digby, Simon. (1986). “The Sufi Shaikh as a Source of Authority in Medieval India”. *Purusartha (Islam and Society in Medieval India)* vol. 9, pp. 57-77.
- Eaton, Richard M. (1974, 2000). “Sufi Folk Literature and the Expansion of Islam,” *History of Religion* vol. 14, pp.117-127. (Also available as *Essays on Islam and Indian History*. Delhi: Oxford University Press, pp.189-199.)

- Pinto, Desiderio S.J. (1989). "The Mystery of the Nizamuddin Dargah: The Account of Pilgrims" in Christian W Troll (ed.) *Muslim Shrines in India*. Delhi: Oxford University Press, pp.112-124.
- Lawrence, Bruce B. (1986). "The Earliest Chishtiya and Shaikh Nizam al-Din Awliya." in R E Frykenberg, (Ed.). *Delhi Through the Ages*. Delhi: Oxford University Press, pp. 104-128.

Unit VII: Students will learn about the gradual integration of agricultural and artisanal production in this unit. The establishment of circuits of exchange gradually tied rural, qasbah and city production, a process that will be charted from the medieval into the early modern period. They will also be expected to develop an understanding of the Indian Ocean trade and its impact on South Asian economy. **(Teaching Time: 2 weeks approx.)**

- Ray Chaudhuri, T and I. Habib. (Eds.). (1982). *The Cambridge Economic History of India, Vol.1: c1200-1750*. Delhi: Orient Longman, pp. 214-434
- Chandra, Satish. (2005). *Religion, State and Society in Medieval India: Collected Works of Nurul Hasan*. Delhi: Oxford University Press, pp. 173-278.
- Bhargava, Meena. (Ed.). (2010). *Exploring Medieval India: sixteenth to the eighteenth centuries*. Delhi: Orient Blackswan
- Prakash, Om. (1998). *The New Cambridge History of India: European Commercial Enterprise in Pre-Colonial India*. Delhi: Cambridge University Press
- Gupta, Ashin Das and M.N. Pearson. (1997) *India and the Indian Ocean 1500-1800*. Delhi: Oxford University Press.

Suggested Readings:

- Asher, Catherine B. and Cynthia Talbot. (2006). *India before Europe*. Cambridge: Cambridge University Press.
- Aquil, Raziuddin. ed. (2010). *Sufism and Society in Medieval India*. Delhi: Oxford University Press.
- Chandra, S. (2004). *Medieval India: From Sultanate to the Mughals, Part 1&2*. Delhi: Haranand Publications.
- Chandra, S. (2004). *Madhyakalin Bharat: Sultanate se Mughal tak*, Bhag 1& 2. Delhi: Jawahar Publishers.
- Chandra, S. (2007). *History of Medieval India (800-1700)*. Delhi: Orient Longman.
- Chandra, S. (2007). *Madhyakalin Bharat: Rajniti, Samajaur Sanskriti, Aathwi se Satrahvis shtabditak*. Delhi: Orient Black Swan.

- Digby, Simon. (2004). "Before Timur came: Provincialization of the Delhi Sultanate through the fourteenth century." *Journal of the Economic and Social History of the Orient* vol. 47no.3, pp. 298-356
- Ernst, Carl W. and Bruce Lawrence. (2002). "The Major Chishti Shrines" in *Sufi Martyrs of Love in the Chishti Order in South Asia and Beyond*. New York: Palgrave Macmillan, pp.85-104.
- Flood, Finbarr Barry (Ed.). (2008). *Piety and Politics in the Early Indian Mosque*. Delhi: Oxford University Press.
- Eaton, Richard M. (1996). *The Sufis of Bijapur, 1300-1700: Social Roles of Sufis in Medieval India*. Princeton: Princeton University Press.
- Faruqi, Munis D. (2012) *The Princes of the Mughal Empire, 1504-1719*. Cambridge: Cambridge University Press
- Green, Nile. (2002). *Sufis and Settlers in the Early Modern Deccan*, Delhi: Oxford University Press.
- Habib, I. (2003). *Madhyakalin Bharat ka Arthik Itihas Ek Sarvekshan*. Delhi: Rajkamal, 2003.
- Habib, I. (Ed.). (1981-2003). *Madhyakalin Bharat*. 7 volumes. Delhi; Rajkamal.
- Hasan, S. Nurul. (2008). *Religion, State and Society in Medieval India*. Delhi: Oxford University Press.
- Khanna, M. (2007). *Cultural History of Medieval India*. Delhi: Social Science Press.
- Khanna, M. (2012). *Madhyakalin Bharat Ka Sanskritik Itihas*. Delhi: Orient Black Swan.
- Koch, E. (2013). *Mughal Architecture: An Outline of its History and Development (1526-1858)*. Delhi: Primus.
- Kumar, S. (2007). *The Emergence of the Delhi Sultanate*. Delhi: Permanent Black.
- Lefèvre, Corinne. (2007). "Recovering a Missing Voice from Mughal India: The Imperial Discourse of Jahāngīr (r. 1605-1627) in His Memoirs", *Journal of the Economic and Social History of the Orient* vol. 50 no.4, pp. 452- 489
- Moosvi, Shireen. (1987). *The Economy of the Mughal Empire*. Delhi: Oxford University Press.
- Orsini Francesca and Samira Sheikh (Eds.). (2014). *After Timur Left: Culture and Circulation in fifteenth century North India*. Delhi: Oxford University Press.
- Rizvi, SAA. (1993). *Muslim Revivalist Movements in Northern India during 16th and 17th centuries*. Delhi: Munshiram Manoharlal.
- Vaniana, Eugenia. (2004). *Urban Crafts and Craftsmen in Medieval India (Thirteenth-Eighteenth Centuries)*. Delhi: Munshiram Manoharlal.
- Verghese, Anila. (2002). *Hampi*. Delhi: Oxford University Press.

Teaching Learning Process:

Classroom teaching on key concepts and discussions on important readings shall be the format. Supporting audio-visual aids like documentaries and power point presentations will be used where necessary. Overall, the Teaching Learning Process shall focus on tracing broad historical trends so that the students develop an overview of the Indian subcontinent during the time period under study. Given that the students are also pursuing another discipline, the process shall consistently emphasize what is meant by the historical approach and delineate the contributions/ importance of historical analysis. With an expanding exposure to historical view points, the BA Programme student shall increasingly imbibe an interdisciplinary approach.

Assessment Methods:

Students will be assessed on the basis of their analytical answers, critical understanding of historical debates and class room comprehension as well as readings. Two written submissions as well as at least one presentation will be considered essential for the final assessment of a student's overall performance.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Delhi Sultanate, *Iqta* System, Nobility, Gujarat Sultanate, Vijayanagara, Mughal State, Mansabdari, Jagirdari, Imperial Ideology, Marathas, Sikhs, Architecture, Miniature Painting, Bhakti, Sufism, Agrarian Economy, Maritime Trade

Core Course IV

History of India, c. 1700-1950

Course Objectives:

This paper provides a thematically arranged overview of the history of India from the beginning of the eighteenth-century to the making of the republic in 1950. The first two units examine the British colonial expansion in the eighteenth-century and proceed to discuss the consolidation of the colonial state power in the political settings of nineteenth-century India. The third unit critically situates the links between land revenue administration, export-oriented commercialisation of agricultural production and deindustrialisation and the rampant famine in colonial India. With a long-term perspective on the ideological, institutional and political formations, the last four units introduce the major tendencies in the anti-colonial nationalist and popular movements in colonial and immediate post-colonial India.

Learning Outcomes:

After the successful completion of this Course, the students will be able to:

- Trace the British colonial expansion in the political contexts of eighteenth-century India and the gradual consolidation of the colonial state power in the nineteenth century.
- Identify the key historiographical debates around the colonial economic policies, including the land revenue collection, commercialisation of agricultural production, trade policies and deindustrialisation.
- Delineate and explain the ideological, institutional, and political formations of the anti-colonial nationalist movement.
- Discuss the colonial context of the emergence of communal politics in India and the subsequent partition of India.

Course content:

- Unit I. India in the 18th century-** Background and Debates
- Unit II. Expansion and consolidation of British power:** Special reference to Bengal, Mysore, Maratha and Punjab
- Unit III. Making of the British Colonial Economy:**
- [a] Land revenue settlements;
- [b] Commercialisation of agriculture;
- [c] Deindustrialisation;
- [d] Drain of wealth
- Unit IV. The Revolt of 1857:** Causes, nature and consequences

Unit V Social and Religious Reform Movements in Colonial India:

- [a] Overview of reformist and revivalist movements in the 19th century;
- [b] Caste Movements (Phule, Sree Narayan Guru, Ambedkar);
- [c] Peasant and tribal movements: an overview

Unit VI. Growth of the National Movement, 1858-1947:

- [a] Early nationalism and foundation of the Indian National Congress;
- [b] A critique of colonialism (moderates, extremists and militant nationalists);
- [c] Mahatma Gandhi and mass nationalism: Non-cooperation, Civil Disobedience, and Quit India movements; relationship between the masses and leaders

Unit VII. Development of Communalism and the Partition of India:

- [a] An overview of the growth of communalism;
- [b] Towards Freedom and Partition

Unit VIII. Independent India: Making of the Constitution: The evolution of the Constitution and its Main Provisions; basic features of the Constitution

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I. This unit situates the major historiographical debates on the transformation of the Indian society in the eighteenth-century. **(Teaching Time: 2 weeks approx.)**

- Bandyopadhyay, Sekhar. (2004). *From Plassey to Partition: A History of Modern India*. Delhi: Orient Longman, pp. 1-138.
- Bayly, C.A. (1990). *An Illustrated History of Modern India 1600-1947*. London: National Portrait Gallery.
- Bose, S and Ayesha Jalal. (1998). *Modern South Asia: History, Culture, Political Economy*. New Delhi: OUP, pp. 38-69.
- Lakshmi Subramanian. (2010). *History of India, 1707-1857*. Hyderabad: Orient Blackswan, pp. 1-98.
- Dube, Ishita Banerjee. (2015). *A History of Modern India*. Delhi: Cambridge University Press, pp. 2-79.
- सेखर ,बंद्योपाध्याय. (2012).आधुनिकभारतकाइतिहास :प्लासीसेविभाजनतक. Hyderabad: Orient Longman.
- आर.एल. शुक्ल. (Ed). (1987). आधुनिकभारतकाइतिहास, Delhi: हिन्दीमाध्यमकार्यान्वयनिदेशालय, pp. 1-44.

Unit II. This unit discusses the process which led to the expansion and consolidation of the British colonial power in India with the help of specific case studies. **(Teaching Time: 2 weeks approx.)**

- Bandyopadhyay, Sekhar. (2004) *From Plassey to Partition*. Delhi: Orient Longman, pp. 1-65.
- Mann, Michael. (2015). *South Asia's Modern History: Thematic Perspectives*. London: Routledge, pp. 20-53.
- Chaudhary, Latika et al. (Eds.). (2016). *A New Economic History of Colonial India*. London: Routledge, pp. 33-51.
- Chandra, Bipan. (1979). *Nationalism and Colonialism in Modern India*. Hyderabad: Orient Longman, pp. 39-125.
- एल .बी ,ग्रोवर. (1995). आधुनिकभारतकाइतिहास. New Delhi: S. Chand & Co.
- सेखर ,बंद्योपाध्याय. (2012).आधुनिकभारतकाइतिहास :प्लासी सेविभाजनतक. Hyderabad: Orient Longman.

Unit III. This unit provides a critical perspective on the changing patterns of land relations, agricultural practices, and trade and industry in the Indian sub-continent under the British colonial rule. **(Teaching Time: 2 weeks approx.)**

- Bandyopadhyay, Sekhar. (2004). *From Plassey to Partition: A History of Modern India*. Delhi: Orient Longman, pp. 82-138.
- Dutt, R.P. (1986). *India Today*. Calcutta: Manisha, pp. 21-96.
- Mann, Michael. (2015). *South Asia's Modern History: Thematic Perspectives*. London: Routledge, pp. 264-314.
- Bose, S and Ayesha Jalal. (1998). *Modern South Asia: History, Culture, Political Economy*. New Delhi: Oxford University Press, pp. 53-69.
- Chaudhary, Latika (et. al. eds.). (2016). *A New Economic History of Colonial India*. London: Routledge, pp. 52-66.
- Sarkar, Sumit. 2014. *Modern Times: India 1880s-1950s: Environment, Economy and Culture*. Ranikhet: Permanent Black, pp. 106-216.
- सब्यसाची ,भट्टाचार्य (2008).राजकमल :दिल्ली .आधुनिकभारतकाआर्थिकइतिहास.
- सेखर ,बंद्योपाध्याय. (2012).आधुनिकभारतकाइतिहास :प्लासी सेविभाजनतक. Hyderabad: Orient Longman.
- आर०एल ,शुक्ल, (ed.). (1987). आधुनिकभारतकाइतिहास Delhi: हिन्दीमाध्यमकार्यान्वयननिदेशालय, pp. 92-95 and 104-178.

Unit IV. This unit elaborates the various aspects of the Revolt of 1857 and understand its impact on colonial rule and the Indian society. **(Teaching Time: 1 week approx.)**

- Bandyopadhyay, Sekhar (2004). *From Plassey to Partition: A History of Modern India*. Delhi: Orient Longman, pp. 169-183.

- Mann, Michael. (2015). *South Asia's Modern History: Thematic Perspectives*. London: Routledge, pp. 264-314, 55-62.
- Pati, Biswamoy. (Ed.). (2007). *The Great Rebellion of 1857 in India: Exploring transgressions, contests and diversities*. London: Routledge, pp. 1-15; 111-128.
- Bose, S and Ayesha Jalal. (1998). *Modern South Asia: History, Culture, Political Economy*. New Delhi: Oxford University Press, pp. 70-77.
- Taneja, Nalini. (2012). "The 1857 rebellion." in K. N. Panikkar, (Ed.). *Perspectives of Modern Indian History*. Mumbai: Popular Prakashan, pp. 93-126.
- सेखर ,बंद्योपाध्याय. (2012). आधुनिकभारतकाइतिहास :प्लासीसेविभाजनतक. Hyderabad: Orient Longman.
- आर०एल ,शुक्ल, (Ed). (1987) आधुनिकभारतकाइतिहास.Delhi: हिन्दीमाध्यमकार्यान्वयनिदेशालय, pp. 238-280.

Unit V. This unit discusses the social and religious reform movements and early rural insurgency in colonial India as a response to British colonialism. **(Teaching Time: 2 weeks approx.)**

- Bandyopadhyay, Sekhar. (2004). *From Plassey to Partition: A History of Modern India*. Delhi: Orient Longman, pp. 139-168; 342-47; 353-356.
- Joshi, V.C. (1975). *Rammohun Roy and the process of modernization in India*. Delhi: Vikas. relevant chapters.
- O'Hanlon, Rosalind. (2012). *Caste, Conflict and Ideology: Mahatma Jotirao Phule and the Low Caste Protest in Nineteenth-Century Western India*. Cambridge: Cambridge University Press, pp. 3-14; 105-134.
- Dube, Ishita Banerjee. (2015). *A History of Modern India*. Delhi: Cambridge University Press, pp. 346-360.
- सेखर ,बंद्योपाध्याय. (2012). आधुनिकभारतकाइतिहास :प्लासी सेविभाजनतक. Delhi: Orient Longman, relevant chapters.
- आर०एल ,शुक्ल. (Ed.). (1987). हिन्दीमाध्यमकार्यान्वयनिदेशालय) आधुनिकभारतकाइतिहास. Delhi: Delhi University, pp. 190-212.

Unit VI. This unit explores the long-term development of institutions, ideologies and different groups and individuals that shaped the political fields of the anti-colonial nationalist movement in the nineteenth and twentieth centuries. **(Teaching Time: 2 weeks approx.)**

- Sarkar, Sumit. (1983). *Modern India 1885-1947*. Delhi: Macmillan, pp. 37-298.
- Bandyopadhyay, Sekhar. (2004). *From Plassey to Partition: A History of Modern India*. Delhi: Orient Longman, pp. 279-404.
- Chandra, Bipan. (1989). *India's Struggle for Independence*. Delhi: Penguin, pp. 170-310.

- Pandey, Gyanendra. (2002). *The Ascendancy of the Congress in Uttar Pradesh 1926-34: A Study in Imperfect Mobilization*. New Delhi: Anthem Press (Second edition). (“Introduction” and Ch.4).
- Bose, S and Ayesha Jalal. (1998). *Modern South Asia: History, Culture, Political Economy*. New Delhi: Oxford University Press, pp. 86-101.
- Amin, Shahid. (1984). “Gandhi as Mahatma: Gorakhpur District, Eastern UP, 1921-22.” in Ranajit Guha, (Ed.). *Subaltern Studies III*. Delhi: OUP, pp. 1-61.
- Dube, Ishita Banerjee. (2015). *A History of Modern India*. Delhi: Cambridge University Press, pp. 260-302.
- सुमित ,सरकार (2009). आधुनिकभारत. Delhi: राजकमल, relevant chapters.
- सेखर ,बंद्योपाध्याय (2012). आधुनिकभारतकाइतिहास : प्लासी सेविभाजनतक. Delhi: Orient Longman, relevant chapters.

Unit VII. This unit critically situates the political and social contexts that led to communal mobilization and its impact on the sub-continent’s social and political fabric. **(Teaching Time: 2 weeks approx.)**

- Sarkar, Sumit. (1983). *Modern India 1885-1947*, Delhi: Macmillan, pp. 355-390 (relevant sections)
- Pandey, Gyanendra. (1990). *The Construction of Communalism in Colonial North India*. Delhi: Oxford University Press, pp. 1-22.
- Chandra, Bipan.(2008). *Communalism in Modern India*. New Delhi: Har Anand, pp. 50-96; 238-324 (all other chapters and relevant as suggested reading).
- Bose, S and Ayesha Jalal. (1998). *Modern South Asia: History, Culture, Political Economy*. New Delhi: OUP, pp. 135-156.
- Chandra, Bipan. (1979). *Nationalism and Colonialism in Modern India*. Hyderabad: Orient Longman, pp. 257-302.
- Misra, Salil. (2012). “Emergence of Communalism in India.” in K. N. Panikkar (Ed.), *Perspectives of Modern Indian History*. Mumbai: Popular Prakashan, pp. 223-258.
- सुमित ,सरकार (2009) आधुनिकभारत. Delhi: राजकमल, relevant chapters.

Unit VIII. This unit situates the process of making the constitution as an attempt to decolonize Indian society and its political practices. **(Teaching Time: 2 weeks approx.)**

- Chandra, Bipan. (2000). *India Since Independence*. Delhi: Penguin Books, pp. 38-85.
- Guha, Ramachandra. (2007). *India after Gandhi: The History of the World’s Largest Democracy*. Delhi: Macmillan, pp. xi-126
- Austin, Granville. (1966). *The Indian Constitution: Cornerstone of a Nation*. New Delhi: Oxford University Press, pp. 1-144.

- Hasan, Mushirul. (2012). "India's Partition: Unresolved Issues." in K. N. Panikkar, (Ed.). *Perspectives of Modern Indian History*. Mumbai: Popular Prakashan, pp. 313-339.
- Dube, Ishita Banerjee. (2015). *A History of Modern India*. Delhi: Cambridge University Press, pp. 436-465.

SUGGESTED READINGS:

- Bahl, Vinay. (1988). "Attitudes of the Indian National Congress towards the working class struggle in India." in K. Kumar, (Ed.). *Congress and Classes: Nationalism, Workers, and Peasants*. New Delhi: Manohar, pp.1-33.
- Bandyopadhyay, Sekhar. (Ed.). (2009). *National Movement in India: A Reader*. New Delhi: Oxford University Press.
- Bhargava, Rajeev. (Ed.). (2009). *Politics and Ethics of the Indian Constitution*. New Delhi: OUP.
- Brown, Judith. (1972). *Gandhi's Rise to Power*, Cambridge: Cambridge University Press.
- Chandra, Bipan. (1996). *Nationalism and Colonialism in Modern India*, Delhi: Orient Longman.
- Chandra, Bipan. (1966, Reprint 2004). *The Rise and Growth of Economic Nationalism in India*. New Delhi: Anamika Publishers.
- Desai, A.R. (1981). *Social Background of Indian Nationalism*. Delhi: Popular Prakashan.
- Gopinath, Ravindran. (2012). "The British Imperium and the Agrarian Economy", in K. N. Panikkar, (Ed.). *Perspectives of Modern Indian History*, Mumbai: Popular Prakashan, pp. 62-90.
- Habib, Irfan. (2013). *Indian Economy 1757-1857*, New Delhi: Tulika Books.
- Habib, Irfan. (2006). *Indian Economy 1858-1914*, New Delhi: Tulika Books.
- Hasan, Mushirul, (1993). *India's Partition: Process, Strategy and Mobilisation*. New Delhi: Oxford University Press.
- Kumar, K. (Ed.). (1998). *Congress and Classes: Nationalism, Workers and Peasants*, Delhi: Manohar.
- Metcalf, B. D. and T.R. Metcalf. (2002). *A Concise History of India*, Cambridge: University Press.
- Metcalf, Thomas. (2001). *Ideology of the Raj*, Delhi: Cambridge University Press.
- Omvedt, Gail. (1994). *Dalits and Democratic Revolution*, Delhi: Sage.
- Pandey, Gyanendra. (2001). *Remembering Partition*, Cambridge: Cambridge University Press.
- Pati, Biswamoy (Ed.). (2007). *The 1857 Rebellion*, Delhi: Oxford University Press.
- Roy, Tirthankar. (2000). *The Economic History of India 1857-1947*, New Delhi: Oxford University Press.

- Sarkar, Sumit and Tanika Sarkar (Eds.). (2014). *Caste in Modern India: A Reader, Vols. I & II*, Delhi: Permanent Black.
- Sarkar, Sumit. (2014). *Modern Times: India 1880s-1950s: Environment, Economy and Culture*. Ranikhet: Permanent Black.
- Sarkar, Sumit (1993). *Popular movements and Middleclass leadership in late colonial India*. Delhi: Aakar.
- Stein, Burton. (1998). *A History of India*. New Delhi: Oxford University Press, pp. 239-366.
- चन्द्र, बिपन. (2009). *आधुनिकभारतकाइतिहास*. Delhi: Oriental BlackSwan.

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Colonialism, Land Revenue Settlement, deindustrialisation, Drain of wealth, commercialisation, nationalism, Gandhi, anti-colonial movement, caste question, Phule, Ambedkar, Partition, Constitution.

Discipline Specific Elective

DSE I

Europe from the Middle Ages to the Renaissance (7th to the 16th century)

Course Objective:

The objective of this course is to make the students familiar with the history of modern Europe. The purpose is to enable them to understand the linkages between themes in Indian history papers and those of European history. The idea is to give them a European perspective of themes involved.

Learning Outcomes: After completing this Course, students will be able to:

- Interpret the importance and implications of periodization
- Explain the development of what are conventionally called modern sensibilities in politics and the arts
- Discuss the development of important institutions such as the Church and political formations such as the city-states
- Point out the category of the 'Renaissance'.

Course Content:

Unit I: Periodization and its implications: Antiquity; Middle Ages/Dark Ages; the Renaissance; Late Antiquity and the Early Medieval: Charlemagne and the Holy Roman Empire

Unit II: Making of the Papacy, cult of saints and monasticism

Unit III: Christianity, the Church and the State:

- [a] Church and the three Orders;
- [b] Feudalism and the agrarian economy

Unit IV: The Mediterranean world and the crusades

Unit V: City States and the Renaissance

Unit VI: Art, Science and Literature

- [a] Humanism in art and literature
- [b] Developments in science and philosophy
- [c] Renaissance beyond Italy

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I: This Unit shall discuss and familiarize the students with the essential historiographical concerns stemming from periodization in the European context. **(Teaching Time: 2 weeks approx.)**

- Anderson, P. (1996). *Passages From Antiquity To Feudalism*. London and New York: Verso.
- Bloch, M. (1966). "The Rise of Dependent Cultivation and Seigniorial Institutions." in M. M. Postan. (Ed.). *The Cambridge Economic History of Europe*. Volume 1: *The Agrarian Life of the Middle Ages*. Cambridge: Cambridge University Press, pp. 224-77.
- Brown, E.A.R. (1974). "The Tyranny of a Construct: Feudalism and Historians of Medieval Europe." *The American Historical Review* vol. 79, pp. 1063-1088.
- Cipolla, C.M., (Ed.). (1976). *Fontana Economic History*. Volume I: *The Middle Ages*. New York: Harvester Press/Barnes and Noble.
- Goff, J.L. (2007). *The Birth of Europe*. Oxford: Blackwell (Introduction).
- Merriman, J. (2010). *A History of Modern Europe: From Renaissance to the Present*. Volume 1. New York, London: W.W. Norton (Ch.1).

Unit II: This Unit shall trace the emergence of the institution of the papacy and social-cultural practices revolving around monasticism. **(Teaching Time: 3 weeks approx.)**

- De Jong, M. (1995). "Carolingian Monasticism: The Power of Prayer." in R. McKitter, (ed.). *The New Cambridge Medieval History*. Volume 2. Cambridge: Cambridge University Press.
- Duby, G. (1977). *The Chivalrous Society*. (trans. Cynthia Postan). Berkeley: University of California Press.
- Noble, Thomas F.X. (1995). "The Papacy in the 8th and 9th centuries." in R. McKitter, (Ed.). *The New Cambridge Medieval History*. Volume 2. Cambridge: Cambridge University Press.
- Brown, P. (1982). *The Cult of the Saints: Its Rise and Function in Latin Christianity*. Chicago: University of Chicago Press.
- Innes, M. (2008). *Cambridge History of Europe – Volume 1- Europe from Antiquity to the Twelfth Century (Part I)*. Cambridge: Cambridge University Press.
- Goff, J.L. (2007). *The Birth of Europe*. Oxford: Blackwell.

Unit III: This Unit shall highlight the evolution of the church and state relations, and the socio-economic structure that developed within the rural countryside. **(Teaching Time: 4 weeks approx.)**

- Power, D. (Ed.). (2006). *The Central Middle Ages: 950-1320*. Oxford: Oxford University Press.
- Duby, G. (1974). *The Early Growth of the European Economy: Warriors and Peasants from the Seventh to the Twelfth Century*. Ithaca: Cornell University Press.
- Le Goff, J. (1999). *Medieval Civilisation 400-1500*. (Trans. by Julia Barrow.) Oxford: Blackwell. (Reprint.)
- Swanson, R.N. (Ed.). (2015). *The Routledge History of Medieval Christianity: 1050-1500*. London/New York: Routledge.
- Bloch M. (1961). *Feudal Society*. Volume I, Chicago: University of Chicago Press.
- Sinha, A. (2010). *Europe in Transition*. Delhi: Manohar. [Available in Hindi].

Unit IV: This Unit shall provide an overview of the key historical developments of the Mediterranean world, leading up to the crusades. **(Teaching Time: 2 weeks approx.)**

- Swanson, Robert. (2006). *Cambridge History of Europe – Volume 1-Medieval Europe 1100-1450 (Part II)*. Cambridge: Cambridge University Press.
- Riley-Smith, J. (Ed.). (1995). *The Oxford Illustrated History of the Crusades*. Oxford: Oxford University Press.
- Sinha, A. (2010). *Europe in Transition*. Delhi: Manohar. [Available in Hindi].

Unit V: This Unit shall familiarize students with the historical context which paved the way for the advent of the Renaissance. It shall also help students identify the key socio-political and economic milieu of the Renaissance. **(Teaching Time: 2.5 weeks approx.)**

- Kaborycha, Lisa. (2011). *A Short History of Renaissance Italy*. New York: Pearson.
- Winks, Robin W. and Lee Palmer Wandel. (2003). *Europe in a Wider World, 1350-1650*. New York: Oxford University Press.
- Merriman, J. (2010). *A History of Modern Europe: From Renaissance to the Present*. Volume 1. New York, London: W.W. Norton (Ch.2).
- Sinha, A. (2010). *Europe in Transition*. Delhi: Manohar. [Available in Hindi].

Unit VI: This Unit shall discuss key developments in the realms of art, science and literature during the Renaissance. **(Teaching Time: 2.5 weeks approx.)**

- Martines, L. (1988). *Power and Imagination: City-States in Renaissance Italy*. Baltimore: John Hopkins University Press.
- Burke, Peter. (1999). *The Italian Renaissance, Culture and Society in Italy*. Princeton: Princeton University Press.

- Merriman, J. (2010). *A History of Modern Europe: From Renaissance to the Present*. Volume 1. New York, London: W.W. Norton (Ch.2).
- Sinha, A. (2010). *Europe in Transition*. Delhi: Manohar. [Available in Hindi].

SUGGESTED READINGS

- Davies, Norman. (1998). *Europe; A History*. New York: Harper Collins.
- Goldthwaite, R. (1993). *Wealth and the Demand for Art in Italy: 1300-1600*. Baltimore: John Hopkins University Press.
- Huizinga, J. (2017). *The Waning of the Middle Ages*. Reprint. London: Stellar Classics.
- King, Margaret L. (1994). *Western Civilizations: A Social and Cultural History*. New York: Prentice Hall.
- Pocock, J.G.A. (1975). *The Machiavellian Moment: Florentine Political Thought and the Atlantic Republican Tradition*. New Jersey: Princeton University Press.
- Ralph, L. P., Standish Meacham, Robert E. Lerner and Edward McNall Burns. (1993). *Western Civilizations*. Volume II. New York/London: W.W. Norton & Co.
- Wiesner-Hanks, M.E. (2013). *Early Modern Europe, 1450-1789*. Cambridge: Cambridge University Press.
- देवेश, विजय (सं.). (2010). यूरोपीयसंस्कृति, दिल्ली:हिंदीमाध्यमकार्यान्वयनिदेशालय, 2010
- सिन्हा,अरविन्द. (2009). संक्रांतिकालीनयूरोप.नईदिल्ली:ग्रन्थशिल्पी.

Teaching Learning Process:

Classroom teaching will concern key concepts and discussions of important readings. As this is a paper tracing aspects of World history and Europe, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall focus on providing a broad historical overview of the period and region under study. The process shall also delineate certain linkages and parallel developments in Indian history and the socio-economic and cultural histories traced in this paper. This shall enable a smooth transition from the student's prior engagement with Indian history and his/her engagement with history of regions outside the Indian subcontinent.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Antiquity, problem of periodisation, three orders, dark ages, feudalism, city states and renaissance, Christianity church and state, humanism.

DSE II

Economy and Politics: Histories of Capitalism and Colonialism - I

Course Objective:

The paper familiarizes the students with the basic concepts of Capitalism, Imperialism and Colonialism. It also introduces the strategies of European capitalism and the importance of slave trade, plantation economies in the emergence of Capitalism. It provides the student with an opportunity to analyze capitalism and the global economy.

Learning Outcomes:

On completion of this course, the student will be able to:

- Define what is meant by capitalism, colonialism and imperialism.
- Delineate the crucial linkages between Atlantic slavery and European capitalism,
- Explain the global interconnectedness of capital.
- Examine the process of colonial expansion via trade.
- Discuss the linking of the non-European economies with the capitalist-dominated world market via case studies of certain commodities.
- Describe the significance of the American Revolution.

Course Content:

Unit I: Key Concepts and their implications: Understanding capitalism, colonialism and imperialism

Unit II: Atlantic slavery and European capitalism

Unit III: Dutch and English East India Companies and colonial expansion

Unit IV: Commodities, capital and empire: Sugar, tea and cotton

Unit V: The American Revolution

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit 1: This Unit shall familiarize the students with the key concepts. It shall enable the students to outline the essential differences as well as connections between the concepts of capitalism, colonialism and imperialism. **(Teaching Time: 4 weeks approx.)**

- Hilton, Rodney. (2006). *The Transition from Feudalism to Capitalism*. Delhi: Aakar Books. [Available in Hindi].
- Bottomore, Tom. (1991). *Dictionary of Marxist Thought*. New Delhi: Blackwell (entries on “Capitalism”, “Colonialism” and “Imperialism and World Market”).
- Beaud, Michel. (2001). *A History of Capitalism 1500 to 2000*. Trans. by Tom Dickman and Anny Lefebvre. New York: Monthly Review Press (Ch.1).
- Sinha, A. (2010). *Europe in Transition*. Delhi: Manohar. [Available in Hindi].

Unit 2: This Unit shall highlight the centrality of the African slave trade in European economic development. **(Teaching Time: 3 weeks approx.)**

- Williams, Eric. (1994). *Capitalism and Slavery*. Reprint. Chapel Hill: University of North Carolina.
- Merriman, J. (2010). *A History of Modern Europe: From Renaissance to the Present*. Volume 1. New York, London: W.W. Norton, pp. 178-186, 200-204.
- Beaud, Michel. (2001). *A History of Capitalism 1500 to 2000*. (Trans. by Tom Dickman and Anny Lefebvre.) New York: Monthly Review Press (Ch.1)
- Sinha, A. (2010). *Europe in Transition*. Delhi: Manohar. [Available in Hindi].

Unit 3: This Unit shall familiarize the students with the important features of commercial trading companies and their colonial expansion into resource-rich regions and vibrant non-European economies. **(Teaching Time: 3 weeks approx.)**

- Chaudhuri, K.N. (1978). *The Trading World of Asia and the English East India Company, 1660-1760*. Cambridge: Cambridge University Press (Ch.1, Ch.3 and Ch.6).
- Zwart, Pim de. (2016). *Globalization and the Colonial Origins of the Great Divergence: Intercontinental Trade and Living Standards in the Dutch East India Company's Commercial Empire c. 1600-1800*. Leiden, Boston: Brill (Ch.1, “Introduction”).
- Merriman, J. (2010). *A History of Modern Europe: From Renaissance to the Present - Volume 1*. New York, London: W.W. Norton, pp. 248-252.
- Sinha, A. (2010). *Europe in Transition*. Delhi: Manohar. [Available in Hindi].

Unit 4: This Unit shall use case studies of important commodities to trace the interconnectedness of the emerging capitalist economies and other economies linked to the world market. Using relevant case studies, this Unit shall equip students with global history of capitalism. **(Teaching Time: 3 weeks approx.)**

- Beckert, Sven. (2014). *Empire of Cotton: A Global History*. New York: Vintage Books (“Introduction” and Ch.2. Ch.5 and Ch.6).
- Chaudhuri, K.N. (1978). *The Trading World of Asia and the English East India Company, 1660-1760*. Cambridge: Cambridge University Press (Ch.12).
- Mintz, S.W. (1985). *Sweetness and Power: The Place of Sugar in Modern Industry*. New York: Penguin (Ch.2, pp.32-72, Ch.4).
- Ellis, M.; R. Coulton and M. Mauger. (2015). *Empire of Tea: The Asian Leaf that Conquered the World*. London: Reaktion Books (Ch.3, Ch.4, Ch.8 and Ch.10).

Unit 5: This Unit shall discuss the importance of the American Revolution in the coming of age of capitalism. This case study shall help students to identify important developments involving colonial settlers and the metropole. **(Teaching Time: 3 weeks approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. I. Second edition. New York: W.W. Norton & Co.
- Lyles, L. D. and E. T. Lyles. (2003). *Historical Development of Capitalism in the United States, 2 volumes*. New York, Lincoln, Shanghai: iUniverse, Inc.
- Beaud. Michel. (2001). *A History of Capitalism 1500 to 2000*. Trans. by Tom Dickman and Anny Lefebvre. New York: Monthly Review Press (Ch.2)
- Dattar, K. (1997). *America Ka Itihas*. Delhi:University of Delhi, Directorate of Hindi Medium Implementation Board.

Suggested Readings:

- Brenner, Robert. (1976). “Agrarian Class Structure and Economic Development in Pre-Industrial Europe.” *Past & Present* vol. 70, pp. 30-75.
- Ralph, Davis. (1973). *The Rise of Atlantic Economies*. Ithaca, N.Y: Cornell University Press.
- Drescher, S. (1997). “Capitalism and Slavery After Fifty Years.” *Slavery and Abolition* vol 18 no.3, pp. 212-227.
- Dutta, Arup Kumar. (1992). *Cha Garam: The Tea Story*. Guwahati. Paloma Publications.
- Galbraith, J.K. *American Capitalism: The Concept of Prevailing Power*. USA: Transaction Publishers, 1993 (8th printing).
- Joll, J. (1990). *Europe since 1870: An International History*. Fourth edition. London: Penguin (Ch.4, “Imperialism”). [Available in Hindi].
- Kocka, J. (2014). *Capitalism: A Short History*. (Trans. Jeremiah Reimer). Princeton and Oxford: Princeton University Press (Chs.1-3).
- Moxham, Roy. (2003). *Tea, Addiction, Exploitation and Empire*. New York: Carroll and Graff.

- Ormrod, D. (2003). *The Rise of Commercial Empires: England and the Netherlands in the Age of Mercantilism*. Cambridge: Cambridge University Press.
- Porter, A. (1994). *European Imperialism, 1860-1914*. London: Palgrave Macmillan.
- Rappaport, E. (2017). *A Thirst for Empire: How Tea Shaped the Modern World*. Princeton and London: Princeton University Press (Ch.3 and Ch.5).
- Roy, Tirthankar. (2012). *The East India Company: The World's Most Powerful Corporation*. New Delhi: Penguin.
- Smith, Andrew F. (2015). *Sugar: A Global History*. London: Reaktion Books (Ch.2, "New World Sugar to 1900).
- Sweezy, Paul M. (1970). *Theory of Capitalist Development*. New York: Monthly Review Press.
- Wallenstein, Immanuel. (1989). *Modern World System- III*. Berkeley: University of California Press.
- Wood, E.M. (2002). *The Origin of Capitalism: A Longer View*. London: Verso ("Introduction", and Ch.4, Ch.5, Ch.6 and Ch.7).

Teaching Learning Process:

Classroom teaching on key concepts and discussions on important readings. As this is a paper tracing aspects of European/world history, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall focus on providing a broad historical overview of the period and region under study. The process shall also delineate certain linkages and parallel developments in Indian history and the socio-economic and cultural histories traced in this paper. This shall enable a smooth transition from the student's prior engagement with Indian history and his/her engagement with history of regions outside the Indian subcontinent.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Capitalism, colonialism, imperialism, Atlantic slavery, American Revolution, trans-Atlantic trade, East India Companies.

DSE III

Issues in Twentieth Century World History-I (the 20th Century)

Course Objectives:

This course aims to provide an understanding of 20th century world history not as a history of parts, individual nations but as an interconnected world history. The paper focuses on how the world changed in the first half of the twentieth century, from the World Wars to new radical and social movements. The course discusses how this world, ridden with conflict and violence, also witnessed growing desires for peace by through an organisation such as the United Nations. The emphasis is on taking up case studies to illustrate the processes and trends in society and culture.

Learning Outcomes:

On completion of this course, the student will be able to:

- Define world history and explain the evolving polities.
- Categorise the economies and cultures of the twentieth century world.
- Define the making of the geopolitical order and ‘North-South’ distinctions.
- Delineate the complex character of modernity and its differences.
- Demonstrate critical skills to discuss and analyze diverse social movements and cultural trends.

Course Content:

Unit I: The Concept and Definition: What is World History?

Unit II: First World War:

- (a) Consequences in Europe and the world,
- (b) League of Nations

Unit III: 1917 Russian Revolution:

- (a) Formation of the USSR;
- (b) Debates on socialism and the role of the Communist International (Comintern)

Unit IV: Fascism and Nazism: Germany and Japan and Second World War

Unit V: Modernity, Rights and Democracy:

- (a) The suffragette movement (England)
- (b) Anti-colonial struggles (Indonesia)
- (c) The formation of the United Nations

(d) Art and politics (Picasso)

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit 1: This Unit shall introduce the students to the concept and definition of world history. **(Teaching Time: 2 weeks approx.)**

- Krippner-Martinez, J. (1995). "Teaching World History: Why We Should Start!" *The History Teacher* 29 (1), pp. 85-92. <https://www.jstor.org/stable/494534>
- Christian, David. (2003). "World History in Context." *Journal of World History* vol. 14 no.4, pp. 437-458. <https://www.jstor.org/stable/20079239>
- Mazlish, Bruce. (1998). "Comparing Global History to World History" *The Journal of Interdisciplinary History* vol. 28 no. 3, pp. 385-395. <https://www.jstor.org/stable/205420>
- Findley, Carter V. and John Rothey. (2011). *Twentieth-Century World*. USA: Wadsworth Publishing.

Unit II: This Unit will familiarize the students with the key consequences of the First World War; including the formation of the League of Nations. **(Teaching Time: 3 weeks approx.)**

- Merriman, J. (YEAR). *A History of Modern Europe: From Renaissance to the Present*. Volume 1. New York, London: W.W. Norton (pp. 1011-1016; 1056-1077; 1083-1087).
- Roberts, J.M. (1999). *Twentieth-Century, the History of the World, 1901-2000*. New York: Viking.
- Findley, Carter V. and John Rothey. (2011). *Twentieth-Century World*. USA: Wadsworth Publishing.
- Henig, R. (1995). *Versailles and After 1919-1933*. Lancaster Pamphlets Series. Second edition. New York, London: Routledge.
- Mahajan, Sneha. (2009). *Issues in Twentieth Century World History*. Delhi: Macmillan.
- महाजन, स्नेहा. (२०१६). बीसवीं शताब्दी का विश्व इतिहास: एक झलक (भाग-२). दिल्ली : लक्ष्मी प्रकाशन.
- देशपांडे, अनिरुद्ध. (२०१४). विश्व इतिहास के प्रमुख मुद्दे: बदलते आयाम. दिल्ली: दिल्ली विश्वविद्यालय प्रकाशन.

Unit III: This Unit will provide the students a broad outline of the history of the USSR post the 1917 October Revolution and shall familiarize them with the functioning of the Comintern. **(Teaching Time: 3 weeks approx.)**

- Nove, Alec. (1992). *An Economic History of the USSR 1917-1991*. London: Penguin.
- Hobsbawm, E.J. (1996). *The Age of Extremes. 1914-1991*. New York: Vintage.
- Hobsbawm, E.J. (2009). *The Age Of Extremes- अतिरेकोंकायुग* (translated in Hindi by Prakash Dixit). Mumbai and Meerut: संवादप्रकाशन
- Roberts, J.M. (1999). *Twentieth-Century, the History of the World, 1901-2000*. New York: Viking.
- Findley, Carter V. and John Rothery. (2011). *Twentieth-Century World*. USA: Wadsworth Publishing.
- Mahajan, Sneh. (2009) *Issues in Twentieth Century World History*. Delhi: Macmillan.
- महाजन, स्नेह. (२०१६). बीसवींशताब्दीकाविश्वइतिहास: एकझलक(भाग-२). दिल्ली: लक्ष्मीप्रकाशन.
- देशपांडे, अनिरुद्ध. (२०१४). विश्वइतिहासकेप्रमुखमुद्दे: बदलतेआयाम. दिल्ली: दिल्लीविश्वविद्यालयप्रकाशन.

Unit IV: This Unit shall introduce the students to important case studies related to the growth of fascism post First World War. The Unit shall connect the discussion on fascism to the Second World War. **(Teaching Time: 3 weeks approx.)**

- Hobsbawm, E.J. (1996). *The Age of Extremes. 1914-1991*. New York: Vintage.
- Hobsbawm, E.J. (2009). *The Age Of Extremes-अतिरेकोंकायुग* (translated in Hindi by Prakash Dixit). Mumbai and Meerut: संवादप्रकाशन.
- Lee, Stephen J. (1982). *Aspects of European History 1789–1980*. London, New York: Routledge (Ch.22, Ch.23, Ch.24 and Ch.30).
- Lee, Stephen J. (2008). *European Dictatorships 1918-1945*. London, New York: Routledge (Ch.5).
- Fairbank, John K., et al. (1965). *East Asia: Modern Transformation*. Boston: Houghton Mifflin; Highlighting edition (section on militarism in Japan).
- Duikar, William J. (2005) *Twentieth-Century World History*. Third edition. USA: Wadsworth Cengage Learning.
- Henig, R. (2005). *The Origins of the Second World War 1933-1941*. Lancaster Pamphlets Series. Second edition. London, New York: Routledge.
- Roberts, J.M. (1999). *Twentieth-Century, the History of the World, 1901-2000*. New York: Viking.
- Mahajan, Sneh. (2009). *Issues in Twentieth Century World History*. Delhi: Macmillan.
- महाजन, स्नेह. (२०१६). बीसवींशताब्दीकाविश्वइतिहास: एकझलक(भाग-२). दिल्ली: लक्ष्मीप्रकाशन.
- देशपांडे, अनिरुद्ध. (२०१४). विश्वइतिहासकेप्रमुखमुद्दे: बदलतेआयाम. दिल्ली: दिल्लीविश्वविद्यालयप्रकाशन.

Unit V: This Unit shall highlight important trends in the development of modern political movements and institutions that unfolded in the first half of the twentieth century. The discussion shall evolve around specified case studies. **(Teaching Time: 5 weeks approx.)**

- Lang, Sean. (2005). *Parliamentary Reform 1789-1928*. Second edition. London, New York: Routledge. (Ch.8, “Votes for Women).
- Thomson, D. (1990). *Europe Since Napoleon*. London: Penguin (Ch.32).
- Perry, Marvin et al. (2016). *Western Civilization: Ideas, Politics, and Society: Since 1400*. Eleventh edition. Canada: Cengage Learning (Ch. 27 – section on Picasso).
- Hobsbawm, E.J. (1996). *The Age of Extremes. 1914-1991*. New York: Vintage.
- Hobsbawm, E.J. (2009). *The Age Of Extremes-अतिरेकोंकायुग* (translated in Hindi by Prakash Dixit). Mumbai and Meerut: संवादप्रकाशन.
- Duikar, William J. (2005) *Twentieth-Century World History*. Third edition. USA: Wadsworth Cengage Learning.
- Roberts, J.M. (1999). *Twentieth-Century, the History of the World, 1901-2000*. New York: Viking.
- Mahajan, Sneh. (2009). *Issues in Twentieth Century World History*. Delhi: Macmillan.
- महाजन, स्नेह. (२०१६). बीसवींशताब्दीका विश्व इतिहास: एक झलक (भाग-२). दिल्ली : लक्ष्मीप्रकाशन.
- देशपांडे, अनिरुद्ध. (२०१४). विश्व इतिहास के प्रमुख मुद्दे: बदलते आयाम. दिल्ली: दिल्ली विश्वविद्यालय प्रकाशन.

Suggested Readings:

- Atkin, N. and M. Biddis. (2009). *Themes in Modern European History, 1890–1945*. London, New York: Routledge (Ch.4, Ch.5, Ch.9 and Ch.10).
- Ferguson, Niall. (2006). *The War of the World: Twentieth-Century Conflict and the Descent of the West*. New York: The Penguin Press.
- Martel, G. (Ed.). (2006). *A Companion to Europe 1900-1945*. Malden, M.A. and Oxford: Blackwell.
- Wakeman, R. (Ed). (2003). *Themes in Modern European History Since 1945*. London, New York: Routledge (Ch.1 and Ch.2).

Teaching Learning Process:

Classroom teaching on key concepts and discussions on important readings. As this is a paper tracing aspects of European/world history, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall focus on providing a broad historical overview of the period and region under study. The process shall also delineate certain linkages and parallel developments in Indian history and the socio-economic and cultural histories traced in this paper. This shall enable a smooth transition from

the student's prior engagement with Indian history and his/her engagement with history of regions outside the Indian subcontinent.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

World History, First World war, Russian Revolution, Fascism, Nazism, Second World war, Suffragette Movement, anti-colonial struggles, United Nations

DSE IV

History of Europe 1500-1848

Course Objective:

The objective of this course is to make the students familiar with the history of modern Europe. The purpose is to enable them to understand the linkages between themes in Indian history papers and to give them a European perspective of themes involved.

Learning Outcomes:

On completion of this course, the student will be able to:

- Define the role of Europe in the world during the period under study.
- Describe Reformation.
- Explain the scientific 'discoveries'.
- Outline the contemporary state and politics.

Course Content:

Unit I. Reformation:

- [a] The Papacy and its critics
- [b] The Protestant reformation: Calvinism; the English Reformation
- [c] Catholic Reformation

Unit II. Science, Navigation and the ' Discoveries'

- [a] Voyages
- [b] Reflections on the scientific method
- [c] Hobbes, Locke and the Philosophes
- [d] Despotism and the limits of Enlightenment

Unit III. State and Politics:

- [a] King and Parliament in 17th century England
- [b] Absolutism and the peasantry in Eastern Europe

Unit IV. Gender, Literature and Art

- [a] Literary trends from Dante to Shakespeare
- [b] Art from Baroque to Rococo and Neo Classicism
- [c] Women Family and the Public Sphere

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I: At the completion of this unit students would have learnt about the ascendancy of the Church and Papacy, the Reformation in Europe and England and its impact on Catholicism and Protestantism. **(Teaching Time: 3 weeks approx.)**

- Elton, G.R. (1990). *Reformation Europe, 1517-1559*. London: Fontana Press.
- Hill, Christopher. (1969). *Reformation to Industrial Revolution*. London: Penguin Books.
- Mac Culloch, Diarmaid. (2004). *Reformation: Europe's House Divided, 1490-1700*. London: Penguin Books Ltd.
- Merriman, J. (YEAR). *A History of Modern Europe: From Renaissance to the Present*. Volume 1. New York, London: W.W. Norton (Ch.3).
- Sinha, A. (2010). *Europe in Transition*. Delhi: Manohar. [Available in Hindi].

Unit II: At the completion of this unit, students would have learnt about the shifts in human history that were a result of the 'Enlightenment' and the Renaissance. **(Teaching Time: 4 weeks approx.)**

- Parry, J. H. (1963). *Age of Reconnaissance*. London: Weidenfield & Nicholson.
- Pagden, Anthony. (2013). *The, Enlightenment: And Why it Still Matters*. Oxford: Oxford University Press.
- Cameron, E. (2001). *Early Modern Europe: An Oxford Dictionary*. Oxford: Oxford University Press.
- Merriman, J. (YEAR). *A History of Modern Europe: From Renaissance to the Present*. Volume 1. New York, London: W.W. Norton (Ch.8).
- Sinha, A. (2010). *Europe in Transition*. Delhi: Manohar. [Available in Hindi].

Unit III. At the completion of this unit, students would have learnt about the making of the modern state, its early representative systems and their exclusions. **(Teaching Time: 4 week approx.)**

- Kumin, Beat (ed.). (2013). *The European World 1500-1800: An Introduction to Early Modern History*. New York: Routledge.
- Wolf, Eric R. (2010). *Europe and the People without History*. Berkeley: University of California Press.
- Cameron, E. (2001). *Early Modern Europe: An Oxford Dictionary*. Oxford: Oxford University Press.
- Merriman, J. (YEAR). *A History of Modern Europe: From Renaissance to the Present*. Volume 1. New York, London: W.W. Norton (Ch.7).

Unit IV. At the Completion of this unit, students would have learnt about the social changes in Europe history through interventions in the field of gender, literature and art. **(Teaching Time: 5 weeks approx.)**

- Rogers, Pat (Ed.). (2001). *The Oxford Illustrated History of English Literature*. Oxford: Oxford University Press, pp. 59-159.
- Landes, J.B. (1988). *Women and the Public Sphere in the Age of the Revolution*. New York: Cornell University Press.
- Power, E. (1997). *Medieval Women*. Cambridge: Cambridge University Press.
- Hauser, Arnold. (2005). *The Social History of Art, Vol. III: Rococo, Classicism and Romanticism*. London: Routledge.
- Cameron, E. (2001). *Early Modern Europe: An Oxford Dictionary*. Oxford: Oxford University Press.

Suggested Readings:

- Anderson, M.S. (1976). *Europe in the 18th century*. New York: Longman
- Anderson, Perry. (1979). *Lineages of the Absolutist State*. London: Verso Edition.
- Davies, Norman. (1998). *Europe; A History*. New York: Harper Collins.
- Eisenstein, E. (1980). *The Printing Press as an Agent of Change*. 2 Vols. Cambridge: Cambridge University Press.
- Gay, Peter. (1966). *The Enlightenment: An Interpretation*. New York: Alfred K. Knopf.
- Greaves, R. L., Robert Zallor and J. T. Roberts. (1994). *Civilizations of the West: From 1660 to the Present*. New York., Harper and Collins College Publishers.
- Kearney, Hugh. (1971). *Science and Social Change, 1500-1700*. University of Wisconsin-Madison: McGraw-Hill.
- King, Margaret L. (1994). *Western Civilizations: A Social and Cultural History*. New York: Prentice Hall.
- Ralph, L. P., Standish Meacham, Robert E. Lerner and Edward McNall Burns. (1993). *Western Civilizations, Vol. II*. New York, London: W.W. Norton & Co.
- Wiesner, Merry E. (2013). *Hanks, Early Modern Europe, 1450-1789*. New York: Cambridge University Press.
- विजय, देवेश (सं.). (2010). यूरोपीयसंस्कृति, नईदिल्ली: हिंदीमाध्यमकार्यान्वयनिदेशालय
- सिन्हा, अरविन्द. (2009). संक्रांतिकालीनयूरोप, नईदिल्ली: ग्रन्थशिल्पी.

Teaching Learning Process:

Classroom teaching on key concepts and discussions on important readings. As this is a paper tracing aspects of European/world history, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall

focus on providing a broad historical overview of the period and region under study. The process shall also delineate certain linkages and parallel developments in Indian history and the socio-economic and cultural histories traced in this paper. This shall enable a smooth transition from the student's prior engagement with Indian history and his/her engagement with history of regions outside the Indian subcontinent.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Reformation, the Papacy, Catholic reformation, discoveries, theory of social contract, despotism, absolutism, enlightenment, Neo-classicism, public sphere

DSE V

Economy and Politics: Capitalism and Colonialism-II

Course Objective:

The course familiarizes the students understand the process of transformation and the uniqueness of Capitalism and Imperialism. It will introduce the student to the impact of imperialist economic policies in China, South Africa and Southeast Asia. The student will also study the impact of the Imperialist interventions in Africa and West Asia. The students will also study the development of capitalism outside the Atlantic economy and examine the rise of Japan as an important economic power.

Learning Outcomes:

- Demonstrate the implications of capitalist developments and their socio-economic impacts in the colonial world.
- Distinguish the nature of imperialist expansion and exploitation of weaker nations.
- Explain the impact of imperialism on various colonies.

Course Content:

Unit I: The Civil War and the emergence of USA as a capitalist power

Unit II: Finance Capital and Imperialism:

[a] Theories of Capitalism; Hobson, Lenin and Schumpeter

[b] Railways (China) / Gold (South Africa) / Rubber (Southeast Asia)

Unit III: Capitalist developments in Japan (1868-1920s)

Unit IV: Colonialist partition of Africa

Unit V: West Asia 1914-1930s:

[a] Ottoman Empire and the first world war

[b] Redrawing the Map: The British and French mandates

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit 1: This Unit will highlight the development of capitalism in USA in the latter half of the nineteenth century and accordingly contextualize the Civil War. **(Teaching Time: 3 weeks approx.)**

- Randall, J. G. and David Herbert Donald. (1969). *Civil War and Reconstruction*. U.S.A.: D.C. Heath & Company.
- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. I. Second edition. New York: W.W. Norton & Co.
- Lyles, L. D. and E. T. Lyles. (2003). *Historical Development of Capitalism in the United States*. 2 vols. New York, Lincoln, Shanghai: iUniverse, Inc.
- Barrington, M. Jr. (2015). "The American Civil War: The Last Capitalist Revolution." *Social Origins of Dictatorship and Democracy, Lord and Peasant in the Making of the Modern World*. Boston: Beacon Press.
- Datar, K. (1997). *America Ka Itihas*. Delhi: Directorate of Hindi Medium Implementation Board, University of Delhi.

Unit 2: In this Unit the students will be provided an overview of the key theories of imperialism and shall proceed to look at a case study of one of the regions of imperialist competition. **(Teaching Time: 4 weeks approx.)**

- Brewer, Anthony. (1990). *Marxist Theories of Imperialism*. London, New York: Routledge (Ch.1, Ch.4 and Ch.6).
- Joll, J. (1990). *Europe since 1870: An International History*. Fourth edition. London: Penguin (Ch.4, "Imperialism"). [Available in Hindi].
- Kocka, J. (2014). *Capitalism: A Short History*. (Trans. Jeremiah Reimer.) Princeton and Oxford: Princeton University Press (Ch.4).
- Beaud. Michel. (2001). *A History of Capitalism 1500 to 2000*. (Trans. by Tom Dickman and Anny Lefebvre.) New York: Monthly Review Press (Ch.3, and Ch.4).
- Jean Chesneaux et al. (1977). *China from the 1911 Revolution to Liberation*. New York: Pantheon Books.
- Chung, Tan. (2013). *Triton and Dragon: Studies on the Nineteenth Century China and Imperialism*. Reprint. Delhi: Gyan Publishing (Ch.6 and Ch.7).
- Tarling, Nicholas. (2001). *Imperialism in Southeast Asia: 'A Fleeting, Passing Phase'*. London and New York: Routledge (Ch.6).
- Osborne, Milton. (2002). *South East Asia: An Introductory History*. Sydney: Allen and Unwin
- Meredith, M. (2007). *Diamonds, Gold and War: The Making of South Africa*. Simon & Schuster.

Unit 3: This Unit shall provide the students a detailed overview of how an Asian power, Japan, developed along capitalist and imperialist lines from the second half of the nineteenth century. **(Teaching Time: 3 weeks approx.)**

- Allen, G. C. (2003). *A Short Economic History of Modern Japan, 1867-1937*. London: Routledge.
- Fairbank, John K., et al. (1965). *East Asia: Modern Transformation*. Boston: Houghton Mifflin; Highlighting edition.
- Hane, Mikiso. (2000). *Japan: A Short History*. Great Britain: Oneworld Publications.
- Norman, E H. (2000). *Japan's Emergence as Modern State*. Canada: UBC Press.

Unit 4: This Unit shall familiarize the students with the land grab and aggressive partitioning of the African continent by advanced imperialist powers. **(Teaching Time: 3 weeks approx.)**

- Klein, Herbert S and Ben Vinson. (1986). *African Slavery in Latin America and Caribbean*. Oxford: Oxford University Press.
- Hobsbawm, E. J. (1975). *Age of Capital, 1848-1875*. London: Phoenix Press.
- Joll, James and Gordon Martel. (2006). *Origins of the First World War*. London, New York: Routledge.
- Roth J.J. (Ed.). (1968). *World War I: A Turning Point in Modern History*. Second edition. New York: Knopf.
- Mazrui, Ali A. (1993). *UNESCO General History of Africa, Africa since 1935*. Vol. 8. California: UNESCO.
- Mackenzie. J. (1983). *The Partition of Africa and European Imperialism of the Nineteenth Century*. London, New York: Methuen.
- Wolf, Eric. (2010). *Europe and the People without History*. California: University of California Press.
- वर्मालालबहादुर, यूरोपकाइतिहासe-book: <https://epustakalay.com/book/67721-europ-ka-itihas-by-lal-bahadur-varma/>

Unit 5: This Unit shall provide the students an overview of the key developments that unfolded in West Asia from the period of First World War to the end of the Second World War. **(Teaching Time: 3 weeks approx.)**

- Aksakal, Mustafa. (2008). *The Ottoman Road to War in 1914: The Ottoman Empire and the First World War*. London, New York, Singapore, Delhi: Cambridge University Press (“Introduction”, Ch.3 and Ch.4).
- Provence, Michael. (2017). *The Last Ottoman Generation and the Making of the Modern Middle East*. Cambridge: Cambridge University Press (pp. 56-100; 190-260).
- Fieldhouse, D.K. (2006). *Western Imperialism in the Middle East 1914-1958*. Oxford: Oxford University Press (sections on Britain and Mesopotamia/Transjordan/Syria-Lebanon, and the French).

Suggested Readings:

- Austen, Ralph. (1987). *African Economic History*. London: James Currey.
- Davies, Norman. (1998). *Europe: A History*. New York: Harper Collins.
- Faulkner, H. U. (1958). *American Economic History*. New York: Harper Bros.
- Galbraith, J.K. (1993). *American Capitalism: The Concept of Prevailing Power*. USA: Transaction Publishers.
- Hobsbawm, E.J. (1987). *The Age of Empire 1875-1914*. New York: Pantheon Books.
- Jelavich, Charles and Barbara Jelavich. (1977). *Establishment of the Balkan National States 1840 – 1920*. Seattle/London: University of Washington Press.
- Kemp, Tom. (1967). *Theories of Imperialism*. London: Dobson Books.
- Lowe, Norman. (1997). *Mastering Modern World History*. Third edition. Delhi: Macmillan India Ltd.
- Martel, G. (Ed.). (2006). *A Companion to Europe 1900-1945*. Malden, M.A. and Oxford: Blackwell.
- Merriman, J. (2010). *A History of Modern Europe: From Renaissance to the Present*. Volume 2. New York, London: W.W. Norton.
- Pedersen, Susan. (2015). *The Guardians: The League of Nations and the Crisis of Empire*. Oxford: Oxford University Press (pp. 17-106).
- Porter, A. (1994). *European Imperialism, 1860-1914*. London: Palgrave Macmillan.
- Stephens, J.J. (2003). *Fuelling the Empire: South Africa's Gold and the Road to War*. New Jersey: Wiley.
- Tarling, Nicholas. (Ed.). (1992). *Cambridge History of South-East Asia*. Vol. II. Cambridge: Cambridge University Press.
- Tran, Binh Tu. (1985). *The Red Earth: A Vietnamese Memoir of Life on a Colonial Rubber Plantation*. (Trans. by John Spragens Jr.) Ohio City: Centre for Research in International Studies, Ohio University.
- Wesseling, H.L. (1996). *Divide and Rule: The Partition of Africa, 1880-1914*. Michigan: Praeger.

Teaching Learning Process:

Classroom teaching on key concepts and discussions on important readings. As this is a paper tracing aspects of European/world history, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall focus on providing a broad historical overview of the period and region under study. The process shall also delineate certain linkages and parallel developments in Indian history and the socio-economic and cultural histories traced in this paper. This shall enable a smooth transition from

the student's prior engagement with Indian history and his/her engagement with history of regions outside the Indian subcontinent.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

American civil war, Theories of capitalism, Imperialism, Africa, China., Southeast Asia, Capitalist Japan, the Ottoman empire and the first world war.

DSE VI
Issues in Twentieth Century World History-II

Course Objectives:

This course aims to provide an understanding of 20th century world history not as history of parts, individual nations but as interconnected world history. Through events focus is on how the world evolved from the Wars of Nations to new radical and social movements. World ridden with conflict and violence also witness growing desires for Peace by forming United Nations. The emphasis is on taking up case studies to illustrate the processes and trends in society and culture.

Learning Outcomes:

- Define world history.
- Discuss and explain the evolving politics, economies and cultures of the twentieth century world.
- Analyze the interconnectedness in world history.
- Demonstrate critical skills to discuss diverse social movements and cultural trends.

Course Content:

Unit I: The World Divided: The Cold War-case studies, Korea/Vietnam

Unit II: Decolonization and the long shadow of colonial exploitation: Ghana/Algeria

Unit III: Popular Movements:

- (a) Environmental Struggles: Chipko Movement; Struggles for the Amazon; Bhopal
- (b) Student Movements: Paris 1968
- (c) Anti-apartheid movements in S. Africa and Civil Rights Movement USA
- (d) Women's Movements: Issues and Debates/Women and Work Place-Vishakha Guidelines

Unit IV: Leisure and Entertainment

- (a) Spectator Sports (football/Olympics)
- (b) Cinema (James Bond films in the context of the Cold War, Satyajit Ray's films and Bicycle Thief in the context of the Depression)

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit 1: This Unit shall discuss the global impact of the Cold War through specified case studies.
(Teaching Time: 3 weeks approx.)

- Dickinson, Edward Ross. (2018). *The World in the Long Twentieth-Century, An Interpretive History*. USA: University of California Press.
- Lightbody, Bradley. (1999). *The Cold War*. New York and London: Routledge.
- McMahon, Robert. (2003). *Cold War-A very Short Introduction*. USA: Oxford University Press.
- Lee, Stephen J. (1982). *Aspects of European History 1789–1980*. London, New York: Routledge (Ch.31).
- Anderson, David L. (2005). *The Vietnam War*. New York: Palgrave Macmillan.
- Stueck, W. (2010). “The Korean War.” in M.P. Leffler and O.A. Westad, (Eds.). *The Cambridge History of the Cold War*. Volume 1. Cambridge: Cambridge University Press.

Unit 2: This Unit shall familiarize the students with the decolonization process and with the politics of persisting colonial interests through a prescribed case study from the African/South American region. **(Teaching Time: 3 weeks approx.)**

- Lee, Stephen J. (1982). *Aspects of European History 1789–1980*. London, New York: Routledge (Ch.36).
- Whitfield, Lindsay. (2018). *Economies after Colonialism: Ghana and the Struggle for Power*. Cambridge: Cambridge University Press, pp. 133-177.
- Choi, Sung-Eun. (2016). *Decolonization and the French of Algeria: Bringing the Settler Colony Home*. New York: Springer (Introduction).
- Findley, Carter V. and John Rothery. (2011). *Twentieth-Century World*. USA: Wadsworth Publishing.
- Duiker, William J. (2005) *Twentieth-Century World History*. USA: Wadsworth Cengage Learning.
- Roberts, J.M. (1999). *Twentieth-Century, the History of the World, 1901-2000*. New York: Viking.
- महाजन, स्नेह. (२०१६). बीसवीं शताब्दी का विश्व इतिहास: एक झलक (भाग-२). दिल्ली : लक्ष्मीप्रकाशन.
- देशपांडे, अनिरुद्ध. (२०१४). विश्व इतिहास के प्रमुख मुद्दे: बदलते आयाम. दिल्ली: दिल्ली विश्वविद्यालय प्रकाशन

Unit 3: This Unit shall provide an outline of important case studies of popular movements that emerged in the latter half of the twentieth century. **(Teaching Time: 6 weeks approx.)**

- Findley, Carter V. and John Rothery. (2011). *Twentieth-Century World*. USA: Wadsworth Publishing.

- Duikar, William J. (2005) *Twentieth-Century World History*. USA: Wadsworth Cengage Learning.
- Burkett, Elinor. (YEAR). "Women's Rights Movement - Political and Social Movement." *Encyclopaedia Britannica* (<https://www.britannica.com/topic/womens-movement>).
- Flavia Agnes. (2001). *Law and Gender Equality: The Politics of Women's Rights in India*. Delhi: Oxford University Press (relevant sections in Part-II).
- Joan Martinez-Alier. (2012). "The Environmentalism of the Poor: Its Origins and Spread" in *A Companion to Global Environmental History*, Eds. J. R. McNeill and Erin Stewart Mauldin, West Sussex: Wiley-Blackwell, pp. 455-73.
- Nagraj, Vijay K. & Nithya V Raman (2006). "Are we Prepared for Another Bhopal." in *Environmental Issues in India*, ed. Mahesh Rangarajan, Delhi: Pearson. (Available in Hindi also)
- McNeill, J. R. (2001). *Something New Under the Sun: An Environmental History of Twentieth-Century World*. New York & London: W.W. Norton & Company. (Especially Introduction)
- Mitchell, Timothy. (2013). *Carbon Democracy: Political Power in the age of Oil*. London & New York: Verso (Introduction).
- Skinner, R. (2017). *Modern South Africa in World History: Beyond Imperialism*. London: Bloomsbury (Ch.6 and Ch.7).
- महाजन, स्नेह. (२०१६). बीसवीं शताब्दी का विश्व इतिहास: एक झलक (भाग-२). दिल्ली: लक्ष्मी प्रकाशन.
- देशपांडे, अनिरुद्ध. (२०१४). विश्व इतिहास के प्रमुख मुद्दे: बदलते आयाम. दिल्ली : दिल्ली विश्वविद्यालय प्रकाशन

Unit 4: This Unit shall discuss important trends in the realm of spectator sports and in cinema. The focus shall be on specified case studies. **(Teaching Time: 4 weeks approx.)**

- Findley, Carter V. and John Rothey. (2011). *Twentieth-Century World*. USA: Wadsworth Publishing.
- Hobsbawm, E.J. (1996). *The Age of Extremes. 1914-1991*. New York: Vintage.
- Hobsbawm, E.J. (2009). *The Age Of Extremes*, translated into Hindi : अतिरेकों का युग : बीसवीं शताब्दी का इतिहास : 1914-1991; अनुवादक, प्रकाश दीक्षित ; मेरठ : संवाद प्रकाशन
- Duikar, William J. (2005) *Twentieth-Century World History*. USA: Wadsworth Cengage Learning.
- Leab, D.L. (1998). "Introduction: The Cold War and the Movies." *Film History* vol. 10 no.3, pp. 251-53.
- महाजन, स्नेह. (२०१६). बीसवीं शताब्दी का विश्व इतिहास: एक झलक (भाग-२). दिल्ली लक्ष्मी प्रकाशन.
- देशपांडे, अनिरुद्ध. (२०१४). विश्व इतिहास के प्रमुख मुद्दे बदलते आयाम. दिल्ली: दिल्ली विश्वविद्यालय प्रकाशन

Suggested Readings:

- Chapman, James. (2005). *Cinemas of the World--Film and Society from 1895 to the Present*. London: Reaktion Books.
- Cumings, Bruce. (2010). *The Korean War: A History*. New York: Modern Library.
- Falola, Toyin and Achberger, Jessica. (Eds.). (2012). *The Political Economy of Development and Underdevelopment in Africa*. New York and London: Routledge.
- Forbes, Geraldine. (1999). *Women in Modern India. The New Cambridge History of India – Volume 4*. Cambridge: Cambridge University Press (Chs.7-8).
- Grosfoguel, Ramon and Cervantes-Rodriguez, Ana Magarita (Eds.). (2002). *The Modern/Colonial/Capitalist World-System in the Twentieth Century: Global Processes, Antisystemic Movements, and the Geopolitics of Knowledge*. USA: Greenwood Press.
- Guelke, Adrian. (2005). *Rethinking the Rise and fall of Apartheid-South Africa and World Politics*. New York: Palgrave Macmillan.
- Guttmann, A. (1986). *Sports Spectators*. New York: Columbia University Press (Chs. 4-6).
- John, M. (2014). "Fears and Furies of Sexual Harassment." *The Economic and Political Weekly* vol. 49 no.15, 29-32.
- Klimke, M. and J. Scharloth. (Eds.). (2008). *1968 in Europe: A History of Protest and Activism 1956-1977*. Basingstoke: Palgrave Macmillan.
- Kumar, Radha. (1993). *The History of Doing*. Delhi: Zubaan (Chs.6-12).
- McNeill, J. R. and Erin Stewart Mauldin (Eds.). (2012). *A Companion to Global Environmental History*. West Sussex: Wiley-Blackwell.
- Moore, Jason W. (2015). *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. London & New York: Verso.
- Rajadhyaksha, Ashish. (2016). *Indian Cinema: A Very Short Introduction*. Delhi: Oxford University Press.
- Rathbone, Richard. (2000). *Nkrumah and the Chiefs: The politics of Chieftaincy in Ghana 1951-60*. Athens: Ohio University Press, pp 1-28, 89-150.
- Schofield, John, Johnson, William Gray and Beek, Colleen M. (Eds.). (2002). *Material Culture-the Archaeology of Twentieth Century Conflict*. New York and London: Routledge.
- Sen, Samita. (2000). "Toward a Feminist Politics? The Indian Women's Movement in Historical Perspective." Policy Research Report on Gender and Development Working Paper Series No. 9. (World Bank), pp. 20-46.
- Sorlin, Pierre. (1998). "The Cinema: The American Weapon for the Cold War." *Film History* vol. 10 no.3, pp. 375-381.

Teaching Learning Process:

Classroom teaching on key concepts and discussions on important readings. As this is a paper tracing aspects of European/world history, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching, Learning Process shall focus on providing a broad historical overview of the period and region under study. The process shall also delineate certain linkages and parallel developments in Indian history and the socio-economic and cultural histories traced in this paper. This shall enable a smooth transition from the student's prior engagement with Indian history and his/her engagement with history of regions outside the Indian subcontinent.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Cold war, Decolonisation, Vietnam War, Anti-apartheid movement, students' movement: Paris 1968, Chipko Movement, Bhopal gas tragedy, Vishakha Guidelines, sports, cinema

Generic Elective

GE- I

Women in Indian History

Course Objectives:

The paper introduces learners to a historical analysis of the lived experiences of women at specific historical moments in the Indian subcontinent. It explores the concerned issues within an interdisciplinary framework. The students will also be familiarized with the theoretical reflections on the study of women's issues with reference to latest researches in the field. The course seeks to make students reflect on the specificity of women's issues in different times and contexts. At the same time, it also traces deeper continuities from a gender perspective.

Learning Outcomes: After successful completion of the course, students will be able to:

- Provide an elementary outline of gender as a concept and patriarchy as a historically constituted system of power.
- Explore women's experiences within specific contexts at specific historical moments.
- Appreciate the contradictions that marked the 'rise' of powerful and 'exceptional' women like Razia, Nur Jahan or Mirabai.
- To discuss the material basis of women's experiences with reference to specific issues like ownership of property.

Course Content:

Unit I. Theory and Concepts

- a) Understanding gender and patriarchy

Unit II. Women in Ancient India

- a) Historiographic Overview
- b) Evolution of Patriarchy with focus on Brahmanical patriarchy
- c) Women and property
- d) Women and work: voices from Tamilakam

Unit III. Women in Medieval India

- a) Historiography and the politics of the harem and the household
- b) Case studies: Razia Sultan, Nur Jahan, Jahanara
- c) Women Bhaktas

Unit IV. Women in Modern India

- a) Gender debate in Colonial India: a case study of sati / women's education
- b) Gandhi, Women's participation and Indian Nationalism
- c) Partition, Refugee Women and Rehabilitation – taught through the movie 'Pinjar'.

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I. The unit aims to familiarize students with the theoretical framework of Gender with special focus on patriarchy and feminism and how these concepts can provide tools for historical analysis. **(Teaching Time: 2 weeks approx.)**

- Bhasin, Kamla. (2000). *Understanding Gender*. New Delhi: Women Unlimited.

Unit II. The segment should apprise students of historiographical trends in ancient India pertaining to women. The idea is to explore their voices in specific spaces and during historical moments. **(Teaching Time: 5 weeks approx.)**

- Chakravarti, Uma. (1993). "Conceptualising Brahmanical Patriarchy in Early India: Gender, Class, Caste and State". *Economic and Political Weekly*. Vol. 28 no.14, pp. 579-85.
- Ramaswamy, Vijaya. (2000). "Aspects of Women and Work in Early South India". Kumkum, Roy (Ed.). *Women in Early Indian Societies*. New Delhi: Oxford University Press.
- Shah, Shalini. (2012). "Patriarchy and Property", in *The Making of Womanhood: Gender Relations in the Mahabharata*, Revised Edition. Delhi: Manohar, pp. 32-62.
- Roy Kumkum (2018). "Introduction" in *Beyond the Woman Question, Reconstructing Gendered Identities in Early India*. Snigdha Singh, et al. (Eds.). Delhi: Primus, pp.1-20).

Unit III. The focus in this section is on studying women through fluctuating gender relations in diverse spaces and explore linkages between women, power and politics through some exceptional women. **(Teaching Time: 4 weeks approx.)**

- Bokhari, Afshan. (2012). "Between Patron and Piety: Jahān Ārā Begam's Sufi Affiliations and Articulations in Seventeenth-century Mughal India". in John Curry and Erik Ohlander, (eds.). *Sufism and Society: Arrangements of the Mystical in the Muslim World, 1200–1800*. Oxon: Routledge.
- Habib, Irfan. (2000). "Exploring Medieval Gender History". *IHC 61st Session, Symposia Paper No.23*, Calicut. pp. 263-75.
- Lal, Ruby. (2005). *Domesticity and Power in the Early Mughal World*. New York: Cambridge Studies in Islamic Civilization.
- Ramaswamy, Vijaya. (2011). "Gender and the Writing of South Indian History". in S. Bhattacharya, (ed.). *Approaches to History: Essays in Indian Historiography*, Delhi: ICHR and Primus. pp.199-224.

- Sharma, Sunil. (2009). "From 'Ā' esha to Nur Jahān: The Shaping of a Classical Persian Poetic Canon of Women". *Journal of Persianate Studies* vol. 2, pp. 148-64.
- Sangari, Kumkum. (1990). "Mirabai and the Spiritual Economy of Bhakti". *Economic and Political Weekly*. vol. 25/27, pp. 1461-75.

Unit IV. The section focuses on issues pertaining to women in the colonial period as well as their participation in Indian nationalism and experiences during Partition. **(Teaching Time: 5 Weeks approx.)**

- Basu, Aparna. (2003). *Mridula Sarabhai, A Rebel with a Cause*. Oxford: Oxford University Press. (Ch.8, "Recovery of Abducted Women", pp. 133-146).
- Forbes, Geraldine. (1996). *Women in Modern India*. Cambridge: Cambridge University Press, pp. 10-31, 121-156.
- Gupta, Charu. (Ed.). (2012). *Gendering Colonial India: Reforms, Print, Caste and Communalism*. Delhi: Orient Blackswan, [Introduction].
- Kumar, Radha. (1997). *A History of Doing: An Illustrated Account of Movements for Women's Rights and Feminism in India. 1800-1990*. Delhi: Zubaan (Ch.2, 4, 5) [Also available in Hindi].
- Menon, Ritu and Kamla Bhasin. (1998). *Borders & Boundaries*. Delhi: Kali for Women, pp. 3-29.
- Sharma, Yuthika. (2015). "Indian Women's Movement in the 20th Century: Resistance or Reaction". *Proceedings of Gender Issues*. 5th Annual Conference, Nalanda.

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of

the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Patriarchy, Property, Tamilakam, Razia, Nur Jahan, Jahanara, Bhakti, Sati, Nationalist Movement, Partition

GE- II

Gender in the Modern World

Course Objectives:

The course seeks to introduce to learners, location of Gender in historical past of modern world. The focus is on specific processes across regions. Through analysis of rubrics, complexities of historical issues involving women and state will be unfolded.

Learning Outcomes:

After the completion of the course, the students will be able to:

- Discuss the issues related to gender in world history in a comparative frame.
- Analyze gender realities in larger International context.
- Describe the main facets of Suffrage movement in Britain or in the USA.
- Delineate the role of women in anti-apartheid movement in South Africa.
- Trace the role of women in the Russian revolutions.
- Critically discuss the women's participation in Chinese revolution.

Course Content:

Unit I.	Historicizing Gender: Patriarchy and feminism
Unit II.	Gender in the French Revolution: Women participation; iconography
Unit III.	Women's Suffrage movement in Britain or USA
Unit IV.	Women and anti-Apartheid movement in South Africa
Unit V.	Women in the Russian Revolution
Unit VI.	Engendering the Chinese Revolution

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I. The unit aims to make students conversant with the conceptual issues around Gender with special focus on patriarchy and feminism. **(Teaching Time: 2 Weeks)**

- Bock, Gisela. (1989). "Women's History and Gender History: Aspects of an International Debate". *Gender and History* vol. 1 no.1, pp. 7-30.
- Learner, Gerda. (1987). *The Creation of Patriarchy*. New York and Oxford: OUP. (Chapter 1 and 10).

- Michelet, Juliet and Ann Oakley. (Eds.). (1986). *What is Feminism?* London: Pantheon books. (Introduction).
- DuBois, Ellen Carol. (1999). *Feminism and Suffrage: The Emergence of an Independent Women's movement in America 1848-1869*. Ithaca: Cornell University Press.
- Smith, Bonnie G. (Ed.). (2008). *Encyclopaedia of Women in World History*. New York: Oxford University Press [IV Volumes relevant sections].
- Weisner-Hanks, Merry. (2007). "World History and the History of Women, Gender, and Sexuality". *Journal of World History* vol. 18 no.1, pp. 53-67.

Unit II. The focus in the unit is on the significant role played by the women in the French Revolution and how the French political paintings of the time reflected a growing image of the revolution from a gendered perspective. **(Teaching Time: 3 Weeks)**

- Graham, Ruth. (1984). "Loaves and Liberty: Women in the French Revolution". in Bridenthal Renate and Claudia Koonz (Eds.). *Becoming Visible: Women in European History*. New York: Monthly Review Press, pp. 236-54.
- Juneja, Monica. (1996). "Imaging the Revolution: Gender and Iconography in French Political Prints". *Studies in History* vol. 12 no.1, pp. 1-65.

Unit III. The unit elucidates the trajectory of suffrage movement in two states across the Atlantic; Britain and USA in late 19th and early 20th centuries. This bears testimony to growing feminist consciousness especially in the fields of politics and power. **(Teaching Time: 3 Weeks)**

- Harrison, Patricia Greenwood. (2000). *Connecting Links: The British and American Women's suffrage movements, 1900-1914*. Westport, CT: Greenwood Press.
- Wingerden, Sophia A. (1999). *The Women's Suffrage Movement in Britain, 1866-1928*. New York: St. Martin's Press.

Unit IV. The unit focuses on anti-apartheid resistance in South Africa a very crucial role played by women whose agony doubled on account of being both women as well as black. **(Teaching Time: 2 Weeks)**

- Walker, Cherryl. (1982). *Resistance in South Africa*, New York: Monthly Review Press.

Unit V. The focal point in the unit is to analyse location of women both in the Russian Revolution and after formation of Soviet Union and whether they worked towards the spread of the fundamental ideals of Russian Revolution. **(Teaching Time: 3 Weeks)**

- Rosenthal, Bernice Glatzer. (1984). "Love on the Tractor: Women in the Russian Revolution and After". In Bridenthal Renate and Claudia Koonz (Eds.), *Becoming Visible: Women in European History*. New York: Monthly Review Press, pp. 370-399.

Unit VI. There is the need to investigate the Chinese revolution from a gendered perspective. Women not just participated in the Chinese Communist movement but worked towards radicalizing it as well, making it a genuine mass movement. **(Teaching Time: 3 Weeks)**

- Gilmartin, Christina. (1995). *Engendering the Chinese Revolution: Radical Women, Communist Politics and Mass Movements in the 1920s*. Berkeley: University of California Press.

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Feminism, Patriarchy, French Revolution, Suffrage movement, Anti-Apartheid movement, Russian revolution, China

GE III

Culture and Everyday Life in India

Course Objective:

Our everyday lives are filled with activities so routine and mundane that it hardly seems worth talking about them—getting up, doing daily ablutions, drinking a cup of tea or coffee, performing daily prayers and rituals, getting dressed for work place, boarding the metro to work, returning home, finding leisure in watching TV, shopping and even planning a holiday. All these sorts of activities are part of our everyday lives and most people have the same sort of everyday experiences. At the same time, however, different people across the world have different sorts of everyday lives that are defined by their society. Further, society itself is defined by peoples' ideas, values customs, beliefs and ways of thinking. All these things may be explained as 'culture'. While there are several definitions of culture, in this module we will take culture to mean the 'whole way of life' of a given group of people who form the urban populace in India. This course explores the everyday life of people in India through mundane aspects like food, beverage and masticatory habits; manner of conduct in the domestic and public sphere; responses to globalization in localized spheres; and defining leisure in cinema or recreational outings. In reading these themes we hope to stimulate discussion about particularities of cultural forms that have evolved and continue to change in response to historical circumstance.

Learning Outcomes: With the completion of this course, the students will be able to:

- Identify the complex nature of relationship between the everyday life and society in urban India.
- Discuss human response to specific historical circumstance.
- Describe the role of Tea, Coffee and betel leave chewing in everyday cultural life and interactions.
- Delineate human interactions with each other in a shrine complex or on the streets.
- Analyze the importance of new avenues of interaction such as Metros, malls or pilgrim centres.
- Discuss the leisurely activities of social groups and resultant spread of ideas.

Course Contents:

Unit I: Culture and everyday life

Unit II: Sustenance and beyond: Chai, coffee and paan

- Unit III: Religion everyday** - at the threshold, shrine & street
- Unit IV: The everyday global in g/local:** Metro, mall & pilgrimage online
- Unit V: Leisure and everyday**

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I. This section equips students to locate the complex nature of relationship between the everyday life and society mainly in urban India keeping in mind the nature of culture. **(Teaching Time: 3 weeks approx.)**

- Radhakrishnan, S. (1944). "Culture of India". *The Annals of the American Academy of Political and Social Science* vol. 233 (India Speaking), pp. 18-21.
- Ramanujan, A. K. (1999). "Is There an Indian Way of Thinking? An Informal Essay." in Vinay Dharwarkar, (ed.). *The Collected Essays of A.K. Ramanujan*. New Delhi: Oxford University Press. pp. 34-51.
- Hansen, Kathryn. (2010). "Who wants to be a cosmopolitan? Readings from the composite culture." *The Indian Economic and Social History Review* vol. 47 no.3, pp. 291–308.

Unit II. The segment examines that culture is multifaceted and evolves in response to historical circumstance and that culture cannot be essentialized. It explores the everyday life in India through mundane aspects like food, beverage and masticatory habits. **(Teaching Time: 3 weeks approx.)**

- Nandy, Ashish. (2004). "The Changing Popular Culture of Indian Food: Preliminary Notes." *South Asia Research* vol. 24 no.1, pp. 9–19.
- Lutgendorf, Philip. (2012). "Making tea in India: Chai, capitalism, culture." *Thesis Eleven* vol. 113 no.1, pp. 11-31.
- Venkatachalapathy, A. R. (2002). "'In those days there was no coffee': Coffee-drinking and middle-class culture in colonial Tamilnadu." *The Indian Economic & Social History Review* vol. 39 nos.2–3, pp. 301–316.
- Gowda, M. (1951). "The Story of Pan Chewing in India". *Botanical Museum Leaflets* Harvard University vol. 14 no.8, pp. 181-214.

Unit III. The unit communicates the complex, diverse and everyday location of culture -- performing daily prayers and rituals, getting dressed for work, finding leisure in watching TV, shopping and planning a holiday. People across the world have different sorts of everyday lives that are framed and negotiated within their respective societies. This unit elaborates on how the

social and cultural world is defined by peoples' ideas, values, customs, beliefs and ways of thinking. **(Teaching Time: 4 weeks approx.)**

- Kilambi, Jyotsna S. (1985). "Toward an Understanding of the Muggu: Threshold Drawings in Hyderabad." *RES: Anthropology and Aesthetics* vol. 10, pp. 71-102.
- Qureshi, Regula. (1992-1993). "'Muslim Devotional': Popular Religious Music and Muslim Identity under British, Indian and Pakistani Hegemony". *Asian Music* vol. 24 no. 1, pp. 111-121.
- Raj, Selva J. (2008). "Public display, communal devotion: Procession at a South Indian Catholic festival". in A. Jacobson Knut, (ed.). *South Asian Religions on Display: Religious Processions in South Asia and in the Diaspora*. London & New York: Routledge, pp. 77-91.
- Mini, Darshana Sreedhar. (2016). "Attukal 'Pongala': The 'Everydayness' in a Religious Space". *Journal of Ritual Studies*. vol. 30 no. 1. Special Issue: Transformations in Contemporary South Asian Ritual: From Sacred Action to Public Performance, pp. 63-73.

Unit IV. The purpose is to apprise students and to help them identify the complex nature of relationships that constitute everyday lives in urban society. This will be useful in stimulating further inquiry and develop ability to analyse culture through multiple frames of reference. **(Teaching Time: 3 weeks approx.)**

- Sadana, Rashmi. (2010). "On the Delhi Metro: An Ethnographic View". *Economic and Political Weekly* vol. 45/46, pp. 77-83.
- Voyce, Malcolm. (2007). "Shopping Malls in India: New Social 'Dividing Practices'". *Economic and Political Weekly* vol. 42 no. 22, pp. 2055-62.
- Scheifinger, Heinz. (2009). "The Jagannath Temple and Online Darshan". *Journal of Contemporary Religion* vol. 24 no.3, pp. 277-90.
- Saeed, Yousuf. (2012). "Jannat ki Rail: Images of Paradise in India's Muslim Popular Culture". in Mumtaz, Currim, (ed.). *Jannat: Paradise In Islamic Art*. Mumbai: Marg Foundation.

Unit V. This segment will take culture to mean the 'whole way of life' of a given group of people who form the urban populace. It explores the everyday life in India through manner of conduct in the domestic and public sphere; responses to globalization in localized spheres; and defining leisure in cinema or recreational outings. **(Teaching Time: 3 weeks approx.)**

- Lutgendorf, Philip. (2006). "Is There an Indian Way of Filmmaking?". *International Journal of Hindu Studies* vol. 10 no. 3, pp. 227-256.

- Srivastava, Sanjay. (2009). "Urban Spaces, Disney-Divinity and Moral Middle Classes in Delhi". *Economic and Political Weekly* vol. 44 no.26/27, pp. 338-45.
- Waghorne, Joanne Punzo. (2014). "Engineering an Artful Practice: On Jaggi Vasudev's Isha Yoga and Sri Sri Ravishankar's Art of Living". in Mark Singleton & Ellen Goldberg, (ed.). *Gurus of Modern Yoga*. New York: Oxford University Press, pp. 283-307.

Suggested Readings.

- Pant, Pushpesh. (2013). "INDIA: Food and the Making of the Nation". *India International Centre Quarterly* vol. 40 no.2. pp. 1-34.
- Pandya, Samta P. (2016). "Guru' Culture in South Asia: The Case of Chinmaya Mission in India". *Society and Culture in South Asia*. vol. 2 no.2. pp. 204-232.
- Srivastava, Sanjay. (2014). "Shop Talk: Shopping Malls and Their Publics". In Nita Mathur (Ed.). *Consumer Culture, Modernity and Identity*. Delhi: Sage, pp. 45-70.
- Warrier, Maya. (2013). "Online Bhakti in a Modern Guru Organization". In Mark Singleton and Ellen Goldberg (Eds.), *Gurus in Modern Yoga*. New York: Oxford University Press. pp. 308-327. (Chapter 14).

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Chai, Coffee, Paan, Everyday Religion, Pilgrimage online, Metro, Mall, Leisure, Yoga

GE IV

Nature in Human History

Course Objectives:

This course proposes to examine the history of change in human-nature interactions. It unpacks standard environmental narratives which reduce environmental concerns to pollution and global warming, on the one hand, and human-nature harmony in pre-colonial era on the other. This will help students understand the usually invisible interplay of political, economic and ideological factors on questions of nature and natural resources. In what ways were environmental concerns mitigated by the class imprint of aspirational consumerism? This course also draws attention to the call of ‘national interest’ while addressing contemporary environmental concerns, often designated by specialists as anthropocene.

Learning Outcomes: After the completion of this Course, the students will be able to:

- Critique an understanding of environmental concerns based on a narrow scientific/ technological perspective
- Discuss environmental issues within a social- political framework
- Examine the role of social inequality, i.e. unequal distribution of and unequal access to environmental resources, in an understanding of the environmental crisis of the world - from the global to the local
- Examine the complexities of resource distribution and inequalities of resource use, locating these within specific social contexts, with reference to case studies regarding water rights and forest rights
- Locate solutions to environmental problems within a framework of greater democratisation of resource use
- Problematise the notion of a pristine past - of perfect balance between human societies and nature in pre-modern times.

Course Content:

Unit I. Society and Nature

- a. Unending quest for Energy resources
- b. Livelihood patterns: Agriculture, Pastoralist

Unit II. Conquest, Colonialisms, and Control

- a. Global Ecological interconnectedness

- b. Conquests, Colonialisms and Control: Forest rights and forest dwellers
- c. Insatiable appetite: agrarian production, commercial plantation

Unit III. Waterscapes

- a. Water harvesting: Conventional vs. Multi Purpose River Valley Projects
- b. Contemporary Urban water disparities
- c. Water rights

Unit IV. Climate Change: Genesis and mitigation

- a. International Cooperation vs. national interests
- b. Debating Anthropocene

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I: This unit introduces student to conflict over natural resources. Changing livelihood patterns and its impact on nature is focus of this unit. **(Teaching Time: 3 weeks approx.)**

- Agarwal, Anil. (1985). "The Politics of Environment I & II." in *The State of India's Environment 1984-85: The Second Citizens' Report*. New Delhi: Centre for Science and Environment. pp. 354-80.[Available in Hindi also].
- McNeill, John. (2000). "Prologue: Peculiarities of a Prodigal Century." in *Something New Under the Sun: An Environmental History of the Twentieth- Century World*. New York: W. W. Norton & Company. pp. 3-17.
- Roy, Dunu. (2007). "Environmentalism and Political Economy." in Mahesh Rangarajan, (ed.), *Environmental Issues in India*. Delhi: Pearson. pp. 521-29.
- रॉय, दुनू. (2010). "पर्यावरणवाद और राजनैति क अर्थव्यवस्था", महेशरं गाराजन (संपादक), भारत में पर्यावरण के मुद्दे: एक संकलन. दिल्ली: पीयरसन. पृष्ठ 331-38.
- Singh, Chetan. (2017). "Forest, Pastoralists and Agrarian Society in Mughal India." in Meena Bhargava, (ed.). *Frontiers of Environment: Issues in Medieval and Early Modern India*. Hyderabad: Orient Blackswan. pp. 71-97.

Unit II: This unit examines the role and impact of colonial power in redefining the character of natural resources exploitation and consequent changes in the livelihood patterns. It also critical examines the significance of discovery of 'new world' and its impact on flora-fauna across the globe. **(Teaching Time: 5 weeks approx.)**

- Bhattacharya, Neeladri. (1995). "Pastoralists in a Colonial World." in David Arnold and Ramachandra Guha, (Ed.). *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia*. Delhi: Oxford University Press. pp. 49-85.

- Crosby, Alfred W. (1988). "Ecological Imperialism: The Overseas Migration of Western Europeans as a Biological Phenomenon." in Donald Worster, (ed.), *The Ends of the Earth* New York: Cambridge University Press. pp.103-117.
- Gadgil, Madhav & Ramachandra Guha. (1992). "Conquest and Control", in *This Fissured Land: An Ecological History of India*. New Delhi: Oxford University Press.
- माधवगाडगीळएवंरामचंद्रगुहा. (2010). भारतमेंपारिस्थितिकीसंघर्षऔरपर्यावरणोपयोगीआंदोलन, महेशरंगाराजन (संपादक), भारतमेंपर्यावरणकेमुद्दे: एकसंकलन. दिल्ली: पीयरसन. पृष्ठ, 225-57.
- Tucker, Richard. (2007). "Conclusion: Consuming Appetites." in *Insatiable Appetite: The United States and the Ecological Degradation of the Tropical World*. Plymouth: Rowman & Littlefield Publishers Inc. pp. 217-22.

Unit III: This unit highlights the significance of water management in general and the monsoon ecology of Indian sub-continent in particular. Vagaries of nature, vulnerabilities of human society and resultant contestations focus of the unit. **(Teaching Time: 4 weeks approx.)**

- D'Souza, Rohan. (2003). "Supply-Side Hydrology in India: The Last Gasp". *Economic and Political Weekly* vol. 38 no.36, pp. 3785-90.
- Kumar, Mayank. (2013). "Visibly Invisible: "Ecological Imprints". In *Monsoon Ecologies: Irrigation, Agriculture, and Settlement Patterns in Rajasthan during the Pre-colonial period*. New Delhi: Manohar, pp. 233-64.
- कुमार, मयंक. (2015). "मानसूनसेसामंजस्यबनातासमाज: सन्दर्भराजस्थान". प्रतिमान, अंक-3 संख्या3, पृष्ठ. 602-16.
- Sharan, Awadhendra. (2014). "Contaminated Flows: Water in City, 1868-1956," in *In the City, Out of Place: Nuisance, Pollution, and Dwelling in Delhi, c. 1850-2000*. Delhi: Oxford University Press, pp. 28-67.
- Singh, Chhatrapati. (1991). "The Jurisprudence of Water Rights." in *Water Rights and Principles of Water Resources Management*. Delhi: Indian Law Institute, pp. 62-97.

Unit IV: This unit addresses the complex issue of Climate Change, its genesis, impact and mitigation with special reference to anthropocene. **(Teaching Time: 4 weeks approx.)**

- Dubash, Navroz K., Radhika Khosla, Ulka Kelkar, and Sharachchandra Lele. (2018). "India and Climate Change: Evolving Ideas and Increasing Policy Engagement". *Annual Review of Environment and Resources* vol. 43no.1, pp. 395-424.
- Seffen, Will., Paul J. Crutzen, and J. R. McNeill. (2008). "The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature". *Ambio* vol. 36 no.8, pp. 614-21.

SUGGESTED READINGS:

- Agarwal Anil and Narain, Sunita (Eds.). (1997). *Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting Systems*. New Delhi: Centre for Science and Environment. [Available in Hindi also].
- Agarwal, Bina. (1992). "The Gender and Environment Debate: Lessons from India." *Feminist Studies* vol. 18 no.1, pp. 119-158.
- Bauer, Jordan and Martin V. Melosi. (2012). "Cities and the Environment." in J. R. McNeill and E. S. Maudlin, (eds.). *Companion to Environmental History*. Chichester, United Kingdom: Blackwell, pp. 360-376.
- Baviskar, Amita. (2012). "Written on the Body, Written on the Land: Violence and Environmental Struggles in Colonial India", in Mahesh Rangarajan and K. Sivramakrishnan, (Eds.). *India's Environmental History*, Vol. II: "Colonialism, Modernity and the Nation". Ranikhet: Permanent Black, pp. 517-549.
- Botkin, Daniel B. (2012). *The Moon in the Nautilus Shell: From Climate Change to Species Extinction, How Life Persists in an ever-changing world*. Oxford: Oxford University Press, pp. 3-96.
- Moore, Jason W. (2015). "The Long Green Revolution: the Life and Times of Cheap Food in the Long Twentieth Century." in *Capitalism in the Web of Life: Ecology and Accumulation of Capital*. London: Verso, pp. 241-290.
- Urry, John. (2013). "The Century of Oil", in *Societies Beyond Oil: Oil Dregs and Social Futures*. London: Zed Books, pp. 36-52.
- Water Resources Law. (2004). *Indian Juridical Review* 1. Special Issue.
- एस.ऍम ,स्वामीनाथन. (2010). , (संपादक) महेशरंगाराजन , अंतरिक्षयान पृथ्वी पर खेती पृष्ठ . पीयरसन : दिल्ली . एकसंकलन : भारत में पर्यावरण के मुद्दे, 115-33.

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of

the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Energy Resources, Forest Rights, Water Harvesting, Water, Climate Change

GE- V

Investigating Inequalities

Course Objectives:

This course proposes to examine the meaning, definition and types of inequality, types of inequality. The paper conveys that difference need not necessarily lead to inequalities; differences are often historical and may result in inequalities. The paper shows that inequalities generate sub-ordination and exploitation. The paper examines inequalities in the larger context of socio-politico-economic-legal structures. It makes a conscious attempt to convey historical processes through which differences and inequalities emerge and change; thereby . Paper critically engages with the political-social mobilization on the basis of ‘identity politics’, which are linked to issues of inequalities, in an era of electoral politics.

Learning Outcomes: After completing this course, students should be able to:

- Critique the prevalent dominant understanding of Caste, Gender, and Tribe.
- Discuss the complex relations between differences and inequalities.
- Examine the inherent politics in the creation of inequalities and differences.
- Critically engage with various initiatives taken by the state to prohibit caste-gender atrocities and upliftment of deprived sections of society.

Course Content:

Unit.I. Inequalities: Caste: Varna, jati/race and untouchables

Unit II. Gender and the Domestic

Unit III. Slavery and Servitude

Unit IV. Tribes and Forest Dwellers

Unit V. Equality and the Indian Constitution

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit-1: This unit introduces students to structure of Inequalities with special reference to Caste system. Fluidity of category visible over long historical past is examined to show the role of socio-politico-economic structures of the time in shaping the character of inequalities. **(Teaching Time: 4 Weeks Approx.)**

- Jaiswal, Suvira. (1998). *Caste: Origins, functions and dimensions of change*. Delhi: Manohar, pp. 1-25.

- जायसवाल, सुबीरा. (2004). वर्णजातिव्यवस्था: उद्भव, प्रकार्य और रूपांतरण (अनुवादक: आदित्यनारायणसिंह). नई दिल्ली: ग्रंथशिल्पी. पृष्ठ 15-43.
- Jha, Vivekanand. (1973). "Stages in the History of Untouchables". *Indian Historical Review* vol. 2 no.1, pp 14-31.
- Singh, Upinder. (2014). "Varna and Jati in Ancient India." in Veluthat, Kesavan and D R Davis, (Eds.). *Irreverent History: Essays for M G S Narayanan*. Delhi: Primus, pp. 205-214.
- Singh, Yogender. (1977). "Sociology of Social Stratification." in *Social Stratification and Change in India*. Delhi: Manohar, pp.1-90
- आंबेडकर, भीमराव. (2006). अछूत: कौन और कैसे (अनुवादक: जुगलकिशोरबौद्ध). नई दिल्ली: सम्यक प्रकाशन. पृष्ठ 31-46 एवं 117-124.

Unit-2: This unit will exemplify how gender identities constitute one of the most prevalent forms of inequalities. These are most fervently enforced and reinforced in the household. **(Teaching Time: 3 Weeks Approx.)**

- Chakravarti, Uma. (2006). "Conceptualising Brahmanical Patriarchy in Early India: Gender, Caste, Class and State," in *Everyday Lives, Everyday Histories: Beyond the Kings and Brahmanas of Ancient India*. Delhi: Tulika, pp. 138-55.
- चक्रवर्ती, उमा. (२०११). जातिसमाजमें पितृसत्ता: नारीवादी नजरिये से (अनुवादक: विजयकुमार झा). नई दिल्ली: ग्रंथशिल्पी. पृष्ठ 43-66.
- Gupta, Charu. (2001). "Mapping the Domestic Domain," in *Sexuality, Obscenity, Community: Women, Muslims and the Hindu Public in Colonial India*. Delhi: Permanent Black, pp.123-95.

Unit-3: Inequalities are defined by their socio-political contexts which are by their character dynamic. This unit will exemplify it with the help of forms of bondage: Ganikas, and slavery in medieval India. **(Teaching Time: 3 Weeks Approx.)**

- Kumar, Sunil. (2006). "Service, Status and Military Slavery in the Delhi Sultanate of the thirteenth and early fourteenth centuries." in Richard Eaton and Indrani Chatterjee, (eds.). *Slavery in South Asia*. Bloomington: Indiana University Press, pp. 83-114.
- Saxena, Monika. (2006). "Ganikas in Early India: Its genesis and dimensions". *Social Scientist* vol. 34 no.11-12, pp. 2-17.

Unit-4: This unit examines, in what ways dominant mode of social structure has used/uses social distancing and exclusion to reinforce their hegemony through the case study of forest dwellers and tribes. **(Teaching Time: 3 Weeks Approx.)**

- Singh, Chetan. (1988). "Conformity and Conflict: Tribes and the 'agrarian system' of Mughal India". *Indian Economic and Social History Review* vol. 23 no.2, pp. 319-340.
- Singh, K.S. (1978). "Colonial transformation of Tribal Society in Middle India". *Economic and Political Weekly* vol. 13 no. 30, pp.1221-32.
- गुप्ता, रमणिका(संपादक). (2008). आदिवासीकौ न. नईदिल्ली: राधाकृष्णप्रकाशन. पृष्ठ, 13-24, 25-28 एवं 29-40.

Unit-5: Indian Constitution envisaged a society based on social and political equality and enacted several acts to achieve this objective. Present unit evaluates the functioning of the constitutional provisions through the prism of their stated objectives. **(Teaching Time: 3 Weeks Approx.)**

- Austin, Granville. (2011). *Working a Democratic Constitution: The Indian Experience*. New York: Oxford University Press. ("Introduction").
- Galanter, Marc. (1997). "Pursuing Equality: An Assessment of India's Policy of Compensatory Discrimination for Disadvantaged Groups", in Sudipta Kaviraj, (ed.). *Politics in India*. New Delhi: Oxford University Press, pp.187-99.

Suggested Readings:

- Banerjee-Dube, Ishita. (2008). "Introduction: Questions of Caste." in Ishita Banerjee-Dube, (Ed.). *Caste in History*. New Delhi: OUP, pp. xv- lxii.
- Chaube, Shibani Kinkar. (2009). *The Making and Working of the Indian Constitution*. Delhi: National Book Trust, pp.1-67.
- Ghure, G S. (2008). "Caste and British Rule." in Ishita Banerjee-Dube, (Ed.). *Caste in History*. New Delhi: Oxford University Press, pp. 39-45.
- Kumar, Vivek. (2014). "Dalit Studies: Continuities and Change", in Yogender Singh, (Ed.), *Indian Sociology: Identity, Communication and Culture*. New Delhi: Oxford University Press, pp. 19-52.
- Metcalf, Thomas. (2005). *Ideology of the Raj, The New Cambridge History of India*, Volume III. Part 4. Cambridge: Cambridge University Press, pp. 66-112 & 113-59.
- Parasher-Sen, Aloka. (2007). "Naming and Social Exclusion: The Outcaste and the Outsider." in Patrick Olivelle, (Ed.), *Between the Empires: Society in India 300 BCE to 400CE*. New Delhi: Oxford University Press, pp 415-55.
- Risley, H. H. (2008). "Caste and Nationality." in Ishita Banerjee-Dube, (Ed.). *Caste in History*, New Delhi: Oxford University Press, pp. 70-75.
- Rodrigues, V. (Ed.). (2005). *The Essential Writings of B.R. Ambedkar*. New Delhi: Oxford University Press, pp. 1-44.

- Sen, Amartya. (2005). "Secularism and Its Discontents", in *The Argumentative Indian*. New Delhi: Penguin, pp. 294-316.
- Sethi, Raj Mohini. (2014). "Sociology of Gender: Some Reflections." in Y Singh, (Ed.). *Indian Sociology: Identity, Communication and Culture*. New Delhi: OUP. Pp. 106-157.
- Xaxa, V. (2014). "Sociology of Tribes." in Y. Singh, (Ed.). *Indian Sociology: Identity, Communication and Culture*. New Delhi: Oxford University Press. Pp. 53-105.
- नंदी, आशिस. (2019). जिगरीदु श्मनः उपनिवेशवादकेसायेमेंआत्म-छयऔरआत्मोद्धार, (अनुवादकः अभयकुमारदुबे), नईदिल्ली:वाणीप्रकाशन. पृष्ठ. 95-156.
- शर्मा, रामशरण. (1990). प्राचीनभारतमेंभौतिकप्रगतिंएवसामाजिकसंरचनाएं, (अनुवादकः पूरनचंदपंत), नईदिल्ली:राजकमलप्रकाशन. पृष्ठ. 29-52.
- सरकार, सुमित. (2001) सामाजिकइतिहासलेखनकीचुनौती, (अनुवादकः एन. ए. खां'शाहिद'). नईदिल्ली: ग्रंथशिल्पी. पृष्ठ. 377-409.

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Caste, Gender, Tribes, Ganikas, Equality and the Constitution

GE VI

Delhi through the Ages

Course Objectives:

The aim of this paper is to acquaint the students with the historical evolution of Delhi. Students are introduced to significant archaeological sites and cities of Delhi from the prehistoric to the contemporary period. The paper focuses on how ecological and historical aspects of Delhi contributed to the gradual growth of the city's hybrid cultural milieu.

Learning Outcomes:

After the completion of this Course, the students will be able to:

- Analyze the historical contexts of tangible and intangible heritage of Delhi.
- Discuss the Ecology of Delhi and outline changes in it through the ages.
- Describe the archaeological cultures that flourished in and around Delhi.
- Analyze the processes leading to the establishment of urban settlements of Delhi
- Outline the importance of Shahjahanabad and its importance in the development of the great imperial city of Delhi.
- Trace the role of Delhi College in the political and literary culture of Delhi.
- Discuss various aspects of the Revolt of 1857 and its consequences for the future development of Delhi.
- Delineate the processes leading to the making of the New Imperial Capital under the British.
- Analyze the impact of Partition on the structure and settlement pattern of Delhi.
- Describe Delhi's importance as economic and cultural centre.

Course Content:

Unit I. Many pasts of Delhi: Ecology, Archaeology and History

Unit II. Cities of Delhi: Urban Settlements from the 13th and 14th centuries – Focus on any two Mehrauli, Siri, Tughluqabad, Firuzabad

Unit III. 18th and early 19th Century Shahjahanabad: Politics, Literary Culture and Delhi College

Unit IV. Delhi in 1857: Revolt and Re-conquest

Unit V. Making of the New Imperial Capital: Delhi 1911-1930

Unit VI. Delhi in 1947: Partition and After

Unit VII. Delhi as economic and cultural centre: Case study (Any Two)

- a. Crafts and artisans

- b. Music
- c. *Hazrat-i Dehli*
- d. Tombs of Delhi
- e. Coronation park

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit-1. This section should apprise students about the early pasts of Delhi by focussing on its ecology, archaeology and historical Methodology. **(Teaching Time: 2 weeks approx.)**

- Singh, Upinder. (Ed.). (2006). *Delhi: Ancient History*. New Delhi, Social Science Press. (see the articles by Grover and Bakliwal; Dilip K. Chakrabarti and Nayanjot Lahiri; A.K. Sharma; B. R. Mani; and B. D. Chattopadhyaya; pp. 3-25, 36-40, 68-76).
- Singh, Upinder. (Ed.). (2010). *Dilli: Prachin Itihas*. New Delhi: Orient Blackswan (above text published in Hindi, refer to same articles).
- Singh, Upinder. (1999). *Ancient Delhi*. Delhi: Oxford University Press, pp. 46-62, 75-87

Unit-2. In this section the learning outcomes would focus on the readings and field trips that students would plan pertaining to 13-14th century settlements in Delhi with specific focus on any two: Mehrauli, Siri, Tughluqabad, Firuzabad. **(Teaching Time: 3 weeks approx.)**

- Singh, Upinder. (Ed.). (2006). *Delhi: Ancient History*. New Delhi: Social Science Press (articles by B. R. Mani and I. D. Dwivedi; pp. 185-211).
- Kumar, Sunil. (2011). "Courts, Capitals and Kingship: Delhi and its Sultans in the Thirteenth and Fourteenth Centuries CE." in Albrecht Fuess and Jan Peter Hartung, (eds.). *Court Cultures in the Muslim World: Seventh to Nineteenth Centuries*. London: Routledge, pp. 123-48.

Unit-3. This segment should apprise students about the politics, literary culture and the role of Delhi College in 18th and early 19th Century Shahjahanabad. **(Teaching Time: 2 weeks approx.)**

- Farooqui, Amar. (2013). *Zafar and the Raj: Anglo-Mughal Delhi, 1800-1850*. Delhi: Primus Books. (Ch.6, "The Palace and the City", pp. 106-133).
- Naim, C. M. (2004). "Ghalib's Delhi: A Shamelessly Revisionist Look at Two Popular Metaphors." in *Urdu Texts and Contexts: The Selected Essays of C. M. Naim*. Delhi: Permanent Black, pp. 250-79.

- Ataullah. (2006-2007). “Mapping 18th Century Delhi: The Cityscape of a Pre-Modern Sovereign City.” *Proceedings of the Indian History Congress*. Session 67, pp. 1042-1057.

Unit-4. The unit should familiarise students about the revolt and the process of British reconquest of Delhi in 1857. It would examine political developments and their legacy during 1857 and how the rebellion in Delhi influenced the city. **(Teaching Time: 3 weeks approx.)**

- Gupta, Narayani. (1999). *Delhi between the Empires: 1803-1931*. Delhi: Oxford University Press, pp. 20-31, 50-66.
- Lahiri, Nayanjot. (2003). “Commemorating and Remembering 1857: The Revolt in Delhi and its Afterlife”. *World Archaeology* vol. 35 no.1, pp. 35-60.

Unit-5. This section examines the motivation, planning and the ideological impact that the British wanted to make through the making of the new Imperial Capital in Delhi. **(Teaching Time: 2 weeks approx.)**

- Gupta, Narayani. (1999). *Delhi between the Empires: 1803-1931*. Delhi: Oxford University Press, pp 160-182.
- Metcalf, Thomas R. (1986). “Architecture and Empire: Sir Herbert Baker and the Building of New Delhi.” in R. E. Frykenberg, (ed.). *Delhi through the Ages*. Delhi: Oxford University Press. pp. 391-400.

Unit-6. This section explores and reflects Delhi during and post-Partition. It examines physical and social transformation of Delhi from the colonial to the contemporary times. **(Teaching Time: 2 weeks approx.)**

- Pandey, Gyanendra. (2001). *Remembering Partition*. Cambridge: Cambridge University Press, pp. 121-51
- Kidwai, Begum Anis. (2011). *In Freedom's Shade*. (Trans. by Ayesha Kidwai.) New Delhi: Penguin. (Chapters 3 and 4.)
- Tan, Tai Yong and Gyanesh Kudaisya. *The Aftermath of Partition in South Asia*. New York: Routledge (Ch.7, “Capitol Landscapes”, pp. 193-200).

Unit-7. The segment would help students focus on intensive understanding of the city through the essential and suggested readings and fieldwork on any of the two mentioned subjects/sites. **(Teaching Time: 2 weeks approx.)**

Suggested Readings:

- Dalrymple, William. (2004). *City of Djinns: A Year in Delhi*. New Delhi: Penguin, pp. 27-37.
- Koch, Ebba. (2001). "The Mughal Waterfront Garden." *Mughal Art and Imperial Ideology*. New Delhi: Oxford University Press, pp. 183-202.
- Lowry, Glenn D. (1987). "Humayun's Tomb: Form, Function, and Meaning in Early Mughal Architecture." *Muqarnas* vol. 4, pp. 133-148
- Metcalf, Thomas. (1989). *Imperial Visions*. New Delhi: Oxford University Press, pp. 211-39.
- Pernau, Margrit (Ed.). (2006). *The Delhi College*. New Delhi: Oxford University Press, pp. 1-32.
- Pinto, Desiderio S.J. (2004). "The Mystery of the Nizamuddin Dargah: the Account of Pilgrims." in Christian W. Troll, (ed.). *Muslim Shrines in India*. New Delhi: Oxford University Press, pp. 112-124.
- Spear, Percival. (2002). *Twilight of the Mughals* (sic). In *The Delhi Omnibus*. Delhi: Oxford University Press. (Chapter IV).
- Tarlo, Emma. (2000). "Welcome to History: A Resettlement Colony in the Making." in Veronique Dupont et al, (ed.). *Delhi: Urban Spaces and Human Destinies*. Delhi: Manohar, pp. 75-94.

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Settlements, Sultanate Delhi, Mughal Delhi, Delhi College, 1857, New Delhi, Partition

Skill Enhancement Courses

SEC I

Heritage and Tourism

Course Objectives:

The objective of this course is to enable the students to understand the social, historic, scientific, aesthetic and economic values that are inherent in a cultural heritage. The template is set with practices of visual representation in colonial India and the institutionalizing of colonial archaeology. In the last quarter of the 19th century, Indian artefacts get museumized with the coming of exhibitions, fairs, collections, setting up of museums and botanical gardens. This making of Indian heritage through the rhetoric of spectacle in the colonial period forms part of the first unit. Moving to the contemporary times, to make the course more conducive to employment opportunities, present day practices of marketing heritage are explored in the next unit. Religious tourism, commercialization of nature tourism, nostalgia tourism and the lived experience of heritage walks as cultural representations are studied here. While there are obvious advantages of Tourism as being economically viable, the last unit deals with the impact of overkill tourism practices. Case studies of three different socio-ecological spaces, as also issues of conservation of heritage sites, making a case for sustainable tourism, are studied in the last unit. The objective of the course, strengthened with project work and field trips, is to equip the students to appreciate the nature of industries associated with heritage and tourism.

Learning Outcomes:

Upon successful completion of course students will have knowledge and skills to:

- Enhance his/her ability to discern the nature of the cultural heritage of the nation.
- Contextualise his/her country's history of heritage representation, to effectively comprehend the present.
- Draw inference from different aspects of tourism, its varieties and be sensitive to the impact of overkill tourism in different geographical areas with specific local sensibilities, thus making a case for sustainable tourism.
- Equip himself / herself with theoretical knowledge of heritage and tourism.

Course Content:

Unit I: Constitution of heritage in colonial India

Institutionalization and commodification of Indian art and architecture: collections, exhibitions, museums and monumentalization – case study of the Great Exhibition,

London; Kew Gardens, London; Indian Museum, Kolkata; Tranquebar; guide books and travel literature.

Unit II: Tourism: marketing heritage

- a. Religious Tourism: Case studies of Kashi, Sarnath, Ajmer Sharif, Amritsar, Bom Jesus Cathedral of old Goa
- b. Memory and tourism: Raj nostalgia, Indian diaspora's search for roots
- c. Ecotourism: commercialising nature
- d. Exhibiting culture: handicrafts, heritage walks and tours, palaces, heritage festivals

Unit III: Sustainable Tourism

- a. Interface with local sensibilities: case study of Agra, Simla, Goa
- b. Conservation of Heritage: Humayun's Tomb, Ajanta Caves

Unit IV: Field trips/Project work: Some suggestions:

- a. Field Trips to Mathura Museum, National Museum, National Gallery of Modern Art, Rail Museum, Sulabh International Museum of Toilets, National Craft Museum, galleries, exhibitions
- b. Heritage walks/trails to monuments and sites
- c. Visit to light and sound shows and live performances at monuments, sites
- d. Documenting the impact of tourism on heritage sites and local communities
- e. Making a report on the ongoing conservation projects of various sites by the ASI, Aga Khan Trust for Culture, INTACH and other community and private organizations
- f. Food tourism etc.

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I: This Unit explains institutionalization and commodification of Indian art and architecture during colonial period. In what ways collections, exhibitions, Museums etc. were institutionalised during British India to Constitute Heritage. **(Teaching Time: 5 Weeks Approx.)**

- Breckenridge, Carol A. (1989). "The Aesthetics and Politics of Colonial Collecting: India at World fairs". *Comparative Studies in Society and History* vol. 31 no.2, pp. 195-216.
- Brockway, Lucile H. (1979). "Science and Colonial Expansion: The Role of the British Royal Botanic Gardens". *American Ethnologist* vol. 6 no.3, pp. 449-65.
- Guha-Thakurta, Tapati, (2004). "The Museum in the Colony: Collecting, Conserving, Classifying." in *Monuments, Objects, Histories: Institutions of Art in Colonial and Postcolonial India*. Ranikhet: Permanent Black, pp. 43-82.
- Fihl, Esther. (2017). "Collections at the National Museum of Denmark." in Esther Fihl (ed.). *Intercultural Heritage and Historical Identities: Cultural Exchange on the Coromandel Coast of India*. Copenhagen: The National Museum of Denmark, pp. 17-32.

- Mackenzie, John M. (2005). "Empires of Travel: British Guidebooks and Cultural Imperialism in the 19th and 20th centuries." in John K. Walton, (ed.). *Histories of Tourism: Representation, Identity and Conflict*. Buffalo, Toronto: Channel View Publications, pp. 19-38.

Unit II: This unit will examine marketing of heritage as a tourism product. It will examine case study of religious tourism, ecotourism and cultural practices. **(Teaching Time: 5 Weeks Approx.)**

- Bandyopadhyay, Rumki and Kushagra Rajendra. (2018). "Religious Tourism: The Beginning of a New Era with Special Reference to India." in Shin Yesuda, Razaq Raj and Kevin Griffin (eds.). *Religious Tourism in Asia: Tradition and Change through Case Studies and Narratives*. Boston: CABI Publishing, pp. 67-76 (Chapter 8).
- Majumdar, Nandini. (2014). *Banaras: Walks through India's Sacred City*. New Delhi: Roli Books.
- Kejriwal, Om Prakash (Ed.). (2010). *Kashi Nagari Ek: Roop Anek*. New Delhi: Publication Division, Govt. of India.
- Sanyal, Usha. (2007). "Tourists, Pilgrims and Saints: The Shrine of Mu'in al-Din Chishti of Ajmer." in Carol Henderson and Maxine Weisgrau (Eds.). *Raj Rhapsodies: Tourism, Heritage and the Seduction of History*. Hampshire: Ashgate, pp. 183-202; (Ashgate e-book.)
- Kalra, Vikram. (2005). *Amritsar: The City of Spirituality and Valour*. New Delhi: INTACH.
- Rajagopalan, S. (1975). *Old Goa*. New Delhi: Archaeological Survey of India.
- Bandyopadhyay, Ranjan. (2012). "'Raj Revival' Tourism: Consuming Imperial/ Colonial Nostalgia". *Annals of Tourism Research* vol. 39 no.3, pp. 1718-1722.
- Seshadri, Swathi. (2012). "Missing the Woods for the Trees?" *Economic and Political Weekly* vol. 47 no.36, pp. 12-14.
- Karanth K. Ullas and Krithi K. Karanth. (2012). 'A Tiger in the Drawing Room: Can Luxury Tourism Benefit Wildlife?' *Economic and Political Weekly* vol. 47 no.38, pp. 38-43.

Unit III: This unit deals with questions of guest-host relationships and its" impact on tourism potential. It also examines important concerns of conservation concerning heritage sites -- natural as well as manmade. **(Teaching Time: 6 Weeks Approx.)**

- Chakravarty, Surajit and Clara Irazabal. (2011). "Golden Geese or White Elephants? The Paradoxes of World Heritage Sites and Community-based Tourism Development in Agra,

- India." *Community Development: Journal of the Community Development Society* vol. 42 no.3, pp. 359-76.
- Batra, Adarsh. (2002). "A Case Study of Major Issues and Sustainable Solutions to Mountain Tourism in the Capital of Himachal Pradesh, Eternal India." *Anatolia: An International Journal of Tourism and Hospitality Research* vol. 3 no.2, pp. 213-20.
 - Pal, Anil and B. K. Pal. (2016) "Tourism and its impact on Socio-Economic Life of Simla District, Himachal Pradesh." *Essence: International Journal for Environmental Rehabilitation and Conservation*. Vol.VII no.2, pp. 1-16.
 - Anon, (1994). "Simla losing its Charm." *India Green File*.
 - Noronha, Frederick. (1997). "Goa: Fighting the Bane of Tourism". *Economic and Political Weekly* vol. 32 no.51, pp. 3253-56.
 - Routledge, Paul. (2000). "Consuming Goa: Tourist Site as Dispensable Space". *Economic and Political Weekly* vol. 35 no.30, pp. 2647-56.
 - For Humayun's Tomb conservation by the Agha Khan Trust for Culture:
https://www.akdn.org/sites/akdn/files/media/publications/2013_09_-_aktc_-_india_-_humayun_tomb_conservation.pdf
 - For Ajanta conservation:
https://www.jica.go.jp/english/our_work/evaluation/oda_loan/post/2007/pdf/project28_full.pdf
<http://ajantacaves.com/Howtoeach/Conservation/>
<https://frontline.thehindu.com/static/html/fl1523/15230650.htm>

Suggested Readings

- Bandyopadhyay, Ranjan. (2018). "Longing for the British Raj: Imperial/colonial nostalgia and tourism." *Hospitality & Society* vol. 8 no.3, pp. 253-71.
- Jafa, Navina. (2012). *Performing Heritage: Art of Exhibit Walks*. New Delhi: Sage Publications (See "Introduction", pp. xxi-xxix.).
- Pubby, Vipin. (1988). *Simla Then and Now*. New Delhi: Indus Publishing Co.
- Thapar, Romila. (2018). *Indian Cultures as Heritage: Contemporary Pasts*. New Delhi: Aleph Book Company.

Teaching Learning Process:

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work towards providing basic exposure to related fields of studies connected to the discipline history and to avenues of interdisciplinary postgraduate studies.

Assessment Methods:

Students will be assessed on the basis of regular group presentations and a detailed (individual) project submission-cum-presentation. The project has to be based on a field visit/field work.

Keywords:

Institutionalization of Indian Art, Colonial Knowledge, Kew Gardens London, India Museum, Colonial Heritage – Tranquebar & Kolkata, Religious Kashi, Ajmer, Amritsar, Sarnath, Tourism, Nostalgia, Handicrafts, Heritage Walks, Conservation.

SEC II

Introduction to Art in the Indian Subcontinent

Course Objective:

The paper provides a glimpse of the art of India from ancient to contemporary times. Starting with a historiographical enquiry of Indian art, it tries to touch upon the broader aspects and examples of sculpture (stone, metal and terracotta), architecture (temples, mosques, mausoleums and forts) and paintings (ancient to contemporary). The purpose of the paper is to familiarize the students with the basic features of the various art forms of India with the details of representative examples to enhance their skills. This course will familiarize the students with the nuances of various aspects of art like sculpture, architecture and paintings. This will help them in understanding various forms of art and art appreciation.

Learning Outcome:

Upon successful completion of course students shall be able to:

- Identify the diversity of Indian art including sculpture, architecture and paintings cutting across time and space.
- Examine the development in architecture in India with reference to temples, mosques, forts and colonial buildings. The ideological underpinning of architecture is also introduced.
- Explain the traditions of painting in India with reference to Mural, miniature; Mughal and Rajputs.
- Demonstrate the major trends in painting during the national movement and in contemporary India.
- Outline the nuances and intricacies of various forms of art.

Course Content:

Unit I: Indian Art; historiographical issues

Unit II: Sculpture

- (a) Stone: Gandhara and Mathura
- (b) Metal: Chola Bronzes
- (c) Terracotta: Contemporary

Unit III: Architecture

- (a) Evolution of Temples
 - (i) Nagar: Sun Temple, Konark
 - (ii) Dravida: Nataraja Temple, Chidambaram
- (b) Mosques and Mausoleums
 - (i) Quwwat al-Islam mosque, Delhi

- (ii) Taj Mahal, Agra
- (c) Forts
 - (i) Kumbhalgarh Fort
- (d) Colonial
 - (i) Rashtrapati Bhawan, Delhi
 - (ii) Victoria Terminus, Mumbai

Unit IV: Painting

- (a) Mural Tradition: Ajanta
- (b) Miniature Tradition: Mughal and Rajput
- (c) Nationalist Tradition: Bengal School
- (d) Contemporary Tradition: Calendar Art

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I: This unit introduces student to the historiographical issues related to the study of Indian Art. The focus of this Unit is how the study of Indian art has changed over a period of time. **(Teaching Time: 2 Weeks Approx.)**

- Dhar, P. P. (Ed). (2011). *Indian Art History: Changing Perspectives*. New Delhi: DK.
- Mitter, Partha. (2001). *Indian Art*. Oxford: Oxford University Press..
- Huntington, Susan L. (1985). *The Art of Ancient India: Hindu, Buddhist, Jain*. New York: Weather Hill.

Unit II: This unit examines historical development in the evolution of sculpture with special reference to stone, metal and terracotta. **(Teaching Time: 4 Weeks Approx.)**

- Banerjea, J. N. (1975). *The Development of Hindu Iconography*. New Delhi: Munshi Ram Manohar Lal.
- Dehejia, Vidya et al. (2007). *Chola: Sacred Bronzes of Southern India*. London: Royal Academy.
- Huyler, Stephen P. (1996). *Gifts of Earth; Terracottas & Clay Sculptures of India*. New Delhi: IGNCA.

Unit III: This unit examines development in architecture in India with reference to temples, mosques, forts and colonial buildings. The ideological underpinning of architecture is also introduced. **(Teaching Time: 6 Weeks Approx.)**

- Brown, Percy. (1942). *Indian Architecture (Buddhist and Hindu period)*. Delhi: CBS Publishers. (Reprint, 2005).
- Brown, Percy. (1942). *Indian Architecture (Islamic period)*. Bombay: D. B. Taraporevala Sons & Co.
- Thiagrajan, K. (2009). *Meenakshi Temple, Madurai*. Madurai: MSTRC.
- Behera, K. S. (2005). *Konark. The Black Pagoda*. Delhi: Publication Division.
- Tejawani, Amit. (2017). *Wonderful India Kumbhalgarh, The Majestic*. Chennai: Notion.
- Prasad, H. Y. Sharada. (1992). *Rashtrapati Bhawan: The Story of President's House*. New Delhi: Publication Division.
- Rahul Mehrotra et al. (2006). *A City Icon; Victoria Terminus Bombay*. Bombay: Eminence Designs.
- Krishnadeva. (2011). *Uttar Bharat ke Mandir*. Delhi: NBT.
- Shrinivashan, K. R. (2005). *Dakshin Bharat ke Mandir*. Delhi: NBT.

Unit IV: This unit deals with the traditions of painting in India with reference to Mural, miniature; Mughal and Rajputs. It also examines the major trends in painting during the national movement and in contemporary India. **(Teaching Time: 4 Weeks Approx.)**

- Jamkhedkar, A. P. (2008). *Ajanta; Monumental Legacy*. New Delhi: OUP.
- Verma, Som Prakash. (2009). *Aspects of Mughal Painting; Expressions and Impressions*. Volume 1. New Delhi: Abhinav Publications.
- Beach, M.C. (1982). *The New Cambridge History of India: Mughal and Rajput Painting*. Delhi: Cambridge University Press.
- Uberoi, Patricia. (2002-03). "Chicks, Kids and Couples: the nation in calendar art". *India International Centre Quarterly* vol. 29 no.3-4, pp. 197-210.
- Uberoi, Patricia. (1990). "Feminine Identity and National Ethos in Indian Calendar Art". *Economic and Political Weekly* vol. 25 no.17, pp. 41-48.

Suggested Readings:

- Coomaraswamy, Ananda K. (1927). *History of Indian and Indonesian Art*. New York: Dover Publications.
- Gupta, S. P. & Shashi P. Asthana. (2002). *Elements of Indian Art*. Delhi: D. K. Printworld.
- Meister, Michael W. and M. A. Dhaky. (Eds.). (1983). *Encyclopaedia of Indian Temple Architecture, South India: Lower Dravidadesa 200 BC-AD 1324*. New Delhi: American Institute of Indian Studies.

- Meister, Michael W. et al. (Eds.). (1988) *Encyclopaedia of Indian Temple Architecture, North India: Foundations of North Indian Style c. 250 BC-AD 1100*, Volume 2, Part 1. Delhi: American Institute of Indian Studies.
- Mitter, Partha. (1994). *Art and Nationalism in Colonial India 1850-1922; Occidental Orientations*. Cambridge: Cambridge University Press.
- Pandya, Yatin. (2005). *Concepts of Space in Traditional Indian Architecture*. Ahmedabad: Granth Corporation.

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Historiographical issues, Art, Sculpture, Architecture, Painting, temples, Mosques, forts

SEC III

History and Archaeology

Course Objectives

This course is about acquainting students with some basic concepts and methods of archaeological research such as excavation, survey, analysis of artefacts and various dating methods. This course will also make them aware of the contributions of key archaeologists and institutions in the evolution of archaeology as a discipline in India. Students will learn an integrative approach to the theoretical perspectives and praxis of archaeology in this paper. The main pedagogical tools for achieving these objectives would be case studies and project work in the context of the Indian subcontinent.

Learning Outcomes:

Upon successful completion of course students will have knowledge and skills to:

- Describe various stages of development of archaeology as a discipline.
- Discuss the methods of excavations.
- Explain various dating methods employed by the archaeologists.
- Identify and contextualize the past objects found during explorations and excavations of sites.
- Interpret aspects of past societies.
- Analyse the role of institutions and individuals in the development of Indian archaeology.
- Undertake projects related to the search of places related to the epics, Sangama texts and the Buddhist tradition.

Course Content:

Unit 1: Defining Archaeology: Aims and methods; Understanding its origins and Development; Variety of archaeological evidence; Survey and excavation of sites and features; Stratigraphy.

Unit 2: Origin and development of archaeology in India; Role of archaeologists and institutions.

Unit 3: Exploring human experience through archaeology in India: Environment, Technology and Subsistence patterns; Society, Trade and Art.

Unit 4: Problems of Correlating Textual Materials and Archaeological Evidence: the epics, Sangama texts and the Buddhist tradition.

Unit 5: Visit to a museum, an archaeological site, report preparation and presentations are part of this course.

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit 1: This unit defines archaeology, its aims and methods. Unit also traces its origins in India. Student will be taught variety of archaeological evidence and Stratigraphy. **(Teaching Time: 4 Weeks Approx.)**

- Bahn, Paul.(1996). *Archaeology: A Very Short Introduction*. Oxford: Oxford University Press.
- Renfrew, Colin and Paul Bahn. (2016). *Archaeology- Theories, Methods, and Practice*. London: Thames & Hudson.
- Wheeler, Sir Mortimer. (1954). *Archaeology from the Earth*. London: Oxford University Press.
- ओझा, रामप्रकाश (1978). पुरातत्वविज्ञान. लखनऊ: प्रकाशनकेंद्र.
- पाण्डेय, जयनारायण. (2015). पुरातत्वविमर्श. इलाहाबाद: प्राच्यविद्यासंस्थान.
- ह्वीलर, सरमोर्टीमर. (1954). पृथ्वीसेपुरातत्व. पटना: बिहारहिंदीग्रन्थअकादमी.

Unit II: This unit deals with the origin and development of archaeology in India. It also examines the role of archaeologists and institutions in India. **(Teaching Time: 4 Weeks Approx.)**

- Chakrabarti, Dilip K. (2003). *Archaeology in the Third World: A History of Indian Archaeology Since 1947*. Delhi: D. K. Printworld Ltd.
- Lahiri, Nayanjot. (2012). *Marshalling the Past: Ancient India and its Modern Histories*. Delhi: Permanent Black (Chs.10-12).
- Ray, H. P. (2007). *Colonial Archaeology in South Asia: The Legacy of Sir Mortimer Wheeler*. Delhi: OUP (“Introduction”, Ch.2, and Ch.6).
- Singh, Upinder. (2005). *The Discovery of Ancient India: Early Archaeologists and the Beginnings of Archaeology*. Delhi: Permanent Black (Chs.1-2, Ch.4, Chs.9-10).

Unit III: This unit teaches students how to explore human experience through archaeology in India. It also teaches role of environment, technology in understanding the subsistence patterns and art through archaeological investigation. **(Teaching Time: 4 Weeks Approx.)**

- Allchin, Bridget and Raymond Allchin. (1997). *Origins of a Civilization: The Prehistory and Early Archaeology of South Asia*. Delhi: Viking (Relevant matters can be found in all chapters).
- Chakrabarti, D. K. (1999). *India: An archaeological History, Palaeolithic beginnings to Early Historic Foundations*. Delhi: OUP (Relevant matters can be found in all chapters).
- Renfrew, Colin, and Paul Bahn. (2016). *Archaeology- Theories, Methods, and Practice*. London: Thames & Hudson.

Unit IV: This unit examines the problems of correlating textual materials and archaeological Evidence with specific reference to the epics, Sangama texts and the Buddhist tradition.
(Teaching Time: 4 Weeks Approx.)

- Champakalakshmi, R. (1975-76). "Archaeology and Tamil Literary Tradition." *Puratattva* vol. 8, pp. 110-112.
- Chattopadhyaya, B. D. (1975-76). "Indian Archaeology and the Epic Traditions." *Puratattva* vol. 8, pp. 67-72.
- Maloney, Clarence. (1975). "Archaeology in South India: Accomplishments and Prospects." in Burton Stein, (ed.). *Essays on South India*. Delhi: Munshiram Manoharlal, pp. 1-40.
- Singh, Upinder. (1996). "Sanchi: The History of the Patronage of an Ancient Buddhist Establishment." *Indian Economic and Social History Review* vol. 33 no.1, pp. 1-35.
- Thapar, Romila. (2010). "Puranic Lineages and Archaeological Cultures." *Ancient Indian Social History: Some Interpretations*. Second edition. Delhi: Orient BlackSwan, pp. 214-37.

Suggested Readings

- Archaeological survey of India Publications on Archaeological Sites.
- Chakrabarti, D. K. (2006). *The Oxford Companion to Archaeology: The Archaeological Foundations of Ancient India, Stone Age to AD 13th Century*. Delhi: Oxford University Press.
- Deo, Sushma G. (2000-2002). "Computer Applications in Archaeology at the Deccan College." *Bulletin of the Deccan College Research Institute* vol. 60/61, pp. 137-42.
- Guha, Sudeshna. (2015). *Artefacts of History: Archaeology, Historiography and Indian Pasts*. Delhi: Sage India.
- Hall, Martin and Stephen W. Silliman (Eds.). (2006). *Historical Archaeology*. Malden: Blackwell Publishing.
- Ray, H. P. and Carla M. Sinopoli (Eds.). (2005). *Archaeology as History in Early South Asia*. Delhi: Aryan Books International.
- एल्टिंग, एम., एफ. फोल्सम. (2008). पुरातत्वविज्ञानकी कहानी. दिल्ली: भारतज्ञानविज्ञानसमिति.
- **Websites:**
<https://www.harappa.com/>
<https://www.sahapedia.org/>

Teaching Learning Process:

Lecture and discussion method, problem- solving method, question - answer method, group discussion method and discussion following student presentations in class and/or in tutorial classes will form the basis of teaching learning process. Presentations shall focus either on important themes covered in the class lectures, around an archaeological site, an institution or an eminent archaeologist. Supporting audio-visual aids like documentaries and power point presentations will be used wherever necessary in order to augment the effectiveness of the methods used in classrooms. Overall, the Teaching Learning Process shall emphasise the interconnectedness of themes within the different rubrics to build a holistic view of the discipline.

Assessment Methods:

Students will be regularly assessed for their grasp on themes through debates and discussions covered in class. One written assignment and one presentation of the report prepared by students individually or in a moderate sized group will be used for final grading of the students.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Archaeological evidence, Antiquarianism, Artefact, Ecofact, Survey, Excavation, Stratigraphy, Tool-technology, Alexander Cunningham, Prehistoric art, John Marshall, Mortimer Wheeler, Archaeological Survey of India.

SEC IV Archives and Museum

Course Objective:

The aim of this course is to make the students familiar with the structure and functioning of both, archives and museums in India. This subject will also be taught with a view to give an insight into the aspects of employability in these institutions.

Learning Outcomes:

Upon successful completion of course students will be able to:

- Examine these two repositories of history from close quarters.
- Contextualise how the heritage is preserved and kept alive here and the difficulties faced in the process.
- Demonstrate the way in which museums are organised and managed.
- Examine the considerations which govern the way exhibitions in museums are managed.
- Assessment will be based on assignments and projects involving visits to the archives and museum, which is an essential component of this course.

Course Content:

Unit I: Definition of Archives and Museum: types - digital, virtual, crafts, media; difference between archives, museum and library

Unit II: History of development of archives and museums in India with one case study each

Unit III: Collection, documentation, preservation

Unit IV: Museum presentation and exhibition

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit-I: This unit defines Archives and Museum. It also elaborates on the types of archives and museums which includes; digital, virtual, crafts, media. It also tells the difference between archives, museum and library. **(Teaching Time: 4 Weeks Approx.)**

- Singh, Kavita. (2003). "Museum is National: The Nation as Narrated by the National Museum New Delhi". in Geeti Sen (Ed.). *India: A National Culture*. New Delhi:Sage.

Unit-II: This unit examines the history of development of archives and museums in India with one case study each. **(Teaching Time: 4 Weeks Approx.)**

- Bhattacharya, Sabyasachi. (2018). *Archiving the Raj: History of Archival Policy of the Govt. of India with Selected Documents 1858- 1947*. Delhi: Oxford University Press.
- Singh, Kavita. (2003). "Museum is National: The Nation as Narrated by the National Museum New Delhi". in Geeti Sen, (ed.). *India: A National Culture*. New Delhi:Sage.

Unit-III: This unit elaborates upon distinct characteristics of collection. It also examines the concerns which govern its documentation and preservation. **(Teaching Time: 4 Weeks Approx.)**

- Agrawal, O. P. (2007). *Essentials of Conservation and Museology*. Delhi: Sundeep.
- Kathpalia, Y. P. (1973). *Conservation and Restoration of Archive Material*. Paris: UNESCO.

Unit- IV: This unit familiarizes students with the way in which museums are organised and managed. It also examines the considerations which govern the way exhibitions in museums are managed. **(Teaching Time: 4 Weeks Approx.)**

- Mathur, Saloni. (2000). "Living Ethnological Exhibits: The Case of 1886". *Cultural Anthropology* vol. 15 no.4, pp. 492-524.
- Breckenridge, Carol. (1989). "Aesthetics and Politics of Colonial Collecting: India at World Fairs." *Comparative Studies in Society and History* vol. 31 no.2, pp. 195-216
- संजय ,जैन. (2009). कनिकाप्रकाशन :बड़ौदा .एकपरिचय :म्यूजियमएवंम्यूज़िओलोजी.

Suggested Readings:

- Ambrose, Timothy & Crispin Paine. (1993). *Museum Basics*. London: Routledge.
- Choudhary, R. D. (1988). *Museums of India and their Maladies*. Calcutta: Agam Prakashan.
- Mathur, Saloni. *India by Design: Colonial History and Cultural Display*. Berkeley: University of California.
- Nair, S. N. (2011). *Bio-Deterioration of Museum Materials*. Calcutta: Agam Prakashan.
- Sengupta, S. (2004). *Experiencing History through Archives*. Delhi: Munshiram Manoharlal.

Teaching Learning Process:

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work towards providing basic exposure to related fields of studies connected to the discipline history and to avenues of interdisciplinary postgraduate studies.

Assessment methods:

Students will be assessed on the basis of regular group presentations and a detailed (individual) project submission-cum-presentation. The project has to be based on a field visit/field work.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Digital, Archives, Library, Museums, Collections, Preservation, Exhibition

SEC V

Popular Culture

Course Objective:

One of the purposes of learning History is to be able to evolve a critical lens with which one can make sense of one's immediate and lived experience. Popular culture happens to be a major component of that experience, surrounding us at all times, particularly since it is easy to access. This course aims to provide students with a critical understanding of popular culture. One of the objectives of the course is to help the student attempt to define popular culture through a study of the complex theoretical discussion on the subject. This theoretical engagement is expected to enable learners to comprehend various aspects of popular culture both in non-Indian and Indian contexts focussing particularly on themes pertaining to religion, performative traditions, food cultures as well as the constitution of a 'new public' with regard to its patterns of consumption of culture, in contemporary times.

Learning Outcomes:

Upon successful completion of course students will be able to:

- Engage with a range of theoretical perspectives in an attempt to define popular culture,
- Describe the methodological issues involved in a historical study of popular culture,
- Identify the relevant archives necessary for undertaking a study of popular culture, while pointing out the problems with conventional archives and the need to move beyond it,
- Interpret the above theoretical concerns to actual historical studies, through a case study,
- Estimate the popular aspects of everyday experience of religion and religiosity, through a wide range of case studies relating to festivals and rituals, healing practices as well as pilgrimage and pilgrim practices,
- Examine the role of orality and memory in popular literary traditions,
- Demonstrate the evolution of theatre and dance within the popular performative traditions,
- Analyse the role of technology in the transformation of music from elite to popular forms,
- Examine the relationship between recipes/recipe books and the construction of national/regional identities,
- Identify the history of the cultures of food consumption and its relationship with the constitution of a modern bourgeoisie,
- Examine the process of emergence of a pattern of 'public consumption' of culture in contemporary times, with specific reference to art, media and cinema

Course Content:

Unit I: Understanding Popular Culture: Some Issues

- [a] Defining Popular Culture : Popular Culture as Folk Culture, Mass Culture, as the 'other' of High Culture, People's culture, etc.
- [b] Popular Culture and History: The Historian and the archives
- [c] Popular Culture in Early Modern Europe or the City of Mumbai

Unit II: Some Aspects of Popular Culture in India

(Students should choose any three from the four rubrics [a] – [d] mentioned below)

- [a] Religion and everyday practice
 - (i) Festivals and Rituals: Case studies of Navaratri in Madras / Urs in Ajmer / Kumbh Mela
 - (ii) Everyday healing and petitioning the divine: Case studies of Jinns in Delhi / Popular Hinduism / Tantric practices
 - (iii) Sacred Geographies, Sacred Spaces: Pilgrimage and pilgrim practices
- [b] Performative Traditions
 - (i) Orality, Memory and the Popular: Case studies of women's Ramayanas in the oral tradition Andhra/ Rajasthan
 - (ii) Theatre and Dance:
 - (iii) Music: Popular music and Technology; Case studies of Devotional music / the Ghazal and the Cassette
- [c] Food Cultures
 - (i) Recipes and the national project: Popular recipe books
 - (ii) Food and Public Cultures of Eating: Udipi Hotels, Dum Pukht, South Asian food in a global world
 - (iii) Cultures of Consumption: Tea-Coffee and the Indian Middle Class
- [d] Making of a new 'Public'
 - (i) Popular Art: Imagining the nation in Calendar art
 - (ii) Print media: Amar Chitra Katha
 - (iii) Cinema: Constructing Family, Gender and Marriage through popular cinema

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I: This unit introduces students to various theoretical dimensions of popular culture coming through more abstract readings on the subject culled from early modern European and contemporary Indian history. This will establish the foundations on the basis of which the student can focus on more detailed case studies of popular culture in the second rubric. **(Teaching Time: 5 weeks approx.)**

- Storey, John. (1996). *Cultural Studies and the Study of Popular Culture: Theories and Methods*. Edinburgh: Edinburgh University Press.
- Groot, Jerome de. (2009). *Consuming History: Historians and heritage in contemporary popular culture*. London: Routledge
- Jain, Jyotindra. (2007). *India's Popular Culture: Iconic Spaces and Fluid Images*. Marg Publications. vol. 59 no.2, pp. 6-31, 60-75, 90-113.
- Burke, Peter. (2009). *Popular Culture in Early Modern Europe*. Surrey: Ashgate, pp. 23-132.

or

- Prakash, Gyan. (2010). *Bombay Fables*. Delhi: Harper Collins, pp. 75-156.

Unit II: This rubric introduces students to different aspects of popular culture through precise case studies. These will cover subjects like popular festivals, religious practices, oral traditions, recorded music, recipe books, popular restaurants, consumption of tea/coffee, calendar art, comics and TV serials. Students are required to choose readings to correlate with their three choices from the four available. **(Teaching Time: 11 weeks approx.)**

- Hancock, Mary Elizabeth. (2018). *Womanhood in the Making: Domestic Ritual and Public Culture in Urban South India*. New York: Routledge.
- Kakkar, Sudhir. (1991). *Shamans, Mystics and Doctors: A Psychological Inquiry into India and its Healing Traditions*. Chicago: University of Chicago Press.
- Taneja, Anand Vivek. (2018). *Jinnealogy: Time, Islam and Ecological Thought in the Medieval Ruins of Delhi*. Stanford: Stanford University Press.
- Mohammad, Afsar. (2013). *The Festival of Pirs: Popular Islam and Shared Devotion in South India*. Delhi: Oxford University Press.
- Waghorne, Joanne Punzo. (2004). *Diaspora of Gods: Modern Hindu Temples in an Urban Middle Class World*, Delhi: Oxford University Press.
- Henn, Alexander. (2014). *Hindu-Catholic Engagements in Goa: Religion, Colonialism and Modernity*. Delhi: Orient BlackSwan, pp. 126-168.
- Rao, Velcheru Narayana. (2016). *Text and Tradition in South India*. Delhi: Permanent Black. (The section on "A Ramayana of their Own", pp. 240-69).
- Bharucha, Rustam. (2003). *Rajasthan: An Oral History, Conversations with Komal Kothari*. Delhi: Penguin.
- Rege, Sharmila. (2002). "Conceptualising Popular Culture: Lavani and Powada in Maharashtra". *Economic and Political Weekly* vol. 37 no.11, pp. 1038-1047.
- Oberoi, Patricia. (2006). *Freedom and Destiny: Gender, Daily and Popular Culture in India*. Delhi: Oxford University Press.

- Manuel, Peter. (1993). *The Cassette Culture: Popular Music and technology in North India*. Chicago: University of Chicago Press.
- Appadurai, Arjun. (1988). "How to Make a National Cuisine: Cookbooks in Contemporary India". *Comparative Studies in Society and History* vol. 30 no.1, pp. 3-24.
- Ray, Krishnendu and Tulasi Srinivas (2012). *Curried Cultures: Globalization, Food and South Asia*. Los Angeles: University of California Press.
- Bhadra, Gautam. (2005). *From an Imperial Product to a National Drink: The Culture of Tea Consumption in Modern India*. Kolkata: CSSSC.
- Venkatachalapathy, A. R. (2006). *In Those Days There Was No Coffee: Writings in Cultural History*. Delhi: Yoda Press.
- Oberoi, Patricia. (2006). "Unity in Diversity? Dilemmas of Nationhood in Indian Calendar Art." in Dilip M Menon, (ed.). *Readings in History: Cultural History of Modern India*. Delhi: Social Science Press.
- Ramaswamy, Sumathi. (2001). "Maps and Mother Goddesses in Modern India." *Imago Mundi* vol. 53 no.1, pp. 97-114.
- Jain, Kajri. (2007). *Gods in the Bazaar: The Economies of Indian Calendar Art*. London: Duke University Press.
- Chandra, Nandini. (2008). *The Classic Popular Amar Chitra Katha, 1967-2007*. Delhi: Yoda Press.
- Aguiar, Marian. (2013). "Arranged Marriage: Cultural Regeneration in Transnational South Asian Popular Culture". *Cultural Critique* vol. 84, pp. 181-213.
- Oberoi, Patricia. (2006). *Freedom and Destiny: Gender Family and Popular Culture in India*. Delhi: Oxford University Press.

Online Resources:

- Students should use the online resources from the project entitled "Visual Pilgrim Project: Mapping Popular Visuality and Devotional Media at Sufi Shrines and Other Islamic Institutions in South Asia":
- Abeer Gupta, The Visual and Material Culture of Islam in Ladakh
- Amit Madheshiya and Shirley Abraham, Syncretic posters at the Sailani baba shrine in Maharashtra: Exploring portability of religious iconography through networks of circulation
- Snehi, Yogesh. (2013). "Replicating Memory, Creating Images: Pirs and Darghas in Popular Art and Media of Contemporary Punjab". *South Asia's Islamic Shrines and Transcultural Visuality* (online journal).
- Torsten Tschacher, 'You have to Grant Your Vision': Ideas and Practices of Visuality in Popular Muslim Art in Tamil Nadu

Teaching Learning Process:

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work towards providing basic exposure to related fields of studies connected to the discipline history and to avenues of interdisciplinary postgraduate studies.

Assessment Methods:

Students will be regularly assessed for their grasp on themes through debates and discussions covered in class. One written assignment and one presentation of the report prepared by students individually or in a moderate sized group will be used for final grading of the students.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords: Definitions of popular culture, History, contemporary Mumbai, Festivals, Navratri, Urs, Jinns, Pilgrimage, Oral traditions, Cassettes, Devotional music, recipe books, Udupi restaurants, Dum Pukht food, Tea and Coffee, Calendar Art, Amar Chitra Katha, Popular television and cinema.

SEC VI
Language, Literature and Region in Early Modern Times

Course Objective:

This course provides students with an understanding of complex historical relationships between development of languages, formation of identities and the politics of region, community and nation. These relationships changed over a period of time and the course attempts to apprise students of the diverse ways in which scholars explain the process of the emergence of regional/ vernacular languages as literary media. It also attempts to equip students with the ability to analyse the politics of language as it is implicated in the politics of regional pride, as well as communal and national identities.

Learning Outcomes:

Upon successful completion of course students will have knowledge and skills to:

- Describe the chronology of the emergence and literarization of major languages in India.
- Analyse and articulate the various ways in which scholars have attempted to examine the histories and politics of languages, especially vis-à-vis the formation of regional, communal and national pride and identities.
- Identify and analyse the larger socio-political implications of the choice of a language, or a particular register of a given language, especially in literature and cinema.
- Justify that language function at multiple levels and in multiple facets of life.
- Examine the differences and why and how these are created has will be identified.

Course Content:

Unit I: Languages in a Multilingual Culture

- a. Regionalization or Vernacularization?
- b. Forms and Histories of Multilingualism

Unit II: Language, Region, Identities: a case study of Telugu

- a. Emergence of Regional identity
- b. Role of Political Patronage

Unit III: Hindi and Urdu in the Age of Nationalism

- a. One Language, Two Scripts
- b. Hindi, Hindui, Rekhta, Urdu, Deccani

Unit IV: Spot the Difference: Language Projects with Literature and Cinema

- a. Language of Premchand, Renu and Hazari Prasad Dvivedi

- b. Sarkari Hindi (Akashvani and GOI official communication) vs. Popular Bollywood Language
- c. Differing Registers in Hindi Films: Barsat (Urdu), Chupke Chupke (Satire), Party (Sarkari Hindi), Pink (Hinglish)

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I: This unit locates the interplay between languages and literary cultures in a multilingual Culture. It also problematises the label regionalisation and Vernacularization as well as forms and histories of Multilingualism. **(Teaching Time: 4 Weeks Approx.)**

- Majumdar, R. C. (Ed.) (n.d.). *History and Culture of the Indian People*. Bombay: Bhartiya Vidya Bhawan (Chapter XV: 'Language and Literature').
- Pollock, Sheldon. (1998). "India in the Vernacular Millennium: Literary Culture and Polity, 1000-1500". in Shmuel Eisenstadt, Wolfgang Schluchter and Bjorn Wittrock, (eds.). *Early Modernities Special Issue of Daedalus* vol. 127 no.3, pp. 41-74.
- Pollock, Sheldon. (1995). "Literary History, Region and Nation in South Asia: Introductory Note." *Social Scientist* vol. 23 no.10-12, pp. 1-7.
- Jha, Pankaj. (2019). "Multilingualism." *A Political History of Literature: Vidyapati and the Fifteenth Century*. Delhi: Oxford University Press, pp. 58-67.
- Orsini, Francesca. (2012). "How to do Multilingual Literary History." *Indian Economic and Social History Review* vol. 49 no.2, pp. 225-46.

Unit II: This unit examines the interrelationship between language and region in the process of identities formation. It will examine this process through a case study of Telugu. **(Teaching Time: 4 Weeks Approx.)**

- Nagaraju, S. (1995). "Emergence of Regional Identity and Beginnings of Vernacular Literature: a Case Study of Telugu." *Social Scientist* vol. 23 no.10-12, pp. 8-23.
- Rao, V. Narayana (1995). "Coconut and Honey: Sanskrit and Telugu in Medieval Andhra." *Social Scientist* vol. 23 no.10-12, pp. 24-40.

Unit III: This unit examines the emergence of Hindi and Urdu in the Age of Nationalism and its histories. It also examines the appropriation of language to reduce it to religious identities and associated politics. **(Teaching Time: 4 Weeks Approx.)**

- Faruqui, S. R. (2003). "A Long History of Urdu Literary Culture". in Sheldon Pollock, (ed.). *Literary Cultures in History: Reconstructions from South Asia*. Berkeley: University of California Press, pp. 805-63.
- Rai, Alok. (2001). *Hindi Nationalism*. Delhi: Orient Longman.
- Petievich, Carla. (2001). "Gender politics and the Urdu ghazal: Exploratory observations on Rekhta versus Rekhti." *Indian Economic and Social History Review* vol. 38 no.3, pp. 223-48.

Unit-IV: This unit suggest that language function at multiple levels and in multiple facets of life. What are the difference and why and how these are created has will be examined through this unit. **(Teaching Time: 4 Weeks Approx.)**

- McGregor, R. S. (2003). "The Progress of Hindi." in Pollock, (ed.). *Literary Cultures in History: Reconstructions from South Asia*. Berkeley: University of California Press, Part-I, pp. 912-57.
- One story/essay each of Premchand, Phanishwar Nath Renu and Hazari Prasad Dvivedi.
- Samples of Akashvani Hindi and Gazette of the Government of India for students to observe and comment on the nature of their language
- Watching the films mentioned and to observe and comment on the difference in their languages

Suggested Readings

- Ali, S. Athar. (1992). "Translations of Sanskrit Works at Akbar's Court". *Social Scientist* vol. 20 no.9/10, pp. 38-45. (Also reproduced in Iqtidar Alam Khan, ed., (1999). *Akbar and His Age*. Delhi: ICHR and Northern Book Centre.)
- An interesting debate between Alok Rai and Shahid Amin can be accessed here: <http://www.urdustudies.com/pdf/20/12AminRai.pdf>
- Bangha, Imre. (2018). "The Emergence of Hindi Literature: From Transregional Maru-Gurjar to Madhyadeśī Narratives", in Tyler Williams, Anshu Malhotra and John Stratton Hawley, (Eds.). *Text and Tradition in Early Modern North India*. New Delhi: Oxford University Press, pp. 3-39.
- Busch, Allison. (2011). *Poetry of Kings: The Classical Hindi Literature of Mughal India*. New York: Oxford University Press. ("Introduction").
- Ernst, Carl W. (2003). "Muslim Studies of Hinduism?: A Reconsideration of Arabic and Persian Translations from Indian Languages." *Iranian Studies* vol. 36 no.2, pp. 173-95.

- Faruqui, Munis. (2014). "Dara Shukoh, Vedanta and Imperial Succession in Mughal India." in Vasudha Dalmia and Munis Faruqui, (Eds.). *Religious Interactions in Mughal India*. Delhi: Oxford University Press, pp. 30-64.
- Pollock, Sheldon. (2001). "The Death of Sanskrit." *Comparative Studies in Society and History*. Vol. 43 no.2, pp. 392-426.
- Shukla, Ramchandra. (1929). *Hindi Sāhitya ka Itihās*. Allahabad: Lokabharati Prakashan (Reprint, 2009).
- Truschke, Audrey. (2016). *Culture of Encounters: Sanskrit at the Mughal Court*. Gurgaon: Penguin Books. ("Introduction: The Mughal Culture of Power").

Teaching Learning Process:

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work towards providing basic exposure to related fields of studies connected to the discipline history and to avenues of interdisciplinary postgraduate studies.

Assessment Methods:

Students will be regularly assessed for their grasp on themes through debates and discussions covered in class. One written assignment and one presentation of the report prepared by students individually or in a moderate sized group will be used for final grading of the students.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Regions, Vernacular, Multilingualism, One Language two scripts, Rekhta, Deccani, Sarkari Hindi, Bollywood Language

SEC VII

Understanding Texts, Rituals and Orality in Indian History

Course Objectives:

This course will seek to provide students with skills in using a variety of archives, namely documents, ritual practice and performance, and oral materials. The course will familiarise them with the ways in which historians regard the underlying structures and meanings of documents, rituals and oral expressions as historical significant. Here students will be invited to study critical research that deals with these issues and undertake case that draws out the value of these archives.

Learning Outcomes:

Upon successful completion of course students shall able to:

- Organise archival or field work relating to historical research.
- Contextualise sources in a meaningful and critical manner.
- Analyse texts, point out ethnography of ritual practices and performances, and use oral narratives for historical purposes.
- Demonstrate a variety of vocational areas like administration, development, culture and art, economy and environmental work.

Course Content:

- Unit 1: Introduction:** Critically understanding historical documents, rituals and orality
- Unit 2: Reading Documents:** Structure and Meaning of Documents
- Unit 3: Exploring Ritual Practices and Performance:** The Dynamics of the Field
- Unit 4: Listening to Oral Narratives:** The Mnemonics of Speech
- Unit 5: Case Study of historical documents, ritual practices and oral traditions**
(with a paper on any one)

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit 1: This unit, through a few path-breaking articles, will seek to introduce the students to thinking critically about historical documents, rituals and oral traditions. **(Teaching Time: 4 Weeks Approx.)**

- Cohn, Bernard, (1998). *Anthropologist Among Historians and Other Essays*. Delhi: Oxford University Press.

- Skaria, Ajay. (1998). *Hybrid Histories: Forests, Frontiers and Wilderness in Western India*. Delhi: Oxford University Press.
- Guha, Ranajit, Gayatri Chakravarty Spivak. (1998). *Selected Subaltern Studies*. Delhi: Oxford University Press.

Unit 2: In this unit, a few studies based on the critical use of documents will be read closely so that the students get to experience how historians critically open up the structures and meanings of archival material. **(Teaching Time: 3 Weeks Approx.)**

- Cohn, Bernard, (1998). *Anthropologist Among Historians and Other Essays*. Delhi: Oxford University Press.
- Guha, Ranajit. (1987). *Subaltern Studies No.5: Writings on South Asian History and Society*. Delhi: Oxford University Press.
- Pati, Biswamoy (Ed.). (2011). *Adivasis in Colonial India: Survival, Resistance and Negotiation*. New Delhi: Orient Blackswan.

Unit 3: Here, students will read researches that seek to understand ritual practice and performance and their historical coding, and become familiar with field-work based histories. **(Teaching Time: 2 Weeks Approx.)**

- Dube, Saurabh. (2009). *Historical Anthropology*. Delhi: Oxford University Press.

Unit 4: In this unit, students will be exposed to works that use oral material to write histories; and therefore to the nature and methods of using orality for historical writings. **(Teaching Time: 4 Weeks Approx.)**

- Chakrabarty, Dipesh and Shahid Amin. (1996). *Subaltern Studies No. 9*. Delhi: Oxford University Press.
- Butalia, Urvashi. (2017). *The Other Side of Silence: Voices from the Partition of India*. Delhi: Penguin.
- Banerjee, Prathama, (2006). "Culture/Politics: The Double Bind of Indian Adivasi". *Indian Historical Review*. vol. 33 no.1, pp. 99-126.

Unit 5: By studying a few documents, rituals and oral narratives, students will develop skills to deal with these sources in a meaningful and critical manner. **(Teaching Time: 3 Weeks Approx.)**

To be decided by students in consultation with teachers according to case studies. Possible Readings: Sections from

- H. H. Risley, *The Report on the Census of India, 1901*
- *The Imperial Gazetteer of India*

- Todd's *Annales and Antiquities*;
- W. G. Archer's *Hill of Flutes*, etc.

Teaching Learning Process:

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work towards providing basic exposure to related fields of studies connected to the discipline history and to avenues of interdisciplinary postgraduate studies.

Assessment Methods:

Students will be assessed on the basis of regular group presentations and a detailed (individual) project submission-cum-presentation. The project has to be based on a field visit/field work.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Historical documents, rituals, orality, performances, The Mnemonics of Speech,

SEC-VIII
Radio and Cinema in India: A Social History

Course Objectives:

The course will apprise students with the elementary outlines of the history of radio and cinema in India from its beginnings till the 1980s. It will familiarize them with the varied ways in which the Indian state attempted to regulate and conduct radio broadcasting during and after the colonial period. It will also impart an understanding of the basic trends in the development of cinema as a narrative medium that drew from diverse traditions of story-telling already present in the subcontinent. The material as well as the generic contexts of these developments would also be made comprehensible to the students.

Learning Outcomes:

Upon successful completion of course students shall be able to:

- Delineate the historical context within which the beginnings of cinema and radio might be understood.
- Analyse the state's attempt to control and deploy radio as a medium that carried forward the state agenda.
- Explain how cinema reflected and engaged with the larger ideological and material tensions of society even as it was also subject to technological changes that helped mediate these developments.
- Identify how Indian cinema engaged with social and ideological issues of its time, especially in the three decades after independence.

Course Content:

Unit 1: Broadcasting in India (Colonial period)

- a. Colonial Foundations in Inter-War Years
- b. AIR Programming, Policies and Propaganda
- c. Quit India Movement and Congress Radio

Unit 2: Establishment and Expansion of Akashvani under Keskar

- a. Classical vs. Popular
- b. 'Ban' on Film Music; Radio Ceylon, VividhBharati

Unit 3: Early Years of Indian Cinema

- a. Silent era to Talkies: Social, Historical, Mythological and Action
- b. Women enter Films
- c. Studio Era: AVM and Gemini Studios
- d. Colonial Censorship and Patriotic Creativity

Unit 4: Social Films of Nehruvian Era and its Aftermath

- a. Angry Young Man, Melodrama
- b. Music: song genres

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I: At the end of this unit, the students should be able to describe the complex trajectories of the development of Radio under the colonial government. **(Teaching Time: 4 Weeks Approx.)**

- Gupta, Parthasarathi. (2001). "Radio and the Raj." *Power, Politics and the People: Studies in British Imperialism and Indian Nationalism*. New Delhi: Permanent Black. Pp. 447-80.
- Lelyveld, David. (1995). "Upon the Subdominant: Administering Music on All India Radio." *Social Text* vol. 39, pp. 111-27.
- Pinkerton, Alasdair. (2008). "Radio and the Raj: Broadcasting in British India, 1920-1940." *Journal of the Royal Asiatic Society* no. 18 no.2, pp. 167-91.

Unit II: Having completed this unit, the students will be able to demonstrate their knowledge of how All India Radio's programming policies especially vis-à-vis music shaped up immediately before and after the independence. **(Teaching Time: 4 weeks approx.)**

- Kripalani, Coonoor. (2018). "All India Radio's Glory Days and Its Search for Autonomy." *Economic and Political Weekly* vol. 53 no.37, pp. 42-50.
- Jhingan, Shikha. (2011). "Re-embodying the Classical: The Bombay Film Song in the 1950s." *Bioscope* vol. 2 no.2, pp. 157-79.

Unit III: After finishing this unit, the learners would be able to trace the development of Indian cinema in its early years, especially as it advanced from the silent era to talkies, and as it experimented with different forms and genres. **(Teaching Time: 4 weeks approx.)**

- Rajadhyaksha, Ashish. (2016). *Indian Cinema: A Very Short Introduction*. Delhi: Oxford University Press.
- Barnouw, Erik and Subrahmanyam Krishnaswamy. (1963). *Indian Film*. New York: Columbia University Press. (The book is more accessible in its many Indian reprints by Indian publishers.)
- Lakshmi, C.S. (2008). "A Good Woman, A Very Good Woman: Tamil Cinema's Women." in Selvaraj Velayutham. *Tamil Cinema: The Cultural Politics of India's Other Film Industry*. Oxford: Routledge, pp. 16-29.

- Mohan, Reena and Dibya Choudhuri. (1996). "Of Wayward Girls and Wicket Women: Women in Indian Silent Feature Films, 1913-1934." *Deepfocus* vol. VI, pp. 4-14.

Unit IV: At the end of the unit, the students will be able to demonstrate fair degree of familiarity with how Indian cinema engaged with social and ideological issues of its time, especially in the three decades after independence. **(Teaching Time: 4 weeks approx.)**

- Prasad, Madhava. (1998). "The Aesthetic of Mobilization." *The Ideology of the Hindi Film: A Historical Reconstruction*. Delhi: Oxford University Press, pp. 138-159.
- Punathambekar, Aswin. (2010). "From Indiafm.com to Radio Ceylon: New media and the making of the Hindi film industry." *Media, Culture and Society* vol. 32 no.5, pp. 841-57.
- Doraiswamy, Rashmi. (2008). "The Golden Fifties." *Gurudutt: through Light and Shade*. New Delhi: Wisdom Tree, pp. 7-27.
- Griffiths, Alison. (1996). "Discourses of Nationalism in Guru Dutt's Pyaasa." *Deepfocus*, vol. 6, pp. 24-31.

Suggested Readings:

- Mishra, Vijay. (2002). *Bollywood Cinema: Temples of Desire*. New York: Routledge. (See especially the chapters entitled "Inventing Bombay Cinema" and "Melodramatic Staging".)
- Pandian, M.S.S. (2015). *The Image Trap: MG Ramachandran in Film and Politics*. Delhi: Sage.
- Pillai, Swarnavel Eswaran. (2015). *Madras Studios: Narrative, Genre and Ideology in Tamil Cinema*. Delhi: Sage.
- Raghavendra, M.K. (2016). *Bollywood*. Delhi: Oxford University Press.
- Rajadhyaksha, Ashish and Paul Willemen (Eds.). (1994). *Encyclopaedia of Indian Cinema*. Delhi: Oxford University Press.

Teaching Learning Process:

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work towards providing basic exposure to related fields of studies connected to the discipline history and to avenues of interdisciplinary postgraduate studies.

Assessment Methods:

Students will be assessed on the basis of regular group presentations and a detailed (individual) project submission-cum-presentation. The project has to be based on a field visit/field work but may not exclude readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Radio, Cinema, All India Radio, Akashvani, VividhBharati, Silent Movies, Talkies, Gemini Studio, Social Films.

COURSE IN LIEU OF MIL (SEMESTER I/II)

Also offered to students of B.Com. programme

In lieu of MIL (Semester I/II)
Also offered to students of B.Com. programme

Communicating Culture: Tellings, Representations and Leisure

Course Objectives:

The aim of the course is to explore culture through its intangible attributes that include traditions inherited from our ancestors – such as oral myths and folktales, performative practices including theatre, music, dance, rituals and festive events, knowledge and practices concerning nature, food, crafts and cultural pursuits like sports. Even though such aspects of culture are a part of our intangible heritage, they are nevertheless crucial in determining ideas that inform material aspects of our life, such as objects, monuments, artefacts and places. Both the intangible and tangible aspects collectively define culture in any given society. The aim of this course is to introduce students into an investigation of the subcontinent's cultural traditions through its intangible components discussed over four themes that address diverse narrative traditions; multiple performances; processional displays; and sporting activities.

Learning Outcome:

After the successful completion of the course, the student will be able to:

- Identify significant features of India's intangible cultural heritage.
- Distinguish between various technical forms like myth, folklore, theatrical and ritual performance, as well as know about evolving patterns of sporting traditions.
- Identify how culture is communicated through narrative strategies and performative acts.
- Appreciate that textuality and performance are not binary opposites and are mutually interactive.
- Develop analytical skills that are necessary for students of literature, sociology, anthropology, religion, psychology, political science and South Asian studies.

Course Content:

Unit I: Tellings: Myths, tales and folklore

Unit II: Performance as communication: Theatre, puppetry and music

Unit III: Processions as display: *Yatra, barat&julus*

Unit IV: Sporting: Mind, body & nation

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit I: This theme explores the meaning, form and function of storytelling in Indian context. It starts with the earliest forms of Oral traditions concerning myths, legends, folktales, proverbs, riddles, jokes and songs. Besides oral traditions, folklore, includes material culture, such as handmade toys, and customary lore, such as rituals etc. Such acts of telling are communication strategies for re-invention and dissemination of culture. **(Teaching Time: 4 weeks approx.)**

- Mital, Kanak. (1995). "A Santhal Myth, Five Elements" in Baidyanath Saraswati, (ed.). *Prakrti, The Integral Vision*, Vol. 1 (Primal Elements – The Oral Tradition), pp. 119-125
- Chandran, M.D. Subhash. (1995). "Peasant Perception of Bhutas, Uttara Kannada." in Baidyanath Saraswati, (ed.). *Prakrti, The Integral Vision*, Vol. 1 (Primal Elements – The Oral Tradition), pp. 151-166
- Ramanujan, A. K. (1997). "'A Flowering Tree': A Woman's Tale." *Oral Tradition* vol. 12 no.1, pp. 226-243.
- Blackburn, Stuart H. (1978). "The Folk Hero and Class Interests in Tamil Heroic Ballads." *Asian Folklore Studies* vol. 37 no.1, pp. 131-149
- Hauser, Beatrix. (2002). "From Oral Tradition to 'Folk Art': Reevaluating Bengali Scroll Paintings." *Asian Folklore Studies* vol. 61 no.1, pp. 105-122.

Unit II. Performance as communication: Divine-play, bardic storytelling & puppetry: A traditional point of view suggests that in the West culture was preserved in texts and artefacts, while in the East culture was communicated as performance. The following essays suggest that it is counterproductive to define textuality and performativity as binary opposites even for heuristic purposes. **(Teaching Time: 4 weeks approx.)**

- Rani, Varsha. (2014). "The unforgettable magic of the Ramnagar Ramlila." *Indian Horizons* vol. 61 no.2, pp. 12-27.
* *The Ramnagar Ramlila* <https://www.youtube.com/watch?v=AiAgXRHZRDw>
- Jain, Jyotindra. (1998). "The Painted Scrolls of the Garoda Picture Showmen of Gujarat." *Marg* vol. 49 no.3, pp. 10-25.
- Sorensen, Niels Roed. (1975). "Tolu Bommalu Kattu: Shadow Theatre Re: Andhra Pradesh." *Journal of South Asian Literature* vol. 10 no.2/4, THEATRE IN INDIA, pp. 1-19
* For illustrations <https://www.sahapedia.org/tag/shadow-puppetry>

Unit III. Processions as display: Yatra, barat & julus: There are many types of processions in India that are organized on various occasions like military parades, political processions, protest marches, religious processions and others such as weddings, festivals and pilgrimages.

Processions are about display, public space and domination and communicate cultural identities.
(Teaching Time: 4 weeks approx.)

- Kulke, Hermann. (1979). "Rathas and Rajas: The car festival at Puri", "Art and Archaeological Research Papers" (AARP, London) XVI, Dec. 1979, on "Mobile Architecture in Asia: Ceremonial Chariots. Floats and Carriages", pp. 19-26
* A clipping <https://timesofindia.indiatimes.com/videos/news/explained-the-significance-of-puris-jagannath-yatra/videoshow/65095341.cms>
- Booth, Gregory D. (2008). "Space, sound, auspiciousness, and performance in North Indian wedding processions" in Knut A. Jacobson, (ed.). *South Asian Religions on Display: Religious Processions in South Asia and in the Diaspora*. London & New York: Routledge, pp. 63-76.
- Balasubrahmanyam, Suchitra. (2016). "Imagining the Indian Nation: The Design of Gandhi's Dandi March and Nehru's Republic Day Parade", in Kjetil Fallan, Grace Lees-Maffei, (eds.). *Designing Worlds: National Design Histories in an Age of Globalization*. New York: Berghahn Books, pp. 108-124.

Unit IV: Sporting: Mind, body & nation: Sports are specific to leisure activities in cultural traditions. But games and sports often travel from their point of origin to influence other cultural traditions. Some like cricket have been appropriated at the national level in India. The following essays explain the historical process of such transfers. (Teaching Time: 4 weeks approx.)

- Hillyer Levitt, Stephan. (1991-92). "Chess—Its South Asian Origin and Meaning." *Annals of the Bhandarkar Oriental Research Institute* vol. 72/73 no1/4, *Amrtamahotsava* (1917-1992), pp. 533-547.
- Zarrilli, Phillip B. (1989). "Three Bodies of Practice in a Traditional South Indian Martial Art." *Social Science & Medicine* vol. 28 no.12, pp. 1289-1309.
- Guha, Ramachandra. (1998). "Cricket and Politics in Colonial India." *Past & Present*. Vol. 161 no.1, pp. 155-190 (is available in Hindi).

Suggested Readings:

- Awasthi, Induja. (2019). "Ramlila: Tradition and Styles", pp. 23-36 accessed on 19 May 2019 from the *Sahapedia An open online resource on the arts, cultures and heritage of India* <https://www.sahapedia.org/tag/dashavatara>
- Bradford Clark, (2005). "Putul Yatra: A Celebration of Indian Puppetry", *Asian Theatre Journal*. vol. 22, No. 2, pp. 334-347.

- Foley, Kathy and Dadi Pudumjee. (2013). "India" in *World Encyclopaedia of Puppetry Arts* called "WEPA" or "EMAM" for *Encyclopédie Mondiale des Arts de la Marionnette*, a project of International Unima.
<https://scholarworks.iu.edu/journals/index.php/resound/article/view/26293/31918>
Available in English <https://wepa.unima.org/en/india/>
Available in Hindi at <https://wepa.unima.org/en/india/>
- Korom, Frank J. (2017). "Introduction: locating the study of folklore in modern South Asian studies." *South Asian History and Culture* vol. 8 no.4, pp. 404-413.
- Kothari, Komal. (1981). "Myths, Tales and Folklore: Exploring the Substratum of Cinema." *India International Centre Quarterly* vol. 8 no.1, Indian Popular Cinema: Myth, Meaning and Metaphor, pp. 31-42.
- Masselos, Jim. (1985). "Audiences, Actors and Congress Dramas: Crowd Events in Bombay City in 1930." *South Asia: Journal of South Asian Studies* vol. 8 no.1-2, pp. 71-86.
- Wadley, Susan S. (1988). "Singing for the Audience: Aesthetic Demands and the Creation of Oral Epics", *RESOUND, A Quarterly of the Archives of Traditional Music* vol. VII no. 2

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments and phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Myths, Oral Epics, Ramlila, Performance, Puppetry, Garoda scrolls, Processions, Sports, Chess, Kalarippayattu, Cricket

In lieu of MIL (Semester III/IV)
Also offered to Students of B.Com. Programme

Histories of Inequalities

Course Objective:

The object of the course is to introduce students to the ways historians and sociologists study questions of inequality and difference. Since these concepts have been very critically examined by sociologists and historians, the course carries a blend of readings that reflects both disciplines.

Learning Outcome: Upon successful completion of course, students will be able to:

- Outline how hierarchies and inequalities are a part of their histories and everyday experiences.
- Explain the contexts that produce these inequalities.
- Identify the importance of social justice.
- They learn the difficulty in studying the impoverished and the disadvantaged.
- Delineate the problems associated with the hegemonic historical narratives which are circulated by the elites.

Course Content:

Unit I: Caste: *Varna* and *Jati*

Unit II: Gender and the household

Unit III: Untouchability

Unit IV: Tribes and forest dwellers

Unit V: Equality and the Indian constitution

ESSENTIAL READINGS AND UNIT-WISE TEACHING OUTCOMES:

Unit-1: This unit examines meaning and definition of inequality along with types of inequality. It is explored by examining Caste, Varna, Race, Gender, Occupation, and Religion. **(Teaching Time: 3 Weeks approx.)**

- Jaiswal, Suvira. (1998). *Caste: Origins, functions and dimensions of change*. Delhi: Manohar, pp. 1-25.
- Metcalf, Thomas. (2005). *Ideology of the Raj, The New Cambridge History of India*, Vol.- III. Part 4. Cambridge: Cambridge University Press, pp. 66-112 & 113-159.

- Singh, Upinder. (2014). “Varna and Jati in Ancient India.” in, Kesavan Veluthat and D R Davis, (ed.). *Irreverent History: Essays for M G S Narayanan*. Delhi: Primus, pp. 205- 14.

Unit-2: This unit will exemplify how gender identities constitute one of the most prevalent forms of inequalities. These are most fervently enforced and reinforced in the household. **(Teaching Time: 3 Weeks approx.)**

- Chakravarti, Uma. (2006). “Conceptualising Brahmanical Patriarchy in Early India: Gender, Caste, Class and State.” in *Everyday Lives, Everyday Histories: Beyond the Kings and Brahmanas of Ancient India*. Delhi: Tulika, pp. 138-55.
- Gupta, Charu. (2001). “Mapping the Domestic Domain.” in *Sexuality, Obscenity, Community: Women, Muslims and the Hindu Public in Colonial India*. Delhi: Permanent Black, pp.123-95.

Unit-3: This unit examines extreme form of social exclusion known as Untouchability. It also examines differentiation in terms of regional variations, cultural practices and communities’ rituals. **(Teaching Time: 3 Weeks approx.)**

- Jha, Vivekanand. (1973). “Stages in the History of Untouchables”. *Indian Historical Review* vol. 2 no.1, pp 14-31.
- Rodrigues, V. (ed.). (2005). *The Essential Writings of B.R. Ambedkar*. New Delhi: Oxford University Press, pp. 1-44.

Unit-4: Through the case study of forest dwellers and tribes this unit examines the ways in which dominant social structures continue to use social distancing and exclusion to reinforce their hegemony.

(Teaching Time: 3 Weeks approx.)

- Singh, Chetan. (1988). “Conformity and Conflict: Tribes and the ‘agrarian system’ of Mughal India.” *Indian Economic and Social History Review* vol. 23 no.2, pp. 319-340.
- Singh, K.S. (1978). “Colonial transformation of Tribal Society in Middle India.” *Economic and Political Weekly* vol. 13 no.30, pp. 1221-32.

Unit-5: Indian Constitution envisaged a society based on social and political equality and enacted several acts to achieve this objective. This unit evaluates the functioning of constitutional provision and their stated objectives. **(Teaching Time: 4 Weeks approx.)**

- Austin, Granville. (2011). *Working a Democratic Constitution: The Indian Experience*. New York: Oxford University Press. (Introduction).

- Galanter, Marc. (1997). "Pursuing Equality: An Assessment of India's Policy of Compensatory Discrimination for Disadvantaged Groups." in Sudipta Kaviraj, (ed.). *Politics in India*. New Delhi: Oxford University Press, pp. 187-99.

Suggested Readings:

- Banerjee-Dube, Ishita. (ed.). (2008). "Introduction - Questions of Caste." in *Caste in History*. New Delhi: OUP, pp xv- lxii.
- Chaube, Shibani Kinkar. (2009). *The Making and Working of the Indian Constitution*. Delhi: National Book Trust, pp 1-67.
- Ghure, G S. (2008). "Caste and British Rule." in Ishita Banerjee-Dube, (ed.). *Caste in History*. New Delhi: Oxford University Press, pp. 39-45.
- Kumar, Vivek. (2014). "Dalit Studies: Continuities and Change." in Yogender Singh, (ed.). *Indian Sociology: Identity, Communication and Culture*. New Delhi: Oxford University Press. Pp.19-52
- Risley, H.H. (2008). "Caste and Nationality", in Ishita Banerjee-Dube, (ed.) *Caste in History*. New Delhi: Oxford University Press, pp. 70-75.
- Sethi, Raj Mohini. (2014). "Sociology of Gender: Some Reflections." in Y Singh, (ed.). *Indian Sociology: Identity, Communication and Culture*. New Delhi: OUP, pp. 106-157.
- Singh, Yogender. (1977). "Sociology of Social Stratification." *Social Stratification and Change in India*. Delhi: Manohar, pp.1-90.
- Xaxa V. (2014). "Sociology of Tribes." in Y Singh. (ed.). *Indian Sociology: Identity, Communication and Culture*. New Delhi: Oxford University Press. Pp. 53-105

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments and phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of

the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Caste, Gender, Untouchability, Tribes Equality, inequality, silencing.

HISTORY DEPARTMENT FACULTY MEMBERS ASSOCIATED WITH COURSE REVISIONS

The list below includes the names of faculty members of the Department of History who were involved in different ways in the LOCF Course Revision exercise of the History CBCS Undergraduate Honours and Programme curricula. Other than those listed below, College Teachers also met in two General Body meetings on 15th March and 10th June 2019 during which there were wide ranging discussions regarding these courses. Unfortunately we could not record the names of all those who participated in this list but would like to record our gratitude for their help and support. Finally, this work was eased considerably because of the help and cooperation of the Department Administrative Staff listed below. We would like to formally record our appreciation.

Department Administrative Staff:

Durga Rai

Ankita

Madhu Chanda Yadav

Shivprasad

Sarita Gupta

Alphabetised list of Faculty Members:

Aditya Pratap Deo (St. Stephen's College)

Alka Saikia (Gargi College)

Amar Farooqui (Department of History, University of Delhi)

Amita Paliwal (Jesus and Mary College)

Amrit Kaur Basra (Delhi College of Arts of Commerce)

Amrita Singh (Shyama Prasad Mukherjee College for Women)

Amrita Tulika (St. Stephen's College)

Anubhuti Maurya (Bharati College)

Aparna Balachandran (Department of History, University of Delhi)

Archana Ojha (Kamala Nehru College)

Archana Verma (Hindu College)

Asha Shukla Choubey (Indraprastha College for Women)
Ataullah (Zakir Husain Delhi College)
Bhairabi P. Sahu (Department of History, University of Delhi)
Bharati Jagannathan (Miranda House)
Chander Pal (Pannalal Girdharlal Dayanand Anglo-Vedic College)
Charu Gupta (Department of History, University of Delhi)
Debatri Bhattacharjee (Lady Shri Ram College for Women)
Deeksha Bhardwaj (Gargi College)
Gayatri Bhagwat Sahu (Rajdhani College)
Gopika Bhandari (Vivekananda College)
Ismail V. (Lady Shri Ram College for Women)
Justin Mathew (Hansraj College)
Kalpana Malik (Motilal Nehru College)
Khurshid Khan (Shivaji College)
Levin (Bharati College)
Madhuri Sharma (Bharati College)
Mahesh Gopalan (St. Stephen's College)
Manisha Agnihotri (Janki Devi Memorial College)
Manoj Sharma (Kirori Mal College)
Maya John (Jesus and Mary College)
Mayank Kumar (Satyawati College Evening)
Meena Bhargava (Indraprastha College for Women)
Meenakshi Khanna (Indraprastha College for Women)
Meera Khare (Pannalal Girdharlal Dayanand Anglo-Vedic College)
Mihir Kumar Jha (Atma Ram Sanatan Dharma College)
Mita Hussain (Shaheed Bhagat Singh College)
Monika Saxena (Ramjas College)
Mukul Manglik (Ramjas College)
Nagendra Sharma (Pannalal Girdharlal Dayanand Anglo-Vedic College Evening)
Naina Dayal (St. Stephen's College)
Namrata Singh (Rajdhani College)

Narottam Vinit (Dyal Singh College)
Nayana Dasgupta (Lady Shri Ram College for Women)
Neeraj Sahay (Shri Venkateswara College)
Neerja Singh (Satyawati College Evening)
Neeru Ailawadi (Delhi College of Arts and Commerce)
Nirmal Kumar (Shri Venkateswara College)
Nishtha Srivastava (Shivaji College)
O. P. Singh (Delhi College of Arts and Commerce)
Padma Negi (Motilal Nehru College)
Pallavi Prasad (Satyawati College)
Pankaj Jha (Lady Shri Ram College for Women)
Parul Lau Gaur (Ram Lal Anand College)
Prabha Rani (Lady Shri Ram College for Women)
Prabhu Mohapatra (Department of History, University of Delhi)
Pragati Mohapatra (Indraprastha College for Women)
Prem Kumar (Motilal Nehru College Evening)
Puneet Yadav (Kirori Mal College)
Rachna Singh (Hindu College)
Radha Madhav Bharadwaj (Deen Dayal Upadhyaya College)
Radhika Chadha (Miranda House)
Rahul Govind (Department of History, University of Delhi)
Rajesh Kumar (Motilal Nehru College Evening)
Rajiv Verma (Satyawati College Evening)
Rakesh Kumar (Ram Lal Anand College)
Ranjan Anand (Zakir Husain Delhi College Evening)
Ranjan Mehra (Swami Shraddhanand College)
Rashmi Pant (Indraprastha College for Women)
Rashmi Seth (Rajdhani College)
Richa Raj (Jesus and Mary College)
Rim Jhim Sharma (Pannalal Girdharlal Dayanand Anglo-Vedic College)
Saba Khan (Zakir Husain Delhi College)

Sandhya Sharma (Vivekananda College)
Sangeeta Luthra Sharma (St. Stephen's College)
Sanghamitra Misra (Department of History, University of Delhi)
Sanjay Kumar (Pannalal Girdharlal Dayanand Anglo-Vedic College Evening)
Saumya Gupta (Janki Devi Memorial College)
Saumya Varghese (Jesus and Mary College)
Shabnam Suri (Mata Sundri College for Women)
Shahana Bhattacharya (Kirori Mal College)
Shalini Shah (Department of History, University of Delhi)
Sharmila Shrivastava (Hansraj College)
Shobhana Warriar (Kamala Nehru College)
Shobhika Mukul (Sri Guru Nanak Dev Khalsa College)
Shubhra Sinha (Kamala Nehru College)
Smita Sahgal (Lady Shri Ram College for Women)
Sneh Jha (Miranda House)
Snigdha Singh (Miranda House)
Srimanjari (Miranda House)
Sunil Kumar (Department of History, University of Delhi)
Surajbhan Bhardwaj (Motilal Nehru College)
Sutapa Das (Bharati College)
Suvritta Khatri (Deshbandhu College)
Syed Mubin Zehra (Atma Ram Sanatan Dharma College)
Tasneem Suhrawardy (St. Stephen's College)
Vandana Chaudhary (Kirori Mal College)
Vasudha Pande (Lady Shri Ram College for Women)
Vijjika Pandey Singh (Atma Ram Sanatan Dharma College)
Vikas Gupta (Department of History, University of Delhi)
Vikram Chaudhary (Kirori Mal College)
Vinita Malik (Kamala Nehru College)
Vipul Singh (Department of History, University of Delhi)
Vishwamohan Jha (Atma Ram Sanatan Dharma College)

Vivek Mohan (Delhi College of Arts and Commerce)

Yuthika Mishra (Vivekananda College)

दिल्ली विश्वविद्यालय UNIVERSITY OF DELHI

Bachelor of Arts (Prog) Philosophy

(Effective from Academic Year 2019-20)



Revised Syllabus as approved by

Academic Council

Date:

No:

Executive Council

Date:

No:

**Applicable for students registered with Regular Colleges, Non Collegiate
Women's Education Board and School of Open Learning**

List of Contents

Page No.

Preamble	3
1. Introduction to Programme	4
2. Learning Outcome-based Curriculum Framework in Programme B.A. (Prog) Philosophy	
2.1. Nature and Extent of the Programme in B.A. (Prog) Philosophy	4
2.2. Aims of Bachelor Degree Programme in B.A. (Prog) Philosophy	5
3. Graduate Attributes in B.A. (Prog) Philosophy	6
4. Qualification Descriptors for Graduates B.A. (Prog) Philosophy	6
5. Programme Learning Outcomes for in B.A. (Prog) Philosophy	7
6. Structure of B.A. (Prog) Philosophy	
6.1. Credit Distribution for B.A. (Prog) Philosophy	7-8
6.2. Semester-wise Distribution of Courses.	9-10
7. Courses for Programme B.A. (Prog) Philosophy	11- 101
7.1. Course Learning Objective	
7.2. Course Learning Outcomes	
7.3. Course Teaching-Learning Process	
7.4. Assessment Methods	
8. Keywords	

Preamble

The objective of any programme at Higher Education Institute is to prepare their students for the society at large. The University of Delhi envisions all its programmes in the best interest of their students and in this endeavour it offers a new vision to all its Under-Graduate courses. It imbibes a Learning Outcome-based Curriculum Framework (LOCF) for all its Under Graduate programmes.

The LOCF approach is envisioned to provide a focused, outcome-based syllabus at the undergraduate level with an agenda to structure the teaching-learning experiences in a more student-centric manner. The LOCF approach has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice. The Under-Graduate Programmes will prepare the students for both, academia and employability.

Each programme vividly elaborates its nature and promises the outcomes that are to be accomplished by studying the courses. The programmes also state the attributes that it offers to inculcate at the graduation level. The graduate attributes encompass values related to well-being, emotional stability, critical thinking, social justice and also skills for employability. In short, each programme prepares students for sustainability and life-long learning.

The new curriculum of B.A. (Prog) Philosophy offers an updated syllabus which will bring students to the forefront of philosophical debates in various areas of philosophy, viz., metaphysics, epistemology, ethics, logic, aesthetics. The syllabus is a combination of traditional aspects of philosophy along with modern trends.

The University of Delhi hopes the LOCF approach of the programme B.A. (Prog) Philosophy will help students in making an informed decision regarding the goals that they wish to pursue in further education and life, at large.

1. Introduction to Programme

BA (Prog) is by nature an interdisciplinary exercise. In the philosophy programme we have a package that does not just deal with Indian and western philosophy – the staple diet – but we also look into Art and Film Appreciation, Critical Thinking, Vedic Values, Jainism and Buddhism, Yoga philosophy and much else. The idea is to interest the student with a wide but controlled presentation of the subject and inculcate in the student a certain curiosity regarding the nature of philosophy and its close cognates. Practically every other subject is related to philosophy in one way or another and it is the idea of the BA (Prog) in Philosophy to make this apparent to the student.

2. Learning Outcomes based approach to Curriculum Planning

The learning outcomes-based curriculum framework for B.A (Prog.) Philosophy is based on the graduate attributes that a graduate in philosophy is expected to attain along coupled with the expected learning outcomes of each course and the combined course. The curriculum for B.A (Prog) Philosophy is prepared keeping in mind the needs, expectations and aspirations of students in philosophy as well as the modernizing trends and methodological perspectives of philosophy as a subject. The course learning outcomes and the programme learning outcomes specify the knowledge, understanding, skills, attitudes, values that a student completing this degree is expected to inculcate and know.

2.1 Nature and extent of the B. A (Prog.) Philosophy

Philosophy is taken to be an abstract study about the fundamental structure of the world. It works towards foundations of each and every subject that is investigating the nature of the world but it does not only deal with foundations of science but with foundations of humanities as well, including that of social structures. The scope of philosophy is therefore vast. Philosophy inculcates the habits of logical reasoning, avoiding fallacious reasoning, thinking more carefully about the place of each and every aspect of nature vis à vis the whole of nature. A philosophy student emerges as a critical thinker who accepts nothing at face value. The philosophy student will contribute to society through corrective reflection about its various facets.

In pursuing these aims, B.A (Prog.) Philosophy Programme aims at developing the ability to think critically, logically and analytically and hence use philosophical reasoning in practical situations. Pursuing a degree in philosophy will make students pursue interesting careers in media, education, law, politics, government etc.

The B A (Prog.) Philosophy programme covers a wide range of philosophy, from classical Indian Philosophy and Greek Philosophy to Modern Logic. In addition to that there are various courses like Art and Film Appreciation and Technology and Ethics, Philosophical aspects of Ambedkar's thought that will make the students aware of contemporary issues. Current issues in ethics and feminist theory are also dealt with. There are many choices students have regarding which options they can take which makes the Programme syllabus a rich and diverse experience for students.

2.2 Aims of Bachelor's degree programme in Philosophy

The overall aims of B A.(Prog) Philosophy Programme are to:

- A) Enable students to think logically and critically and analytically and inculcate strong curiosity about philosophy and its cognates
- B) Develop understanding of definitions, key concepts, and principles of various theories of philosophers and develop comparing and contrasting techniques regarding the various theories
- C) Enable learners/students to apply the knowledge and skills acquired by them to solve specific theoretical and applied problems in philosophy, especially ethical and bio ethical fields
- D) Develop in students the ability to apply critical thinking tools developed in philosophical theorising to handle issues and problems in ethics, social sciences and problems that arise out of the technological effects of natural sciences

3. Graduate Attributes in Philosophy

Some of the graduate attributes in philosophy are listed below:

A) Disciplinary knowledge: Students must have good knowledge of the history of the subject, the relevant historical line of development in Indian and western philosophy and should show good command of logic, ethics and know the applied aspects of philosophy in fields like technology, applied ethics, well.

B) Communications skills: Ability to communicate various concepts of philosophy in writing and orally and ability to present complex philosophical ideas with clarity and present philosophical concepts logically

C) Critical thinking and analytical reasoning: Ability to identify relevant assumptions, hypothesis, implications or conclusions; formulate logically correct arguments and to know the pros and cons of the various arguments given by philosophers

D) Self-directed learning: Ability to work independently, ability to search relevant resources and e-content for self-learning and enhancing knowledge in philosophy

E) Moral and ethical awareness/reasoning: To understand how serious the effects of plagiarism are and to inculcate a lifelong habit of never indulging in plagiarism.

F) Lifelong learning: Ability to acquire a habit of reading and thinking about philosophy for life and to appreciate modern developments in the subject with the critical spirit that they will inculcate in the program.

4. Qualification descriptors for B.A (Prog.) Philosophy

Students who choose B.A (Prog) Philosophy Programme, develop the ability to think critically, logically and analytically and hence use philosophical reasoning in their daily lives.

BA (Prog) Philosophy consists of Core Courses, Skill Enhancement Courses, Electives and also Discipline Specific Courses. A student qualifying in the subject will have broad knowledge of Indian philosophy and western philosophy; the student will know specific details of the theories of analytic and continental philosophy; the student will develop highly specific skills

in logic, ethics, metaphysics, epistemology and will be well informed about current trends in feminism and social issues related to applied ethics, apart from advancing in critical thinking.

Descriptors for B.A (Prog.) Philosophy may include the following:

- i. demonstrate analytic and coherent knowledge of the academic field of philosophy with comprehensive understanding of ontology, metaphysics and epistemology and to think in an interdisciplinary manner
- iii. demonstrate skills to identify presuppositions and entailments of theories
- iv. Apply the acquired knowledge in philosophy and transferable skills to new/unfamiliar contexts and real-life problems.
- v. Demonstrate philosophical ability in the evaluation of arguments in real life situations.

5. Programme Learning Outcomes in B A (Prog.) Philosophy

The completion of the B A. (Prog.) Philosophy Programme will enable a student to:

- i) Understand the broad ideas that are enshrined in the basic thinking of various centres of philosophy
- ii) Critically analyse the hypothesis, theories, techniques and definitions offered by philosophers
- iii) Utilize philosophy to understand social realities and problems and to come up with ideal solutions to them
- iv) Identify how deeply philosophy is connected to other disciplines like economics and natural sciences and literature

6.0 Structure of B.A. (Prog) Philosophy

6.1 Credit Distribution for B.A. (Prog) Philosophy

Courses	Theory+Practical	Theory+Tutorial
Core Courses (12 papers) Two papers English Two papers MIL Four papers Discipline 1	12X4= 48	12X5= 60

Four papers Discipline 2		
Core Course	12X2=24	12X1= 12
Practical/Tutorial * (12 Practical/Tutorials*)		
Elective Course (6 Papers) Two Papers: Discipline 1 specific Two Papers: Discipline 2 specific Two Papers: Interdisciplinary (Two papers from each discipline of choice and two papers of interdisciplinary nature.) Elective Course Practical/Tutorial* (6 Practical/Tutorials*) Two papers- Discipline 1 specific Two papers- Discipline 2 specific Two papers- Generic (Inter disciplinary) (Two papers from each discipline of choice including papers of interdisciplinary nature.) • Optional Dissertation or project work in place of one elective paper (6 credits) in 6th Semester	6X4 = 24 6X2= 12	6X5=30 6X1= 6
Ability Enhancement Courses 1. Ability Enhancement Compulsory (2 Papers of 2 credits each) 2. Ability Enhancement Elective (Skill Based) (4 Papers of 2 credits each)	2X2= 4 4X2= 8	2X2= 4 4X2= 8
Total Credits	120	120

Institute should evolve a system/policy about ECA/ General Interest/ Hobby/ Sports/ NCC/ NSS related courses on its own.

*** wherever there is a practical there will be no tutorial and vice-versa**

6.2 Semester-wise Distribution of Courses.

CHOICE BASED CREDIT SYSTEM IN B.A. (PROG.) PHILOSOPHY

Sem.	Core Course	Ability enhancement Compulsory Course (AECC)	Skill Enhancement Course (SEC)	Discipline Specific Elective (DSE)	General Elective (GE)
I	Logic (DSC) (I) Introduction to Logic (MIL I)				
II	Ethics (DSC) (II) Ethical Studies (MIL II)				
III	Indian Philosophy (DSC) (III) Introduction to Indian Philosophy (MIL III)		Ethical Decision Making (SEC I)		
IV	Modern Western Philosophy (DSC) (IV) Introduction to Western Philosophy (MIL IV)		Yoga Philosophy (SEC II)		
V			Art & Film Appreciation (SEC III)	Vedic Value System (DSE 1)	Fundamentals of Indian Philosophy (GE 1)
				Buddhism (DSE 2)	

				Greek Philosophy (DSE 3)	Technology and Ethics (GE 2A)
				Social and Political Philosophy (DSE 4)	Or
				Applied Ethics (DSE 5)	Ethics (GE 2B)
VI			Critical Thinking & Decision Making (SEC IV)	Jainism (DSE 6)	Philosophical Thoughts of Ambedkar (GE 3)
				Philosophy of Religion (DSE 7)	Inductive Logic (GE 4A)
				Feminism (DSE 8)	Or
				Aesthetics (DSE 9)	Logic (GE 4B)
				Analytic Philosophy (DSE 10)	

7.0 Courses for Programme B.A. (Prog) Philosophy

Semester I

Logic (DSC) (I)

(CC (I))
Core Course

Course Objective

This course primarily helps in developing ones skill in correct reasoning or argumentation. It trains the student to construct good and sound arguments rejecting the vague and unsound ones at any point of time and situation.

Course Learning Outcomes

This course

1. Helps in sharpening the reasoning and argumentation skill of a learner and simultaneously helps in identifying the flaws.
2. Enhances the analytical skills, so that one can resolve the difficult issues and finally arrives at a reasonable solution.
3. Helps in good scoring for a better rank in form of result

Unit 1 Basic Logical Concepts

1. Proposition and Sentence
2. Deductive and Inductive argument
3. Truth, Validity and Soundness

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016. Ch 1-2. .

Unit 2 Traditional Logic (A)

1. Terms and Distribution of terms
2. Categorical Propositions
3. Traditional Square of Opposition and Existential Import
4. Translating Ordinary Language Sentences into Standard form

Traditional Logic (B)

1. Immediate Inferences- Conversion, Obversion and Contraposition
2. Categorical Syllogism: Figure and Mood
3. Syllogistic Rules and Fallacies
4. Venn Diagram

Recommended Readings:

1. 1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016. Ch 5-7.

Unit 3

Unit 4: Symbolization

1. Types of Truth functions: Negation, Conjunction, Disjunction(Alternation), Conditional (Implication) and Bi-Conditional (Equivalence)
2. Statements, Statement forms and Logical status
3. Decision procedures: Truth table Method and Reductio ad Absurdum

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016.. Ch 8.

Unit 4

Unit 5: Informal Fallacies

1. Fallacies of relevance
2. Fallacies of defective induction
3. Fallacies of presumption
4. Fallacies of ambiguity

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016. Ch 4.
-

References

1. Copi, Irving M. *Introduction to logic*. 6th Ed. New York London: Macmillan Collier Macmillan, 1982. Ch5-7.

Additional Resources:

1. Jain, Krishna. *A Textbook of Logic*. New Delhi: D.K. Printworld, 2018.
-
-

Teaching Learning Process

Lectures and tutorial as per University norm is essential.

Assessment Methods

75% for University exam and 25% for internal assessment as per University guidelines is required.

Keywords

Deduction and Induction, Truth, Validity & Soundness, Syllogism, Venn-Diagram, Informal Fallacies

Introduction to Logic (MIL I)
(MIL-I)
Core Course

Course Objective

As a foundational discipline, logic exercises skills and habits that are pertinent to virtually every other human endeavour -- academic or otherwise. The cognitive skills developed through a training in basic logic can help one to become a clearer, more persuasive thinker or communicator. The principles of logic helps one to construct cogent arguments in both speech and writing. Informal fallacies enables one to understand the flaws in the arguments which we use in our day to day life.

Course Learning Outcomes

Learning outcomes of this course are as follows: 1. To learn identifying different types of arguments as well as their premises and conclusions. 2. To be able to evaluate arguments and identify mistakes in reasoning. 3. To learn how to prove the validity and invalidity of arguments using method of Rules and Fallacies and also by Truth Table method. 4. To develop the overall reasoning skills of the students which are useful in various competitive exams.

Unit 1 BASIC CONCEPTS

1.1 Propositions and Arguments,

1.2 Deduction and Induction

1.3 Validity, Truth and Soundness

Essential Reading

Chapter 1 of Irving Copi, *Introduction to Logic*, (Delhi: Pearson, 2014,2017), 14th ed, 2-33.

Unit 2 CATEGORICAL PROPOSITIONS

2.1 The components of Categorical Propositions

2.2 Quality, Quantity and Distribution

2.3 The Traditional Square of Opposition

2.4 Conversion, Obversion and Contraposition

2.5 Translating Ordinary Language Statements into Standard form of Categorical Propositions.

Essential Reading

Chapter 5 and chapter 7 (7.3) of Irving Copi, *Introduction to Logic*, (Delhi: Pearson, 2014,2017), 14th ed, 164-188 and 249-257.

Unit 3 CATEGORICAL SYLLOGISMS

3.1 Standard form, Mood and Figure

3.2 Rules and Fallacies

Recommended Reading

Chapter 6 of Irving Copi, *Introduction to Logic*, (Delhi: Pearson, 2014,2017), 14th ed, 205-238.

Unit 4 PROPOSITIONAL LOGIC

4.1 Symbols and Translation

4.2 Truth Functions (Logical Connectives)

4.3 Truth Tables for Statements & Statement-Forms

4.4 Truth Tables for Arguments & Argument-Forms

4.5 Indirect Truth Tables (*Reductio Ad Absurdum*)

Recommended Reading

Chapter 8 of Irving Copi, *Introduction to Logic*, (Delhi: Pearson, 2014,2017), 14th ed, 287-333.

References

Copi, Irving. *Introduction to Logic*, Delhi: Pearson, 2012. (Hindi translation of this text is also available)

Additional Resources:

1. Hurley, Patrick, *Introduction to Logic*, Wadsworth: Delhi, 2007.
2. Sen, Madhucchanda, *LOGIC*, Delhi: Pearson, 2008.
3. Chakraborti, Chhanda, *Logic: Informal, Symbolic and Inductive*, Delhi: Prentice-Hall of India Private Limited, 2006.

Teaching Learning Process

Lectures, PPT, and Tutorials

Assessment Methods

Assignments, Presentation and Examination

Keywords

Logic, argument, premise, conclusion, truth, validity, invalidity, statement form, argument form, truth-table.

Semester II

Ethics (DSC 2)
(CC (II))
Core Course

Course Objective

The course is designed to grasp the traditional ethical (Western and Indian) theories as well as to help students apply it on the practical front. It is a curriculum which enables students to develop ability for moral reasoning and act with ethical deliberations.

Course Learning Outcomes

This curriculum should enable students to develop ability for moral reasoning and act with ethical deliberations. After studying ethics one is equipped with the ethical sensitivity and moral understanding required to solve complex ethical dilemmas.

Unit 1 Introduction to Ethics

1. Introduction to Moral Philosophy
2. The development of Morality (from Convention to Reflection)
3. Importance of freewill.

Recommended Readings:

1. Satyanarayana, Y.V. (2010), Ethics: Theory and Practice, Pearson, Chapter-1, "Morality and Moral Reasonings", pp, 1-12.
 2. Mackenzie, J.S., (1977), A Manual of Ethics, Oxford University Press Bombay, Chapter-1, "Scope of Ethics", pp, 1-14.
 3. Lillie, W., (1948), An Introduction to Ethics, Methuen & Co. Ltd. London, Chapter-3, "The Development of Morality", pp, 51-71.
 4. Taylor, Paul. W. (1978), "Problems of moral philosophy: an introduction to ethics", Dickenson publishing company, Inc. Belmont, California, Introduction, pp, 3-12.
-

Unit 2 Theories of Ethics

1. J.S. Mill and Utilitarianism.
2. Immanuel Kant and Duty, Categorical Imperative and Good will.
3. Aristotle: Well-being and Golden Mean.

Recommended Readings:

1. Mill, J.S. (1863): Utilitarianism, London, in Mary Warnock. Ed.1962.
2. Aristotle, (1926) Nichomachian Ethics, Harvard University Press.
3. Kant, Immanuel: Groundwork of the Metaphysics of Morals, Trans. H J Paton, as The Moral Law. London.
4. Lillie, W.,(1948), An Introduction to Ethics, Methuen & Co. Ltd. London,Chapter-9, "The Standard as Pleasure",pp,166-177.
5. Lillie, W.,(1948), An Introduction to Ethics, Methuen & Co. Ltd. London,Chapter-16, "Virtue",pp,287-290.
6. Sinha, Jadunath, (2004), A Manual of Ethics, New Central Book Agency, Chapter-12, pp,136-147.

Unit 3 Applied Ethics

1. The theories of punishments
2. Euthanasia
3. Animal Rights

Recommended Readings:

1. Satyanarayana, Y.V.(2010), Ethics: Theory and Practice, Pearson, Chapter-7, "The Justification of Capital Punishment", pp,121-138.
2. Satyanarayana, Y.V.(2010), Ethics: Theory and Practice, Pearson, Chapter-9, "The Justification of Voluntary Euthanasia", pp,164-184.
3. Rachel, James.(1989), The Right Things to Do, 6th Ed.,Mc Graw Hill Publications, Chapter-16, "Do Animals Have Rights?", pp,134-146.

Unit 4 Indian Ethics

1. Puruṣārthas
2. *Niṣkāmakarma (Bhagavadgītā)*
3. Eight-Fold Path (Buddhism)

Recommended Readings:

1. Satyanarayana, Y.V. (2010), Ethics: Theory and Practice, Pearson
2. Mizuno, Kogen, (1987), Basic Buddhist Concepts, Kosei publishing corporation, Tokyo, Chapter-7, "The Eight Fold Path", pp, 129-137.
3. Sinha, Jadunath, (2004), A Manual of Ethics, New Central Book Agency, Chapter-XXXVI, "Indian Ethics", pp, 365-369.
4. Hiriyanna, M. (1950), Popular Essays In Indian Philosophy, Kavayalaya Publishers: Mysore. Chapter-9, pp, 65-68.

Suggested Readings:

1. Dasgupta, S.N (2004), A History of Indian Philosophy, vol.1, Delhi: MLBD Publishers
2. Kaveeshwar, G.W. (1971), The Ethics of Gita, Motilal Banarasi Dass Publications, Delhi, Chapter-12, "Ideal Action according to Gita", pp, 197-220.

References

Given above in each unit

Additional Resources:

- Hartmann, N. (1950) *Moral Phenomena*, New Macmillan.
 - Taylor, P.W., Problems of Moral Philosophy: An Introduction to Ethics, Dickenson Publishing Co. Inc. Belmont, California.
 - Lillie, W., An Introduction to Ethics, Methuen & Co. Ltd. London, 1948.
 - Shelly Kagan, (1998) Normative Ethics, Westview Press.
 - Kaveeshwar, G.W. (1971), The Ethics of Gita, Motilal Banarasi Dass Publications, Delhi, Chapter-12, "Ideal Action according to Gita", pp, 197-220.
-

Keywords

- Ethics, Freewill, Virtue Ethics, Utilitarianism, Duty, Puruṣārthas, Niṣkāmakarma, Bhagavadgītā, Euthanasia, Punishment, Ahimsa. Imperatives, Moral

Ethical Studies (MIL-II) Core Course

Course Objective

The course is designed to grasp the traditional ethical (Western and Indian) theories as well as to help students apply it on the practical front. It is a curriculum which enables students to develop ability for moral reasoning and act with ethical deliberations.

Course Learning Outcomes

This curriculum should enable students to develop ability for moral reasoning and act with ethical deliberations. After studying ethics one is equipped with the ethical sensitivity and moral understanding required to solve complex ethical dilemmas.

Unit 1 Introduction to Ethics

1. Introduction to Moral Philosophy
2. The development of Morality (from Convention to Reflection)
3. Importance of freewill.

Recommended Readings:

1. Satyanarayana, Y.V. (2010), Ethics: Theory and Practice, Pearson, Chapter-1, "Morality and Moral Reasonings", pp, 1-12.
 2. Mackenzie, J.S., (1977), A Manual of Ethics, Oxford University Press Bombay, Chapter-1, "Scope of Ethics", pp, 1-14.
 3. Lillie, W., (1948), An Introduction to Ethics, Methuen & Co. Ltd. London, Chapter-3, "The Development of Morality", pp, 51-71.
 4. Taylor, Paul. W. (1978), "Problems of moral philosophy: an introduction to ethics", Dickenson publishing company, Inc. Belmont, California, Introduction, pp, 3-12.
-

Unit 2 Theories of Ethics

1. J.S. Mill and Utilitarianism.
2. Immanuel Kant and Duty, Categorical Imperative and Good will.
3. Aristotle: Well-being and Golden Mean.

Recommended Readings:

1. Mill, J.S. (1863): Utilitarianism, London, in Mary Warnock. Ed. 1962.

2. Aristotle, (1926) Nichomachian Ethics, Harvard University Press.
3. Kant, Immanuel: Groundwork of the Metaphysics of Morals, Trans. H J Paton, as The Moral Law. London.
4. Lillie, W.,(1948), An Introduction to Ethics, Methuen & Co. Ltd. London,Chapter-9, "The Standard as Pleasure",pp,166-177.
5. Lillie, W.,(1948), An Introduction to Ethics, Methuen & Co. Ltd. London,Chapter-16, "Virtue",pp,287-290.
6. Sinha, Jadunath, (2004), A Manual of Ethics, New Central Book Agency, Chapter-12, pp,136-147.

Unit 3 Applied Ethics

1. The theories of punishments
2. Euthanasia
3. Animal Rights

Recommended Readings:

1. Satyanarayana, Y.V.(2010), Ethics: Theory and Practice, Pearson, Chapter-7, "The Justification of Capital Punishment", pp,121-138.
2. Satyanarayana, Y.V.(2010), Ethics: Theory and Practice, Pearson, Chapter-9, "The Justification of Voluntary Euthanasia", pp,164-184.
3. Rachel, James.(1989), The Right Things to Do, 6th Ed.,Mc Graw Hill Publications, Chapter-16, "Do Animals Have Rights?", pp,134-146.

Unit 4 Indian Ethics

1. Puruṣārthas
2. *Niṣkāmakarma (Bhagvadgītā)*
3. Eight-Fold Path (Buddhism)

Recommended Readings:

1. Satyanarayana, Y.V.(2010), Ethics: Theory and Practice, Pearson
2. Mizuno, Kogen, (1987), Basic Buddhist Concepts, Kosei publishing corporation, Tokyo, Chapter-7, "The Eight Fold Path", pp,129-137.

3. Sinha, Jadunath, (2004), A Manual of Ethics, New Central Book Agency, Chapter-XXXVI, "Indian Ethics", pp,365-369.

4. Hiriyanna, M.(1950), Popular Essays In Indian Philosophy, Kavayalaya Publishers: Mysore. Chapter-9, pp,65-68.

Suggested Readings:

1. Dasgupta, S.N (2004), A History of Indian Philosophy, vol.1, Delhi: MLBD Publishers
2. Kaveeshwar, G.W. (1971), The Ethics of Gita, Motilal Banarasi Dass Publications, Delhi, Chapter-12, "Ideal Action according to Gita", pp,197-220.

References

Given above in each unit

Additional Resources:

- Hartmann, N. (1950) *Moral Phenomena*, New Macmillan.
- Taylor, P.W., Problems of Moral Philosophy: An Introduction to Ethics, Dickenson Publishing Co. Inc. Belmont, California.
- Lillie, W., An Introduction to Ethics, Methuen & Co. Ltd. London, 1948 .
- Shelly Kagan,(1998) Normative Ethics , Westview Press.
- Kaveeshwar, G.W. (1971), The Ethics of Gita, Motilal Banarasi Dass Publications, Delhi, Chapter-12, "Ideal Action according to Gita", pp,197-220.

Keywords

- Ethics, Freewill, Virtue Ethics, Utilitarianism, Duty, Puruṣārthas, Niṣkāmakarma, Bhagvadgītā, Euthanasia, Punishment, Ahimsa. Imperatives, Moral

Semester III

Indian Philosophy (DSC 3)
(CC (III))
Core Course - (CC)

Course Objective(2-3)

(i) The learning outcomes from this course must be dovetailed to highlight the positive contribution of this paper and in what way some of the thought processes are better than its Western counterpart. (ii) It should also be the endeavour to promote the Indian way of life encapsulating Indian values, ethos and cultural context. As future citizens, students should go out of the university fully aware of Indian philosophical tradition and should be indeed part of it. As Indian Philosophy projects another type of aspect of life which has not been explored by the student before. It brings personal growth and unless they feel part and parcel of this thought processes, they would not be able to contribute any value addition to their job profile.

Course Learning Outcomes

(i) At a macro level, the Indian contribution to global philosophy is still not recognised in the same manner as Western Philosophy. To give one example, while we essentially teach Western Philosophy in our university curriculum, Indian Philosophy is still not popular in West or elsewhere and is not a 'compulsory' element of course curriculum. Part of the reason is that we have not brought out the contribution of Indian Philosophy properly. Therefore, the learning outcomes from this course must be dovetailed to highlight the positive contribution of this paper and in what way some of the thought processes are better than its Western counterpart. (ii) It should also be the endeavour to promote the Indian way of life encapsulating Indian values, ethos and cultural context. As future citizens, students should go out of the university fully aware of Indian philosophical tradition and should be indeed part of it. Unless they feel part and parcel of this thought processes, they would not be able to contribute any value addition to their job profile.

Unit 1 Indian Philosophy: An Overview:

1. General Characteristics of Indian Philosophy

Recommended Readings:

1. Chatterjee, S & Datta. D.M (1984) An Introduction to Indian Philosophy, 8th ed., University of Calcutta , Chapter 1 General Introduction pp 1-24.
2. Hiriyana,(1950), Popular Essays in Indian Philosophy, Kavyalaya Publishers, Mysore. Chapter-2,"Aim of Indian Philosophy", pp,19-24.

Unit 2 Theory of Knowledge (Nyāya–Vaiśeṣika)

1. Perception (*Pratyakṣa*)

2. Inference (*Anumāna*)
3. Testimony (*Śabda*)
4. Comparison (*Upamāna*)

Recommended Readings:

1. Chatterjee, S & Datta. D.M (1984) An Introduction to Indian Philosophy, 8th ed., University of Calcutta ,Chapter 5 The Nyaya Philosophy pp 161 - 201.

Unit 3 Theories of Causation:

1. Buddhism (*Pratītyasamutpāda*)
2. *Asatkāryavāda* (Nyāya– Vaiśeṣika)
3. *Satkāryavāda* (Samkhya --Yoga)

Recommended Readings:

1. Chatterjee and Datta (2016) An Introduction to Indian Philosophy , Motilal Banarasidass Publishers, Chapter VII The Samkhya Philosophy pp 254 - 257.
2. Mehta, S. (2017), The problem of meaning in Buddhist Philosophy, Delhi Krishi Sanskriti Publications, Chapter -2, pp-17-33
3. Sharma, C.D.(2000) A Critical Survey of Indian Philosophy, Motilal Banarasidass Publishers, Chapter 11 Theory of Causation pp151 - 157
4. Sharma, C.D.(2000) A Critical Survey of Indian Philosophy, Motilal Banarasidass Publishers, Chapter-3,pp,132-135.

Unit 4 Theories of Reality:

1. Buddhism - Anatmavāda
2. Jainism – Anekāntavāda, Syādvāda
3. Nyāya–Vaiśeṣika – Self World and God
4. Śaṅkara – Parā – Aparā distinction, Nature of Brahmana (Mundaka Upanisad) Aphorism 1

Recommended Readings:

1.Chatterjee, S & Datta. D.M (1984) An Introduction to Indian Philosophy, 8th ed., University of Calcutta, Chapter-3, "The Jaina Philosophy", pp,73-84.

2. Chatterjee, S & Datta. D.M (1984) An Introduction to Indian Philosophy, 8th ed., University of Calcutta, Chapter-4, "The Buddha Philosophy", pp,135-137.
3. Chatterjee, S & Datta. D.M (1984) An Introduction to Indian Philosophy, 8th ed., University of Calcutta, Chapter-5, "The Nyaya Philosophy", pp,201-227.
4. Mehta, S. (2017), The problem of meaning in Buddhist Philosophy, Delhi Krishi Sanskriti Publications, Chapter-3,pp-6-17
5. Sharma, C.D.(2000) A Critical Survey of Indian Philosophy, Motilal Banarasi Das.(MLBD)
6. Mundaka Upanisad Apph. I

References

Additional Resources:

- Hiriyanna, M. (1994) *Outlines of Indian Philosophy*, Delhi: MLBD Publishers.
- Hiriyanna, M. (2015) *The Essentials of Indian Philosophy*, Delhi: MLBD Publishers
- [Radhakrishnan, S.](#) (1929) *Indian Philosophy, Volume 1*. Muirhead Library of Philosophy (2nd ed.) London: George Allen and Unwin Ltd.

Teaching Learning Process

(i) Focus to be on richness of Indian philosophical tradition, cultural context and identifying those concepts that can appeal to Western and global audience. (ii) Field visits to historical places, cultural sites and making case studies on them so as to establish empirical relevance of the subject. (iii) Promotion of developing philosophical perspective on contemporary socio-political and economic issues.

Assessment Methods

Internal Assessment

Teachers can take test, assignments, projects, hold group discussions, debates and presentations of 20 marks. Rest 5 marks will be given on the basis of student's attendance.

Keywords

- Brahman, Śaṃkara, Parā vidya, Aparā vidya, World, God, Self, Syadvada, Pratyakṣa, Anumāna, Śabda, Upamāna, Pratītyasumatpāda, Asatkāryavāda, Satkāryavāda, Anātmavāda, Anekāntavāda, Syādvāda, Brahmana

Introduction to Indian Philosophy (MIL) (MIL-III) Core Course

Course Objectives

- The objective of this course is to make students familiar with Indian Intellectual traditions. This course will be an Introduction to the major schools of Indian philosophy. Focus will be on interactive learning where students will engage themselves. The course will help the students in understanding the significance of Indian philosophical studies in their daily life, how to overcome the stress, how to manage their life and take challenges in life; hence there will be a focus on the dialectical and analytical method to understand Indian philosophy.
- Make students gain familiarity with, and clear understanding of, the major concepts within Indian philosophical studies.
- Increase students understanding of Indian Philosophical systems and their philosophy.
- Improved critical reading of the texts, their rational and logical understanding, and writing abilities.
- Exposure to various Indian texts .
- Finally it will give a holistic development of their personality

Course Learning Outcomes

- Students will appreciate the Indian Metaphysics of various ancient Indian schools such as Charvaka, Buddhism, Jainism, Samkhya, Mimamsa and Vedanta. They will become aware

of the Metaphysics of various schools which will help them to understand the society at large.

In the unit II, students will gain familiarity with the epistemology of Charvaka and Nyaya - Vaisheshika system. Unit II and Unit III are interrelated in the sense that epistemology of a particular school can be understood through its metaphysics and vice-versa.

- In Unit IV Students will learn to develop scientific, logical and rational inquiry for understanding the systems. Students will be able to do a comparative analysis of all systems which will further enhance their debating skills. Students will develop the ability to think critically and to read and analyze scientific literature.
- Students will develop strong oral and written communication skills through the effective presentation of Projects, Quiz as well as through Seminars.

Unit 1: Basic Outlines of Indian Philosophy

1. General Characteristics of Indian Philosophy

Recommended Readings

- Chatterjee, S and D.M.Datta. 1984. *An Introduction to Indian Philosophy*, 8th ed. Calcutta: University of Calcutta.
- Raju, P.T. 1985. *Structural Depths of Indian Thought*. Albany (New York): State University of New York Press.
- Surendranath Dasgupta, A History of Indian Philosophy, Vol.1, Delhi: Motilal Banarsidass Publishers Private Limited, 2004, pp.67-77.

Unit 2 Indian Epistemology

1. Carvaka Epistemology

2. Nyaya Theory of Perception

Recommended Readings

- Chatterjee, S and D.M.Datta. 1984. *An Introduction to Indian Philosophy*, 8th ed. Calcutta: University of Calcutta.
- Datta, D.M. 1972. *The Six Ways of Knowing*. Calcutta: University of Calcutta Press.
- Surendranath Dasgupta, A History of Indian Philosophy, Vol.1, Delhi: Motilal Banarsidass

Unit 3 Indian Metaphysics

1. Four-fold Noble Truths, Doctrine of Dependent Origination and Momentariness of Buddhism
2. Samkhya Dualism: Prakriti and Purusha

Recommended Readings

- Chatterjee, S and D.M.Datta. 1984. *An Introduction to Indian Philosophy*, 8th ed. Calcutta: University of Calcutta.
- Sharma, C.D. 2000. *A Critical Survey of Indian Philosophy*. Delhi: Motilal Banarasidass

Unit 4: Trajectories of the Philosophical

1. The Vedic Primordial Quest

Raimundo Pannikar (ed. & trans). 2006. "May Peace Bring Peace' (Shanti Mantra)

Atharva Veda XIX,9-15,14". In *The Vedic Experience: Mantramanjari*, P. 305. Delhi: Motilal Banarasidass.

2. The Upanishadic Query: The Immanent and the Transcendent, Isa Upanishad, Verses 1 to 11

S. Radhakrishnan (ed. & trans). 1987. "Isa Upanishad", In *The Principal Upanishadas*, 567-575. New Delhi: Harper Collins Publishers India.

3. "The Moral Question and the Subtlety of Dharma"

Gurucharan Das. 2012. "Draupadi's Courage." In *The Difficulty of Being Good*, 33-53. New Delhi: Penguin Books.

References

As above

Additional Resources:

Suggested Readings

- Organ, Troy Wilson. 1964. *The Self in Indian Philosophy*. London: Mouton & Co.

- Pandey, SangamLal. 1983. *Pre-Samkara Advaita Philosophy*, 2nd ed. Allahabad: DarsanPeeth.
 - Paul S. and Anthony J. Tribe. 2000. *Buddhist Thought: A Complete Introduction to the Indian Tradition*. London: Routledge.
 - Stcherbatsky, Theodore. 1970. *The Soul Theory of Buddhists*, 1st ed. Varanasi: Bharatiya Vidya Prakasana.
 - Koller, John M. 1977. [Skepticism in Early Indian Thought](#). *Philosophy East and West* 27(2): 155-164
-
-

Teaching Learning Process

Teaching-Learning Process

The B.A (MIL) Introduction to Indian Philosophy aims to make the student proficient in understanding their Philosophy, Culture and Society through the transfer of knowledge in the classroom as well as in life. In the classroom this will be done through blackboard and chalk lectures, charts, PowerPoint presentations, and the use of audio-visual resources that are available on the internet such as virtual lab. An interactive mode of teaching will be used. The student will be encouraged to participate in discussions, group discussions and deliver seminars on some topics. A problem-solving approach will be adopted wherever suitable.

Assessment Methods

Assessment methods

The student will be assessed over the duration of the programme by many different methods. These include short objectives-type quizzes, assignments, written and oral examinations, group discussions and presentations, problem-solving exercises, seminars, preparation of reports. The wide range of assessment tasks aim to break the monotony of having a single assessment method. Students will strictly follow the course policies.

Grade will be determined on the basis of graded assignments as specified below: Evaluation:

- Four Assignments/ Projects: 10% each
- Three in-class quizzes/oral tests: 5% each
- Paper Presentations: 5%

- Final exam: 10%
- Attendance and participation 5%

Keywords

Keywords

Shruti and Smriti, Idealism, Materialism, Realism, Self, Brahman, Maya, Dualism, Preyas, Shreyas and Nihisreyas, Anekantavada, Syadvada, Karma, Jnana, Bhakti, Pratityasamutpada, Nirguna and Saguna Brahman, Jivaetc

Ethical Decision Making (SEC (I)) Skill-Enhancement Elective Course - (SEC)

Course Objectives

This course is primarily focused to develop a skill of resolving ethical dilemmas in personal and professional spaces. The paper offers us insight into the process, nature and ethics involved in the larger realm of decision making.

Course Learning Outcomes

This course would enable developing an ability to use theories of standard Ethics and reflective morality to resolve the real life issues and concerns. In other words, this course would facilitate a skill in addressing issues that ensue moral dilemmas or the 'trolley problems'.

Unit 1 Ethical Theories : Traditional and Contemporary

1. Traditional Ethical Theories: Virtue Ethics, Utilitarian Ethics and Deontology
2. Contemporary Approaches: Care Ethics and casuistry Ethics

Recommended Readings:

Rachel, J. ,The Elements of Moral Philosophy. (Oxford: Oxford University Press, 2011).

Pertinent Topics

Jecker, N. S., Jonsen, A. R., and Pearlman, R. A. eds. Bioethics: An Introduction to the History, Method and Practice(New Delhi: Jones and Bartlett, 2010). Chapters on 'Casuistry Ethics'and 'Care Ethics'.

Unit 2 Moral Reasoning and Addressing Dilemmas, Trolley Problem

1. Values, Dilemma and Choices
2. Responsibility, Justice & Fairness

Recommended Readings:

Lisa Newton, Ethical Decision Making: Introduction to Cases and Concepts in Ethics, (Springer Series, 2013), Chapters 1 and 2 for this Unit.

Howard, R.A. and Kroger, C.D., Ethics for the Real World: Creating a personal code to guide decisions in work and life, (Harvard Business Press: Boston, 2008). Chapter-1 for this Unit.

Unit 3 Ethical Decision Making in Inter-Personal Relations

1. Respect for self and others
2. Creating a Personal code to guide moral decisions in Professional space and Inter-Personal Relations

Recommended Readings:

Lisa Newton, Ethical Decision Making: Introduction to Cases and Concepts in Ethics, (Springer Series, 2013), (p.6-23 and 31-39 for this unit)

Howard, R.A. and Kroger, C.D., Ethics for the Real World: Creating a personal code to guide decisions in work and life, (Harvard Business Press: Boston, 2008), (p.155-175 for this unit).

Unit 4 Ethical Models

Case studies and Situational role plays in Inter-personal and community Concerns.

Recommended Readings:

Lisa Newton, Ethical Decision Making: Introduction to Cases and Concepts in Ethics (Springer Brief in Ethics series, 2013).

Howard, R.A. and Kroger, C.D., Ethics for the Real World: Creating a personal code to guide decisions in work and life, (Harvard Business Press: Boston, 2008), Chapters4-7.

Contemporary Debates in Bioethics, (Eds) Arthur L. Caplan and Robert Arp, (UK: Wiley-Blackwell, 2014)

Nitishastra (Applied Ethics) by M P Chourasia, (Motilal Banarasidas, New Delhi., 2009). This is an excellent Hindi sourcebook.

Besides these the blogs, movies dealing with cases needing a moral resolution, ted talks, media reports etc. will be useful for deliberating on this issue.

Practical

This course addresses life issues and, hence, is one of the courses that requires a practical interface of theory and real life situations. Students need to engage with a sensitive issue and work on a project of social/ community care. So, a project work indicating a model/policy for resolving a sensitive concern should be encouraged.

References

Lisa Newton ,Ethical Decision Making: Introduction to Cases and Concepts in Ethics by Lisa Newton (Springer Brief in Ethics series, 2013).

Howard, R.A. and Kroger, C.D. Ethics for the Real World: Creating a Personal Code to Guide Decisions in Work and Life (Harvard Business Press: Boston, 2008).

Brown, M. The Quest for Moral Foundations: An Introduction to Ethic. (University Press: Georgetown,1996).

Josephson, M. S. Making Ethical Decisions (Josephson Institute of Ethics, 2002 Arthur

L. Caplan and Robert Arp (eds). Contemporary Debates in Bioethics (Wiley-Blackwell: U.K. ,2014)

Chourasia, M. P. Nitishastra(Applied Ethics). (Motilal Banarasidas: New Delhi. 2009). (An excellent sourcebook in Hindi).

Additional Resources:

Cohen, Stephen. The Nature of Moral Reasoning: The Framework and Activities of Ethical Deliberations, Arguments and Decision Making, (Oxford University Press,2004).

Teaching Learning Process

This course should enable the students to develop skills to help them take decisions in a morally sticky situation or what is called a dilemma or trolley problem. Students need to be initiated into deliberating upon some viable models/planners to suggest a resolution of these issues. An engagement with other institutions like hospitals, old age homes, NGOs etc and use of Ted talks, social media as pedagogical tools will certainly add value to this course.

Assessment Methods

Same as the university mandate of 75% end of semester exam and 25% of Internal Assessment comprising of assignments etc. The assignment in this skill based course should necessarily include students working on a project that works as a planner or a code or a policy framework on a morally sensitive social or an inter-personal issue.

Keywords

Ethical Theories, Trolley Problem, Dilemmas , Case studies, Ethical Codes, Moral Reasoning , Social and Inter-Personal Ethics

Semester IV

Modern Western Philosophy (DSC 4)
(CC (IV))
Core Course

Course Objectives

The objective of the course is to

- a. Understand the core philosophical ideas of Western traditions and the problems that led to the empiricist and rationalist uprising in philosophy.
- b. Learning about various positions on metaphysical monism, dualism and pluralism.
- c. Knowledge of the Copernican Revolution brought forth by Kant, in the examination of the conditions which makes knowledge possible.

Course Learning Outcomes

- This course will enable students to think outside the box of the prevalent philosophical orthodoxies.
- The history of philosophy trains the mind to think differently and alternatively about the fundamental problems of philosophy.

Unit 1 Introduction to Western Philosophy with reference to Rationalism and Empiricism.

Recommended Readings

Scruton Roger, From Descartes to Wittgenstein A short history of modern philosophy. London: Routledge & Kegan Paul 1981 (chapter 1 & 2)

Unit 2 Rationalism

1. Descartes: Cogito Ergo Sum, Mind body Dualism
2. Spinoza: Concepts of Substance
3. Leibnitz : Theory of Monads

Recommended Readings

Descartes, R. (1647), Meditations Concerning First Philosophy, Meditation II, Harper Torch Books.

Spinoza, B. (1677), Ethics, Penguin Classics

Leibniz, G. W. (1991), Monadology : An Edition for Students, University of Pittsburgh Press; 1 edition

Unit 3 Empiricism

1. Locke- Critique of Innate Ideas, Ideas and Qualities
2. Berkeley: Critique of Locke's theory of Material substance
3. Hume: Theory of Causation

Recommended Readings

Locke, J. (1706) An Essay Concerning Human Understanding, London,. CH. XXIII

Berkeley, G. (1985), The Principles of Human Knowledge G.J. Warnock, (ed). Great Britain: Fontana Press, Part-1, Sections 1-24.

Hume, D. (1748), An Enquiry Concerning Human Understanding (Oxford World's Classics)

Unit 4 Kant: Classification of Propositions, Possibility of synthetic a priori.

Recommended Readings

Kant Immanuel , Critique of Pure Reason (The Cambridge Edition of the Works of Immanuel Kant) : Kant, Paul Guyer, Allen W. Wood: Books, (1999)

References

- Descartes, R. (1647), Meditations Concerning First Philosophy, Meditation II, Harper Torch Books.

- Locke, J. (1706) An Essay Concerning Human Understanding, London,. CH. XXIII
- Berkeley, G. (1985), The Principles of Human Knowledge G.J. Warnock, (ed). Great Britain: Fontana Press, Part-1, Sections 1-24.

Additional Resources:

- Moore, B. (2011) Philosophy: The Power of Ideas, New Delhi: TMH.
- O'Connor, D. J. (1964) A Critical History of Western Philosophy, New York:Macmillan.
- Stegmuller, W. (1969), Main Currents in Contemporary German, British and American Philosophy, , Dordrecht: D. Reidel Publishing.
- Thomson, G. (1992) An Introduction to Modern Philosophy, California:Wadsworth Publishing.
- Titus, S. and Nalan. (1994) Living Issues in Philosophy, London: OUP.
- Scruton Roger, From Descartes to Wittegenstein A short history of modern philosophy.London: Routledge & Kegan Paul 1981 (chapter 1& 2)

Teaching Learning Process

Textual readings, Power Point Presentations, Group Discussion

Assessment Methods

Internal Assesment

Assignment/Test

Keywords

Rationalism, Empiricism, Subjective Idealism,Cogito Ergo Sum, Interactionism, pre-established harmony, Monism, Dualism, Parallelism

Introduction to Western Philosophy (MIL)
(MIL-IV)
Core Course

Course Objectives

Philosophy is both fascinating and frustrating. It deals with the most difficult questions of life which have always bewildered us. Philosophers have been relentlessly working to quench this thirst of the mankind by expounding theories which have broadened the base of human understanding. The paper is designed to appreciate the profound ideas that sprung from the minds of the great philosophers of the modern western world. The syllabus comprises of six philosophers grouped under two traditions of thought: Rationalism and Empiricism. It begins with Descartes' seminal views on epistemology and metaphysics and traces the emergence of ideas in a kind of chronological order which demonstrates methodical development of philosophical thought.

Course Learning Outcomes

This paper seeks to do three things: 1. it will make students witness how philosophers who were either predecessors or contemporaries evaluated the theories of others, thus will advise them in distinguishing good arguments from bad arguments. 2. it will enable students to have a better understanding of how a man thinks and what goes on into the making of human thought. 3. It will also make students aware that there is no place for superficial approach to the complex questions in life.

Unit 1 Introduction to Rationalism and Empiricism

Recommended Readings:

Markie, Peter, "Rationalism vs. Empiricism", The Stanford Encyclopedia of Philosophy (Fall 2017 Edition), Edward N. Zalta (ed.)

Unit 2 The concept of substance: Descartes and Spinoza

1. Descartes: Method of doubt, Mind-body dualism
2. Spinoza: Notion of Substance Descartes:

Recommended Readings:

Descartes: Meditations on First Philosophy, London: Penguin Classics. 1998 (Ch. 1, 2 and 6)
Spinoza: Ethics London: Penguin Classics, 2005 (Book 1 and 2).

Unit 3 Epistemology in the works of Leibnitz and Locke

1. Leibniz: Truth and Reason
2. Locke: Ideas and qualities

Recommended readings :

Strickland, Lloyd. Leibniz's Monadology: A New Translation and Guide. Edinburgh, UK: Edinburgh University Press, 2014

Locke, John: An Essay Concerning Human Understanding, London: Penguin Classics, 1997 (Book 2)

Unit 4 The concept of ideas: Berkeley and Hume

1. Berkeley : Immaterialism
2. Hume: Impressions and Ideas

Recommended Readings:

Berkeley: Three dialogues between Hylas and Philonous London: Penguin Classics, 1988 (First dialogue only).

Hume, David: An Enquiry Concerning Human Understanding. Oxford: Clarendon Press 1975 (Part I, section II and III)

References

- Markie, Peter, "Rationalism vs. Empiricism", The Stanford Encyclopedia of Philosophy (Fall 2017 Edition), Edward N. Zalta (ed.),
- Descartes: Meditations on First Philosophy, London: Penguin Classics. 1998 (Ch. 1, 2 and 6)
- Spinoza: Ethics London: Penguin Classics, 2005 (Book 1 and 2).
- Strickland, Lloyd. Leibniz's Monadology: A New Translation and Guide. Edinburgh, UK: Edinburgh University Press, 2014
- Locke, John: An Essay Concerning Human Understanding, London: Penguin Classics, 1997 (Book 2)
- Berkeley: Three dialogues between Hylas and Philonous London: Penguin Classics, 1988 (First dialogue only).
- Hume, David: An Enquiry Concerning Human Understanding. Oxford: Clarendon Press 1975 (Part I, section II and III)

Additional Resources:

- Copleston, F.J. History of Philosophy. USA: Image Books, 1993
 - Falkenberg, R. History of Modern Philosophy, USA: Jefferson Publication , 2015
 - O' Connor, D.J. A Critical History of Western Philosophy. USA: MacMillan, 1964.
-
-

Teaching Learning Process

lectures, tutorials, discussions, assignments and tests.

Assessment Methods

assignments and tests

Keywords

Rationalism, Empiricism, Knowledge, Ideas, Mind-Body, Materialism, Immaterialism, Qualities, Monads,

Yoga Philosophy (SEC (II)) Skill-Enhancement Elective Course

Course Objective

(i) The learning outcomes from this course must be dovetailed to highlight the positive contribution of this paper and in what way some of the thought processes are better than its Western counterpart. (ii) It should also be the endeavour to promote the Indian way of life encapsulating Indian values, ethos and cultural context. As future citizens, students should go out of the university fully aware of Indian philosophical tradition and should be indeed part of it. As Indian Philosophy projects another type of aspect of life which has not been explored by the student before. It brings personal growth and unless they feel part and parcel of this thought processes, they would not be able to contribute any value addition to their job profile.

Course Learning Outcomes

(i) At a macro level, the Indian contribution to global philosophy is still not recognised in the same manner as Western Philosophy. To give one example, while we essentially teach Western Philosophy in our university curriculum, Indian Philosophy is still not popular in West or elsewhere and is not a 'compulsory' element of course curriculum. Part of the reason is that we have not brought out the contribution of Indian Philosophy properly. Therefore, the learning outcomes from this course must be dovetailed to highlight the positive contribution

of this paper and in what way some of the thought processes are better than its Western counterpart. (ii) It should also be the endeavour to promote the Indian way of life encapsulating Indian values, ethos and cultural context. As future citizens, students should go out of the university fully aware of Indian philosophical tradition and should be indeed part of it. Unless they feel part and parcel of this thought processes, they would not be able to contribute any value addition to their job profile.

Unit 1 Introduction to Yoga

1. The Definition and Essence of Yoga
2. Citta, citta-vritti, citta vritti nirodh

Recommended Readings:

1. Werner, K., (2014), Yoga and Indian Philosophy, Motilal Banarasi Dass Publications, Delhi, Chapter-5, "Yoga and its origin, Purpose and Relation, pp,93-118.
2. Sharma, I.C.,(1965), Ethical Philosophies of India, George Allen and Urwin, Chapter-9, "Ethics of Yoga", pp-199-206.
3. Chatterjee, S & Datta. D.M (1984) An Introduction to Indian Philosophy, 8th ed., University of Calcutta , Chapter-8, "Yoga Philosophy",pp,294-301.

Suggested Readings

1. Feuerstein, George, (2001), "The yoga tradition: its history, literature, philosophy and practices"

Unit 2 Yoga in Bhagvadgita

- 1.Jnana Yoga
- 2.Bhakti Yoga
3. Karma Yoga

Recommended Readings:

1. Radhakrishnan, S.(2011), The Bhagvadgita, Harper Collins.
2. Kaveeshwar, G. W. (1971) The Ethics of the Gita, Delhi: Motilal Banarsidas.

Unit 3 Yoga and Meditation

1. Jainism (Panchmahavrata)

2. Buddhism (Vipassana)

Recommended Readings:

1. Gopalan, S. (1974) *Outlines of Jainism*, John Wiley & Sons (Asia) Pt. Ltd.
2. Sobti, Harcharan Singh. (1992), *Vipassana : The Buddhist Way : The Based on Pali Sources*, Chapter-9, pp,84-92, Eastern Book Linkers, Delhi.
3. Sobti, Harcharan Singh. (1992), *Vipassana : The Buddhist Way : The Based on Pali Sources*, Chapter-11, pp,99-119, Eastern Book Linkers, Delhi.
4. Sobti, Harcharan Singh, (2003), Published by Eastern Book Linkers,

Chapter 5. "Vipassana : a psycho-spiritual analysis".

Chapter 16. "Vipassana a distinct contribution of Buddhism to world culture".

Unit 4 Patanjali's Astangik Yoga Marga

Recommended Readings:

1. Dasgupta, S. N. (1930) *Yoga Philosophy in Relation to Other Systems of Indian Thought*, Calcutta: University of Calcutta.
2. Chatterjee, S & Datta. D.M (1984) *An Introduction to Indian Philosophy*, 8th ed., University of Calcutta , Chapter-8, "Yoga Philosophy, The Eight Fold Means of Yoga, pp-301-308.

References

Additional Resources:

- Abhishiktananda, Swami: (1974) *Guru and Disciple*, London: Society for the Promotion of Christiana Knowledge,
- Aranya, H.: (1983) *Yoga Philosophy of Patanjali*, rev. ed.. Trans. by P. N. Mukherji, Albany, New York: Suny Press,
- Bhattacharya, H. (1956) (ed.). *The Cultural Heritage of India*, Calcutta: Ramkrishna Mission Institute of Culture, 4 vol.
- Cleary, T. (1995) translated *Buddhist Yoga: A Comprehensive Course*, Boston, Mass: Shambhala Publications.

- Feuersteein, George, (2001), "The yoga tradition: its history, literature, philosophy and practices", Hottm press prescott, Arizona.
- Werner, Karel. "Yoga and Indian philosophy", Motilal Banarsidass Publ., New Delhi,

Teaching Learning Process

Teachers should entice students to learn the spiritual aspect of Yoga along with the physical aspect in order to establish equilibrium between mind and body.

Assessment Methods

Internal Assessment

Teachers can take test, assignments, projects, hold group discussions, debates and presentations of 20 marks. Rest 5 marks will be given on the basis of student's attendance.

Keywords

- Yoga, Citta, citta-vritti, citta vritti nirodh, Astangik Yoga Marga, Patanjali, Bhakti Yoga, Karma Yoga, Jyana Yoga

Semester V

**Art and Film Appreciation
(SEC (III))
Skill-Enhancement Elective Course - (SEC)**

Course Objective

Art and Film Appreciation

- The objective of the course is to enable a student to become an active and engaging viewer of art and cinema.
- To discern the aesthetic experience as different from art experience
- To enable a student to understand and appreciate films and other related art forms

Course Learning Outcomes

It is a skill to develop and enhance philosophical analysis and contextualizing in terms of Rasa ,empathy and disinterestedness.

Unit 1 Art and Experience

1. Meaning and Analysis

References

Satre, J.P, "The Work of Art" in Aesthetics, Harold Osborne,(London: Oxford University Press, 1972).

Hospers, John (1969) *Introduction Readings in Aesthetics*, Free Press.

Gupta, Shamala. *Art, Beauty and creativity*. (DK Printworld New Delhi 1999).

Hiryanna, M. (1997) Art Experience, Indira Gandhi National Centre for the Arts Manohar. Chapter-1.

Unit 2 Film as an Art Form

1. Documentaries, Commercial, Parallel Cinema and Web Series as New Art Form

References

Christopher, Falzon, *Philosophy goes to the Movies*, Routledge.

Vijaya, Mishra. (2009) *Specters of Sensibility: The Bollywood Film*. Routledge.

Sussane Langer. (1953) *Feeling and Form*, Longman Publishing House.

Arnheim, Rudolf, Film as Art, "*Film and Reality*" University of California Press

https://www.academia.edu/37948527/.The_Aesthetics_of_Digital_Art.pdf

<https://thirdcinema.wordpress.com/2015/10/27/indias-parallel-cinema/>

https://ipfs.io/ipfs/QmXoybizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Parallel_cinema.html

Unit 3 Art, Social Values and Morality

1. Life art interface
2. Film and Cultural representation

References

Gupta, Shyamala. *Art, Beauty and creativity*. (DK Printworld New Delhi 1999).

Hiriyanna, *M. Art Experience* , Indira Gandhi National Centre for the Arts, Manohar.: Delhi, 1997, Chapter-7.

Clark, Kenneth. *The Nude: A Study in Ideal Form*. (Bollingen Series 35.2. New York: Pantheon Books, 1956).

Unit 4 Art and Communication in and through Films

References

<https://thirdcinema.wordpress.com/2015/10/27/indias-parallel-cinema/>

https://ipfs.io/ipfs/QmXoybizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Parallel_cinema.html

References

- Harold, Osborne (1976) *Aesthetics*, OUP.
- Hospers, John (1969) *Introduction Readings in Aesthetics*, Free Press.
- Christopher, Falzon, *Philosophy goes to the Movies*, Routledge.
- Vijaya, Mishra. (2009) *Specters of Sensibility: The Bollywood Film*. Routledge.

Additional Resources:

- Sussane Langer. (1953) *Feeling and Form*, Longman Publishing House.

Arnheim, Rudolf, Film as Art, "Film and Reality" University of California Press.

Teaching Learning Process

Lectures, Group Discussion, Film Screening and visit to Art Gallery.

Assessment Methods

Internal Assessment and Examination

Keywords

Rasa, disinterestedness, Coffee house cinema, commercial cinema, documentary, web series.

**Vedic Value System
(DSE (I))
Discipline Specific Elective - (DSE)**

Course Objectives

To critically evaluates the importance of Vedic values, ethos and Indian value system in life. It brings personal and social growth. They should be able to contribute value addition for the betterment of society and themselves.

Course Learning Outcomes

The student must fully understand the reverence of the Vedic Values in the contemporary world. This course will help develop an understanding about the importance of the Nature (Cosmos) and help student pursuit a holistic existence.

Unit 1 Values in Vedas

1.Introduction to Vedas (classification and explanation)

2. Values in Vedas

Recommended Readings:

1. Panikkar, R. (2001), The Vedic Experience, Motilal Banarasidas Publications, New Delhi. pp,5-34.

2. Dasgupta, S. N.(2012), A History of Indian Philosophy, Vol.1,Motilal Banarasidas Publications, New Delhi. Chapter-2, pp-10-27

3. Prasad, H.S., The Centrality of Ethics in Buddhism, Exploratory Essays, MLBD, 2007, Chapter II pg. 55-77

Unit 2 Cosmic Values

1. Prithvi Sutaka (Rg Veda) hymns 47 to 60

2. The concept of Rta, *Satya and dharma*.

Recommended Readings:

1. Wezler,A.,'Dharma in the Veda and Dharmasastras', DHARMA(ed. Patrick Olivelle), MLBD, 2009, pg. 207 - 231

2. Atharva Veda Prithvi Sutaka, 47 to 60.

3. Prasad, H.S. (2007), The Centrality of Ethics in Buddhism: Exploratory Essays, Motilal Banarasi Dass Publications, Delhi. Chapter-2, pp,99-105.

Suggested Readings:

1. Pradhan, R.C.(2008), Philosophy, Culture and Value, I.C.P.R, Chapter-7, Concept of Rta as expounded by G.C Pnade: A Critical Evolution, pp,135-143.

Unit 3 Social Values

1. Asram system and 16 Vedic sanskaras

2. The Varna Theory: Facts and misconceptions (caste)

Recomended Readings:

1. Gupta, Shantinath,(1978), Indian Concept Of Values, Manohar.
2. Sharma, I.C.,(1965), Ethical Philosophies of India, George Allen and Urwin, Chapter-3, pp-70-86.
3. Pandey, Rajbali. (2013), Hindu Samskaras: Socio-Religious study of Hindu Sacraments, Motilal Banarasi Dass Publications, Delhi.
4. Prasad, H.S. (2007), The Centrality of Ethics in Buddhism: Exploratory Essays, Motilal Banarasi Dass Publications, Delhi. Chapter-2, pp,80-96.
5. Goyal, Pritiprabha. (2004), Bharatiya Sanskriti, Rajasthan Grathagar, Jodhpur. Chapter-2-4, pp,17-104.
6. Prasad, Rajendra, (1999), Varnadharmā, Niskamakarma and Practical Morality, A Critical essay on Applied Ethics. D. K. Print world (P) Ltd. New Delhi.

Suggested Readings:

Tandon, Kiran. (2012), Bharatiya Sanskriti, Eastern Book Linkers, New Delhi. Chapter 4-5, pp, 232-329.

Unit 4 Personal Values

- 1.The Purusarthas: Trivarga (purpose of life)
- 2.Concept of Sreyas and Preyas (Katho Upanisada Apph.2 Commentary by Sankara)

Recomended Readings:

1. Kathopanishad, Aphorism 2.
- 2.Satyanarayana,Y.V.(2010), Ethics: Theory and Practice, Pearson, Chapter-2 "Critical Survey of Indian Ethics", pp,13-17.
3. Hiriyana,(1950), Popular Essays in Indian Philosophy, Kavyalaya Publishers, Mysore. Chapter-9,"Idea of Purusarthas, pp,65-68.
4. Prasad, H.S. (2007), The Centrality of Ethics in Buddhism: Exploratory Essays, Motilal Banarasi Dass Publications, Delhi. Chapter-2, pp,96-99.

Suggested Readings:

1. Tandon, Kiran. (2012), Bharatiya Sanskriti, Eastern Book Linkers, New Delhi. Chapter -3, pp, 192-231.

References

Additional Resources:

- Chatterjee, S. Chandra, *The Fundamentals of Hinduism*, Calcutta: University of Calcutta, 1970.
- Chennakesavan, Sarswati, *A Critical Study of Hinduism*, Delhi, Motilal Banarsidas, 1980.
- Devraja, N. K., *Hinduism and Modern age*, New Delhi, Jamia Nagar, 1975.
- Jingran, Saral, *Aspects of Hindu Morality*, Delhi, Motilal Banarsidas, 1999.
- Krishna, Yuvraj, *The Doctrine of Karma*, Delhi, Motilal Banarsidas, 1997.
- O' Flaherty, Wendy Doneger, *Karma and Rebirth in Classical Indian Traditions*, Delhi, Motilal Banarsidas, 1999.
- Potter, Karl H., *Presuppositions of Indian Philosophy*, New Delhi, Princeton Hall of India, 1965
- Prasad, Rajendra, *Varnadharma, Niskamakarma and Practical Morality*, A Critical essay on Applied Ethics. D. K. Print world (P) Ltd. New Delhi, 1999.
- Radhakrishnan, S., *Indian Philosophy*, Vol – I & II, New York: The Macmillan Company, 1956.
- Radhakrishnan, S. (2011) *The BhagvadGita*, Harper Collins.
- Radhakrishnan, S. (1960), *The Hindu view of life*, Unwin books, London.
- Maha Upanisad
- Gupta, Shantinath, *Indian Concept Of Values*, Manohar 1978
- <http://www.advaita.it/library/mahaupanishad.html>
- <https://www.learnreligions.com/what-are-vedas-1769572>

Teaching Learning Process

(i) Focus to be on richness of Indian philosophical tradition, vedic value systems, cultural context and identifying those concepts that can appeal to Western and global audience. (ii) Promotion of developing philosophical perspective on contemporary socio-political and economic issues.

Assessment Methods

Internal Assessment

Teachers can take test, assignments, projects, hold group discussions, debates and presentations of 20 marks. Rest 5 marks will be given on the basis of student's attendance.

Keywords

Veda, Value, Dharma, Rta, Purusarthas, Asrama, Sanakaras, Prithvisukta, Sreyas, Preyas

Buddhism
(DSE (II))
Discipline Specific Elective - (DSE)

Course Objectives

- The primary objective of this course is to advance students' critical awareness of the background to the origin, nature and classification of Buddhism.
 - Comprehensive understanding of the philosophy of Indian Buddhism.
-

Course Learning Outcomes

- At the end of the course, a student should be able to demonstrate a clear understanding of the background to the origin of Buddhism in India.
 - have acquired a good understanding of the key doctrines of Buddhism.
 - have the sound understanding of Buddhist epistemology, metaphysics, ethics and shall be able to go for further studies in the subject.
-

Unit 1 Introduction to Buddhism

1. Origin and Nature of Buddhism
2. Schools of Buddhism

Recommended Readings:

• Bapat, P.V. (1959), 2500 Years of Buddhism, Government of India, *Publications Division*, New Delhi, and its Hindi translation also by the Publications Divisions. Chapter-2, pp, 9-20 and Chapter-6, pp,97-138.

- Mahathera, Narada. (2006), The Buddha and His Teachings, Jaico Publishing House, Mumbai. Chapter-1 to14, pp,1-173.

Unit 2 Ethics of Buddhism

1. Five Vows
2. Four Noble Truth
3. Eight Fold Path
4. Brahma Viharas

Recommended Readings:

- Mahathera. Narada. (2006), The Buddha and His Teachings, *Jaico Publishing House*, Mumbai. Chapter-15 to17, pp,201-251.
- Dahlke, P., Silacara, B., Oates, L.R., & Lounsbery, G. Constant. (2008), The Five Precepts, Buddhist Publication Society, Srilanka, pp,3-13.
- Walpola, Sri Rahula. (1974), What the Buddha Taught, Grove Press, New York, Chapter- 2 to 5, pp,16-50.

Unit 3 Ontology of Buddhism

1. Paramitas
2. Pratītyasamutpāda

Recommended Readings:

- Mahathera. Narada. (2006), The Buddha and His Teachings, Jaico Publishing House, Mumbai. Chapter-25, pp,326-337.
- Mehta, Sonia. (2017), The Problem of Meaning in Buddhist Philosophy, Krishi Sanskriti Publication, Delhi.

Chapter-3, pp,17-33

Unit 4 Doctrines of Buddhism

1. Karma and Rebirth
2. Nirvana

3. Anatmavada (No Soul theory with special reference to the debate between Miland and Nagsen)

Recommended Readings:

- Mahathera, Narada. (2006), The Buddha and His Teachings, Jaico Publishing House, Mumbai. Chapter-18 to 36, pp,252-426.
- Walpola Sri Rahula. (1974), What the Buddha Taught, Grove Press, New York, Chapter- 6, pp,51-66

References

Recommended Readings:

- Bapat, P.V. (1959), 2500 Years of Buddhism, Government of India, *Publications Division*, New Delhi, and its Hindi translation also by the Publications Divisions.
- Dahlke, P., Silacara, B., Oates, L.R., & Lounsbery, G. Constant. (2008), The Five Precepts, Buddhist Publication Society, Srilanka.
- Mehta, Sonia. (2017), The Problem of Meaning in Buddhist Philosophy, Krishi Sanskriti Publication, Delhi.
- Walpola, Sri Rahula. (1974), What the Buddha Taught, Grove Press, New York.

Additional Resources:

Suggested Readings

- Bhatta, J. (1971), Nyayamanjari ed. S.N. Shukla, Varanasi: Chowkhamba Vidyabhavan.
- Pande, G.C. (1957), Studies in the Orgins of Buddhism, Allahabad University, Allahabad.
- Halbfars, W. (1999), Karma, Apurva and "Nature" causes: observation on the growth and limits of the theory of Samsaras", O' Flabearty.
- Harvey, Peter. (1990), An Introduction of Buddhist Ethics, Cambridge University Press, Cambridge.
- Sarao, K.T.S. (2003), "Anatman/Atman (No-self/self)", Encyclopedia Buddhism, Memillan, New York.
- Kamla, J. (1983), The Concept of Pancsila in Indian Thought, P. V. Institute: Varanasi.
- Keown, D. (1992), The Nature of Buddhist Ethics, Macmillan, London.

Teaching Learning Process

Lectures and Tutorials as per University Guidelines

Assessment Methods

As per University system of semester exams for 75% and Internal assessment which comprises of class attendance, tests and assignment assessment forms the rest 25%

Keywords

Pancsila, Four Noble Truth, Eight Fold Path, Paramitas, Brahma Viharas, Pratītyasamutpāda, Nirvana, Anatmavada

**Greek Philosophy
(DSE (III))
Discipline Specific Elective - (DSE)**

Course Objectives

The course is intended for giving a comprehensive account of Greco-Roman Philosophy to undergrad students pursuing a BA Programme course with Philosophy as one of their disciplines.

Course Learning Outcomes

This course will provide students with a seminal awareness of the Western Classical Philosophical tradition, and give them clarity on classics.

Unit 1 Socrates and the Sophists

1. Care of the self and Virtue.
2. Moral Relativism and Persuasion

Recommended Readings;

Christopher Shields(edited). The Blackwell Guide to Ancient Philosophy , (Blackwell Publishing,2003), Chapter-2, Parts I and II

Mary Louise Gill and Pierre Pellegrin (eds). A Companion to Ancient Philosophy, (Blackwell,2006.) Relevant chapters

Warren, James & Frisbee Sheffield (eds.). The Routledge Companion to Ancient Philosophy. Routledge: London and New York, 2014. Part-1.,pp. 94-124

Unit 2 Plato

1. The ideal state
2. Critique of Democracy

Recommended Readings:

The Routledge Companion to Ancient Philosophy edited by James Warren and Frisbee Sheffield, (Routledge: London and New York,2014) Part-II , Chapters 12-15

Lee, Desmond (translated), Plato: The Republic,edited by Betty Radice, (Penguin Classics,1974) Books 8 and 9

Unit 3 Aristotle

1. Political Naturalism
2. Human nature and the nature of the state

Recommended Readings:

James Warren and Frisbee Sheffield(eds),The Routledge Companion to Ancient Philosophy (Routledge: London and New York,2014),Part-III,Chapter-25 Christopher Shields(edited). The Blackwell Guide to Ancient Philosophy , (Blackwell Publishing,2003, chapter-10.

Unit 4 Epicurus and the Stoics

1. Pleasure and happiness
2. Living according to nature

Recommended Readings:

Christopher Shields(edited). The Blackwell Guide to Ancient Philosophy , (Blackwell Publishing,2003, chapters 12 and 13 Warren, James & Frisbee Sheffield (eds.). The Routledge Companion to Ancient Philosophy. Routledge: London and New York, 2014. chapters 31-33

Practical

An understanding of the classics and an ability to contextualise the tradition in the present times should be an interesting endeavor for the students pursuing this course.

References

Recommended

- The Routledge Companion to Ancient Philosophy edited by James Warren and Frisbee Sheffield, (Routledge: London and New York, 2014)
- Christopher Shields (edited). The Blackwell Guide to Ancient Philosophy, (Blackwell Publishing, 2003).
- Mary Louise Gill and Pierre Pellegrin (eds). A Companion to Ancient Philosophy, (Blackwell, 2006.)
- Kerferd, G. B. The Sophistic Movement, (Cambridge: Cambridge University Press, 1981)
- Keyt, D. and Miller (Jr.), F. D. (eds.) A Companion to Aristotle's Politics. (Oxford: Oxford University Press, 1991)
- Long, A. Hellenistic Philosophy, 2nd ed. (California: University of California Press, 1986)
- Rist, J. M. Epicurus, (Cambridge: Cambridge University Press, 1972) Schofield, M. Plato: Political Philosophy, (Oxford: University Press, 2006).
- Lee, Desmond (translated), Plato: The Republic, edited by Betty Radice, (Penguin Classics, 1974).

Additional Resources:

Annas, J. The Morality of Happiness, (Oxford: Oxford University Press, 1993) Epicurus, Letter to Menoeceus, Trans. by Robert Drew Hicks (E Text: <http://classics.mit.edu/Epicurus/menoec.html>)

Teaching Learning Process

A comparative study of the classical philosophical traditions of Greece and India will add a pedagogical value to this paper. Assignments or a project could be made on this comparative analysis besides the mandatory tests and assignments that are strictly according to the syllabus prescribed.

Assessment Methods

As per University rules of 75% semester exam and 25% Internal assessment.

Keywords

Sophists, Socrates, Plato, Aristotle, Epicurus, Stoics,

Social and Political Philosophy: Indian & Western (DSE (IV)) Discipline Specific Elective - (DSE)

Course Objectives

- A. Understanding of the basic social and political concepts both in Western and Indian context.
- B. Understanding the philosophical underpinnings of the social and political structures.
- C. To study different thinkers who have given their theories in understanding the society and principles of the governance.

Course Learning Outcomes

- to make students a better citizens by understanding the notion of democracy
- to know rights of Individuals and communities.
- to learn to live in cohesive manner in a multicultural setup.

Unit 1 A Study of Social and Political concepts:

- Rights
- justice
- Equality
- Democracy

References

Benn, S. I., R. S., Peters. " chapter 4,5,7 and 15 ". In *Social Principles and The Democratic State*, London: George Allen and Unwin LTD.

Further Reading

Rawls, John. "*Fundamental ideas*" in *justice as fairness*. 1971.

Unit 2 Indian Social Thinkers:

- Tagore's Cosmopolitanism
- Gandhi critique of modern civilization.
- Ambedkar's Annihilation of Caste and state
- M.N.Roy's Nationalism

References

Tagore, R. (2002a). *Nationalism*. New Delhi: Rupa and Co.

Parel, j. (eds). Gandhi Critique of modern civilization, Hind Swaraj. Chapter - 6-13th. Cambridge: Cambridge University Press, 1997.

Rodrigues, Valerian. *The Essentials writing of B.R. Ambedhkar*: Oxford India Paperbacks.

Ray, Sibnarayan, ed., *Selected Works of M. N. Roy, vol. I*, (Delhi Oxford University Press, 1987).

Unit 3 Western Social and Political Thinkers:

- John Locke; state of nature, social contract, nature of state; its forms and characteristics
- Karl Marx ; dialectic materialism,

References

Nelson, Brian. *Western Political Thought- 2007* Pears.

Bertell, Ollman. *Dance of Dialectic*. chapter 1 and chapter 2. University of ILLINOIS PRESS Urban Chicago.

Further Reading

Locke, John. *The Second Treatise on Civil Governance*, 1690.

Karl Marx and Friedrich, *The Communist Manifesto*. Penguin Classic.

Dunn, John. *The political thought of John Locke, Chap-1*. Cambridge: Cambridge University Press.

Unit 4 Communitarianism, Multiculturalism, Minority Rights and Feminism:

- Charles Taylor (Politics of Responsibility)
- Bell Hooks (A movement to end sexist operation.)

References

Hooks, Bell, *Feminism by Oxford Reader*.

Taylor, Charles, *Responsibility for self*. In Amelie Oksenburg Rorty (ed.), *The Identities of Person*. University of California Press. pp. 281-99 (1976).

Taylor, Charles. *Multiculturalism: Examining the Politics of recognition*. Princeton: Princeton University Press, 1994.

References

As above

Additional Resources:

- Raphael, D.D. *Problems of Political Philosophy*.
- Ghoshal, U.N., *A History of Indian Political ideas*, Oxford University Press, 1950.
- Kabir, Humayun, *Mysticism and Humanity of Tagore*, East and West, vol. 12 nos 2-3 (september 1961)

Teaching Learning Process

Textual Reading , Group Discussion

Assessment Methods

internal assesment

(test/ assignments)

Keywords

multiculturalism, democracy, rights, justice, property, liberty, equality, fraternity, nationalism, cosmopolitanism

**Applied Ethics
(DSE (V))
Discipline Specific Elective - (DSE)**

Course Objective

The objective is to make students aware of Ethical tools that must be used to resolve moral and ethical issues around us.

Improving analytical and writing skills.

Course Learning Outcomes

The course shall give a vision that merges the social with ethical understanding of choices.

The issues in human lives that touch each one of us must be synergised for all and this course makes that outcome a good possibility.

Unit 1 An Introduction to Moral Philosophy and Applied Ethics.

Essential Readings:

Rachel, J., The Elements of Moral Philosophy. Oxford: Oxford University Press, 2011

Singer, P., Applied Ethics. Oxford: Oxford University Press, 1986

Unit 2 Issues, Rights and Concerns

1. Issues of life and Death (Euthanasia and Suicide, Theories of Punishment)

2. Organ Transplantation

3. Concerns (Surrogacy ,Cloning)

Essential Readings:

Singer, P., Applied Ethics. Oxford: Oxford University Press, 1986

Jecker, N. S., Jonsen, A. R., and Pearlman, R. A. eds., Bioethics: An Introduction to the History, Method and Practice New Delhi: Jones and Bartlett, 2010

Careless thought costs lives: The Ethics of transplant by Janet Radcliffe Richards, Oxford University Press, 2012

Unit 3 Environmental Ethics

1. Nature as Means or End.
2. Respect to animals and ecology

Essential Reading:

Singer, P., Applied Ethics. Oxford: Oxford University Press, 1986

Unit 4 Media and Cyber Ethics

Media Ethics

Print and Cyber Media

Essential Readings:

Spinello, Richard.A., The Internet and Ethical Values, In CyberEthics: Morality and Law in Cyberspace, Jones and Bartlett Publishers, 2003, pp.1-28

Spinello, Richard.A., Intellectual Property in Cyberspace, In Cyber Ethics: Morality and Law in Cyberspace, Jones and Barlett Publishers, 2003, pp. 91-104.

References

Rachel, J., The Elements of Moral Philosophy. Oxford: Oxford University Press, 2011

Singer, P., Applied Ethics. Oxford: Oxford University Press, 1986

Jecker, N. S., Jonsen, A. R., and Pearlman, R. A. eds., Bioethics: An Introduction to the History, Method and Practice New Delhi: Jones and Bartlett, 2010

Richards, J R Careless thought costs lives: The Ethics of transplant, Oxford University Press, 2012

Spinello, Richard.A., CyberEthics: Morality and Law in Cyberspace, Jones and Bartlett Publishers, 2003, pp 1-28, pp 91-104.

Additional Resources:

Dower, N., World Ethics: The New Agenda. Edinburgh: Edinburgh University Press, 2007

Teaching Learning Process

Lectures

Tutorials

Power Point Presentations

Assessment Methods

Internal assessment

University examination

Presentation

Keywords

Applied Ethics, Media Ethics, Cyber Ethics, Environmental Ethics, Organ Transplantation

Fundamental of Indian Philosophy (GE (I)) Generic Elective - (GE)

Course Objective(2-3)

Course Objectives:

•The objective of this course is to make students familiar with Indian Intellectual traditions. This course will be an Introduction to the major schools of Indian philosophy . Focus will be on interactive learning where students will engage themselves. The course will help the students in understanding the significance of Indian philosophical studies in their daily life,

how to overcome the stress, how to manage their life and take challenges in life ; hence there will be a focus on the dialectical and analytical method to understand Indian philosophy.

- Make students familiar with, and clear understanding of, the major concepts within Indian philosophical studies.
 - Increase students understanding of Indian Philosophical systems and their philosophy.
 - Improved critical reading of the texts, their rational and logical understanding, and writing abilities.
 - Exposure to various texts .
 - Finally it will give a holistic development of their personality
-

Course Learning Outcomes

- Students will appreciate the Indian Metaphysics of various ancient Indian schools such as Charvaka, Buddhism, Jainism, Samkhya ,Mimamha and Vedanta. They will become aware of the Metaphysics of various schools which will help them to understand the society at large.

In unit II, students will gain familiarity with the epistemology of Charvaka and Nyaya - Vaishesika system. Unit II and Unit III are interrelated in the sense that epistemology of a particular school can be understood through its metaphysics and vice-versa.

- In Unit IV Students will learn to develop scientific, logical and rational inquiry for understanding the systems. Students will be able to do a comparative analysis of all systems which will further enhance their debating skills. Students will develop the ability to think critically and to read and analyze scientific literature.
-

Unit 1 Basic Outlines of Indian Philosophy

1. General Characteristics of Indian Philosophy

Recommended Readings

- Chatterjee, S and D.M.Datta. 1984. *An Introduction to Indian Philosophy*, 8th ed. Calcutta: University of Calcutta.
- Raju, P.T. 1985. *Structural Depths of Indian Thought*. Albany (New York).State University of New York Press.

•Surenranath Dasgupta, A History of Indian Philosophy, Vol.1, Delhi: Motilal Banarsidass Publishers Private Limited, 2004, pp.67-77.

Unit 2 Indian Epistemology

1. Carvaka Epistemology
2. Nyaya Theory of Perception and Inference

Recommended Readings

- Chatterjee, S and D.M.Datta. 1984. *An Introduction to Indian Philosophy*, 8th ed.Calcutta: University of Calcutta.
- Datta, D.M. 1972. *The Six Ways of Knowing*. Calcutta: University of Calcutta Press.
- Surenranath Dasgupta, A History of Indian Philosophy, Vol.1, Delhi: Motilal Banarsidass Publishers Private

Unit 3 Indian Metaphysics

1. Four-fold Noble Truths, Doctrine of Dependent Origination and Momentariness of Buddhism
2. Samkhya Dualism: Prakriti and Purusha

Recommended Readings

- Chatterjee, S and D.M.Datta. 1984. *An Introduction to Indian Philosophy*, 8th ed.Calcutta: University of Calcutta.
- Sharma, C.D. 2000. *A Critical Survey of Indian Philosophy*. Delhi: MotilalBanarasidass

Unit 4 Trajectories of the Philosophical

1. The Vedic Primordial Quest

Raimundo Pannikar (ed. &trans),'May Peace Bring Peace' (Shanti Mantra)

Atharva Veda XIX,9-15,14 The Vedic Experience: Mantramanjari, Delhi:Motilal Banarasidass Publishers Private limited, 2006, pp.305

2. The Upanishadic Query: The Immanent and the Transcendent, Isa Upanishad, Verses 1 to 11

S. Radhakrishnan, Isa Upanishad(ed. &trans), The Principal Upanishadas, New Delhi: Harper Collins Publishers India, 1987, pp.567-575.

3. "The Moral Question and the Subtlety of Dharma"

Gurucharan Das, "Draupadi's Courage" in The Difficulty of Being Good, New Delhi: Penguin Books, 2012, pp.33-53

References

Suggested Readings

- Organ, Troy Wilson. *The Self in Indian Philosophy*. London: Mouton & Co., 1964
- Pandey, Sangam Lal. *Pre-Samkara Advaita Philosophy*, 2nd ed. Allahabad: Darsan Peeth, 1983.
- Paul S. and Anthony J. Tribe. *Buddhist Thought: A Complete Introduction to the Indian Tradition*. London: Routledge, 2000

Additional Resources

- Stcherbatsky, Theodore. *The Soul Theory of Buddhists*, 1st ed. Varanasi: Bharatiya Vidya Prakasana, 1970.
- Koller, John M. "Skepticism in Early Indian Thought". *Philosophy East and West* 27(2). 1977, 155-164.

Teaching Learning Process

Teaching-Learning Process:

The B.A (GE) Fundamentals of Indian Philosophy aims to make the student proficient in understanding their Philosophy, Culture and Society through the transfer of knowledge in the classroom as well as in life. In the classroom this will be done through blackboard and chalk lectures, charts, PowerPoint presentations, and the use of audio-visual resources that are available on the internet such as virtual lab. An interactive mode of teaching will be used. The student will be encouraged to participate in discussions, group discussions and deliver seminars on some topics. A problem-solving approach will be adopted wherever suitable.

Assessment Methods

Grade will be determined on the basis of graded assignments as specified below: Evaluation:

- Four Assignments/ Projects: 10% each
 - Three in-class quizzes/oral tests: 5% each
 - Paper Presentations: 5%
 - final exam: 10%
 - Attendance and participation 5%
-
-

Keywords

Key words

Shruti and Smriti, Idealism, Materialism, Realism, Self, Brahman, Maya, Dualism, Preyas, Shreyas and Nihisreyas, Anekantavada, Syadvada, Karma, Jnana, Bhakti, Pratityasamutpada, Nirguna and Saguna Brahman, Jiva etc.

Technology and Ethics (GE (II A)) Generic Elective - (GE)

Course Objective

To enable students to ethically analyse the technological advancements which is a challenge for human kind in the light of ethical evaluation and implications of actions in the digital space. The studies aims to guide students to use technology responsibly. They will understand the development of technology and the importance of its ethical usage so that they become ethical citizens in a digital world.

Course Learning Outcomes

Students' enhanced ability to analyse the impact of technology on social, political, economic and legal issues from an ethical point of view. They will responsibly function and lead the

usage to technology so as to save society from its harmful effects. With an increased ethical sensitivity and an improved ethical judgment capacity, they will be expected to advocate for the best practices of technology with its ethical implications.

Unit 1 Introduction to Technology and Ethics:

- Ethical Issues in the Use of Information Technology
- Computer Ethics
- Digital Divide

Recommended Readings:

- Floridi, Lucians.(ed.) , *The Cambridge Handbook of Information and Computer Ethics*, Cambridge University Press, New York, 2010. pp. 14-17, 33-38.
- Tavani, H. T. *Ethics and Technology*, (4th ed.) Wiley, 2004. pp. 303-309.

Further Readings:

- Himma, K.E and Tavani,H. (Ed): *The Handbook of Information and Computer Ethics*, New Jersey . John Wiley and Sons., 2000.
- Mitcham C. *Encyclopedia of Science Technology and Ethics*, Introduction, Macmillan , U.S.A 2005.
- Tavani, H.T. *Ethics & Technology*, 4th Edition, Willey, U.S.A, 2004.
- Bynum T.W. and Rogerson S. (eds.) *Computer Ethics and Professional Responsibility*, Wiley Blackwell Publishing , 2003.
- Canellopoulou M. and Himma K. E. The Digital Divide: Perspective for future, *The Hand Book of Information and Computer Ethics*, New Jersey: John Wiley and sons, 2008.
- Floridi, L. (ed) *The Cambridge Handbook of Information and Computer Ethics*. Cambridge University Press. Cambridge . 2010.

Unit 2 Biotechnology

- GM Foods
- Cloning
- Stem Cell Culture

Recommended Readings:

- Burkhardt, J. *The GMO Debates: Taking Ethics Seriously*, Institute of Food and Agricultural Science, University of Florida.
- Harris, John, "Goodbye Dolly: The Ethics of Human Cloning", *Journal of Medical Ethics*,23, 1997, pp.353-360.
- "Of Stem Cells Ethics" *Nature Cell Biology*, vol. 19, 2017. editorial pp. i. Also available at www.nature.com/articles/ncb3652.

Further Readings:

- Burkhardt, J. *The GMO Debates: Taking Ethics Seriously*, Institute of Food and Agricultural Science, University of Florida.
- Harris, John, "Goodbye Dolly: The Ethics of Human Cloning", *Journal of Medical Ethics*, 23, 1997.
- "Of Stem Cells Ethics" *Nature Cell Biology*, vol. 19, 2017. editorial pp. i. Also available at www.nature.com/articles/ncb3652.
- Margaret R Mclean, *The Future of Food : An Introduction to Ethical Issues in Genetically Modified Foods* , Markkula Centre for Applied Ethics, 2005, <http://www.scu.edu/ethics/practicing/focusareas/medical/conference/presentations/genetically-modified-foods.html>.
- Tavani, T.H. *Ethics And Technology* , *The Handbook of Information and Computer Ethics*, Willey. 2008. U.S.A.
- Himma, K.E. & Tavani, H.T. (ed) *Encyclopedia of Science, Technology and Ethics*: Mac Millan Reference USA, 2005.
- Feenberg, Andrew. *Questioning Technology*, Routledge, 1999.

Unit 3 Some Recent Considerations in Technology

- Artificial Intelligence
- Nano- technology

Recommended Readings:

- Tavani, H. T. *Ethics and Technology*, (4th ed.) Wiley, 2004. pp. 355-363, 382-387.

Further Readings:

- Noble, D. G. "The Immortal Mind: Artificial Intelligence" in *The Religion of Technology: The Divinity of Man and the Spirit of Intervention*, New York, : Alfred A. Knopf., 1997,
- Tavani, H. T. *Ethics and Technology*, (4th ed.) Wiley, 2004.

Unit 4 Public Evaluation of Technology

- Social Implications of Technology
- Justice
- Rights

Recommended Readings:

- Veraszto, E. V., Freito, L. V. "Technology and Its Social Implications: Myths and Realities in the Interpretation of the Concept" *International Scholarly and Scientific Research & Innovation*, vol. 8, no 9, 2014, pp. 3015-19.

- Floridi, L. (ed) *The Cambridge Handbook of Information and Computer Ethics*. Cambridge University Press. Cambridge . 2010. pp 116-131. 168-173.

Further Readings:

- Himma, K.E and Tavani,H. (Ed): *The Handbook of Information and Computer Ethics*, New Jersey . John Willey and Sons., 2000.
- Mitcham C. *Encyclopedia of Science Technology and Ethics*, Introduction, Macmillan , U.S.A 2005.
- Tavani, H.T. *Ethics & Technology*, 4th Edition, Willey, U.S.A, 2004.
- Bynum T.W. and Rogerson S. (eds.) *Computer Ethics and Professional Responsibility*, Wiley Blackwell Publishing , 2003.
- Canellopoulou M. and Himma K. E. *The Hand Book of Information and Computer Ethics*, New Jersey: John Wiley and sons, 2008.
- Floridi, L. (ed) *The Cambridge Handbook of Information and Computer Ethics*. Cambridge University Press. Cambridge . 2010.
- Barnes, B. The Public Evaluation of Science and Technology From Carl Mitcham (Ed.) *Encyclopedia of Science, Technology and Ethics*:Mac Millan Reference USA, 2005.
- Veraszto, E. V., Freito, L. V. "Technology and Its Social Implications: Myths and Realities in the Interpretation of the Concept" *International Scholarly and Scientific Research& Innovation*, vol. 8, no 9, 2014.

References

Essential Readings:

- Himma, K.E and Tavani,H. (Ed): *The Handbook of Information and Computer Ethics*, (New Jersey: John Willey and Sons.,2008.) 25-48.
- Fritz Allhoff, Patrick Lin, James Moor, John Weckert (Ed.) *Nanoethics: The Ethical and Social Implications of Nanotechnology* (New Jersey: John Wiley and sons, 2008)1-17.
- Mitcham C. *Encyclopedia of Science Technology and Ethics*, Introduction, Macmillan , U.S.A 2005, xi - xvii
- Tavani, H.T. *Ethics & Technology*, 4th Edition, (U.S.A: Willey, 2004) 382-389.
- Bynum T.W. and Rogerson S. (eds.) *Computer Ethics and Professional Responsibility*, (New York: Wiley Blackwell Publishing , 2003)17- 20
- Canellopoulou M. and Himma K. E. The Digital Divide: Perspective for future, *The Hand Book of Information and Computer Ethics*, (New Jersey: John Wiley and Sons, 2008) 621-638.
- Floridi, L. (ed) *The Cambridge Handbook of Information and Computer Ethics*. (Cambridge : Cambridge University Press.2010)33-38, 86-92.
- Margaret R M., *The Future of Food : An Introduction to Ethical Issues in Genetically Modified Foods* , Markkula Centre for Applied Ethics, 2005,
<http://www.scu.edu/ethics/practicing/focusareas/medical/conference/presentations/genetically-modified-foods.html>.

- Burkhardt, J. *The GMO Debates: Taking Ethics Seriously*. Institute of Food And Agricultural Sciences. University of Florida.<http://www.farmfoundation.org/news/articlefiles/120-burkhardt.pdf>
- Barnes, B. The Public Evaluation of Science and Technology From Carl Mitcham (Ed.) *Encyclopedia of Science, Technology and Ethics*. (U.S.A: Mac Millan Reference, 2005) 16-35.

Additional Resources:

Further Readings

- Debiprasad Chattopadhyaya, *Science, Philosophy and Society*, New Delhi: Critical Quest, 2007.
- Terry Ward Bynum. *Milestones in the history of information and computer ethics*, Kenneth Einar Himma and Herman T Tavani (Eds.), *The Hand Book of Information and Computer Ethics*, (New Jersey: John Wiley and Sons, 2008) 25-48.
- Margaret R Mclean, *The Future of Food : An Introduction to Ethical Issues in Genetically Modified Foods* , Markkula Centre for Applied Ethics, 2005, <http://www.scu.edu/ethics/practicing/focusareas/medical/conference/presentations/genetically-modified-foods.html>.
- Tavani, T.H. *Ethics And Technology* , The Handbook of Information and Computer Ethics, New York: Willey. 2008.
- Himma, K.E. & Tavani, H.T. (ed) *Encyclopedia of Science, Technology and Ethics*: (U.S.A: Mac Millan Reference, 2005) 663-669.
- Feenberg, Andrew. *Questioning Technology*, (London: Routledge, 1999) 139-158
- Himma, K.E and Tavani, H. (Ed): *The Handbook of Information and Computer Ethics*, (New Jersey: John Willey and Sons., 2008) 25-48.
- Fritz Allhoff, Patrick Lin, James Moor, John Weckert (Ed.) *Nanoethics: The Ethical and Social Implications of Nanotechnology*, (New Jersey: John Wiley and Sons, 2008) 1-17.
- Mitcham C. *Encyclopedia of Science Technology and Ethics*, Introduction, Macmillan , U.S.A 2005.
- Tavani, H.T. *Ethics & Technology*, 4th Edition, Willey, U.S.A, 2004.
- Bynum T.W. and Rogerson S. (eds.) *Computer Ethics and Professional Responsibility*, New Jersey: Wiley Blackwell Publishing , 2003.
- Canellopoulou M. and Himma K. E. The Digital Divide: Perspective for future, *The Hand Book of Information and Computer Ethics*, New Jersey: John Wiley and sons, 2008.
- Floridi, L. (ed) *The Cambridge Handbook of Information and Computer Ethics*. Cambridge University Press. Cambridge . 2010.
- Margaret R M., *The Future of Food : An Introduction to Ethical Issues in Genetically Modified Foods* , Markkula Centre for Applied Ethics, 2005, <http://www.scu.edu/ethics/practicing/focusareas/medical/conference/presentations/genetically-modified-foods.html>.
- Burkhardt, J. *The GMO Debates: Taking Ethics Seriously*. Institute of Food And Agricultural Sciences. University of Florida.<http://www.farmfoundation.org/news/articlefiles/120-burkhardt.pdf>

- Barnes, B. *The Public Evaluation of Science and Technology* From Carl Mitcham (Ed.) Encyclopedia of Science, Technology and Ethics: Mac Millan Reference USA, 2005

Teaching Learning Process

PPT, Group Discussion etc

Assessment Methods

Internal Class Tests, Assignments, Projects

Keywords

Technology, Ethics, Computer Ethics, Biotechnology, Nano- technology, Digital divide

Ethics (GE 2B)
(GE (II B))
Generic Elective - (GE)

Course Objective(2-3)

The course is designed to grasp the traditional ethical (Western and Indian) theories as well as to help students apply it on the practical front. It is a curriculum which enables students to develop ability for moral reasoning and act with ethical deliberations.

Course Learning Outcomes

This curriculum should enable students to develop ability for moral reasoning and act with ethical deliberations. After studying ethics one is equipped with the ethical sensitivity and moral understanding required to solve complex ethical dilemmas.

Unit 1 Introduction to Ethics

1. Introduction to Moral Philosophy
2. The development of Morality (from Convention to Reflection)
3. Importance of freewill.

Recommended Readings:

1. Satyanarayana, Y.V. (2010), Ethics: Theory and Practice, Pearson, Chapter-1, "Morality and Moral Reasonings", pp, 1-12.
2. Mackenzie, J.S., (1977), A Manual of Ethics, Oxford University Press Bombay, Chapter-1, "Scope of Ethics", pp, 1-14.
3. Lillie, W., (1948), An Introduction to Ethics, Methuen & Co. Ltd. London, Chapter-3, "The Development of Morality", pp, 51-71.
4. Taylor, Paul. W. (1978), "Problems of moral philosophy: an introduction to ethics", Dickenson publishing company, Inc. Belmont, California, Introduction, pp, 3-12.

Unit 2 Theories of Ethics

1. J.S. Mill: Utilitarianism.
2. Immanuel Kant: Duty, Categorical Imperative and Good will.
3. Aristotle: Well-being and Golden Mean.

Recommended Readings:

1. Mill, J.S. (1863): Utilitarianism, London, in Mary Warnock. Ed. 1962.
2. Aristotle, (1926) Nichomachian Ethics, Harvard University Press.
3. Kant, Immanuel: Groundwork of the Metaphysics of Morals, Trans. H J Paton, as The Moral Law. London.

4. Lillie, W.,(1948), An Introduction to Ethics, Methuen & Co. Ltd. London,Chapter-9, "The Standard as Pleasure",pp,166-177.
5. Lillie, W.,(1948), An Introduction to Ethics, Methuen & Co. Ltd. London,Chapter-16, "Virtue",pp,287-290.
6. Sinha, Jadunath, (2004), A Manual of Ethics, New Central Book Agency, Chapter-12, pp,136-147.

Unit 3 Applied Ethics

1. The theories of punishments
2. Euthanasia
3. Animal Rights

Recommended Readings:

1. Satyanarayana, Y.V.(2010), Ethics: Theory and Practice, Pearson, Chapter-7, "The Justification of Capital Punishment", pp,121-138.
2. Satyanarayana, Y.V.(2010), Ethics: Theory and Practice, Pearson, Chapter-9, "The Justification of Voluntary Euthanasia", pp,164-184.
3. Rachel, James.(1989), The Right Things to Do, 6th Ed.,Mc Graw Hill Publications, Chapter-16, "Do Animals Have Rights?", pp,134-146.

Unit 4 Indian Ethics

1. Puruṣārthas
2. *Niṣkāmakarma (Bhagavadgītā)*
3. Eight-Fold Path (Buddhism)

Recommended Readings:

1. Satyanarayana, Y.V.(2010), Ethics: Theory and Practice, Pearson, pp 13-16.
2. Mizuno, Kogen, (1987), Basic Buddhist Concepts, Kosei publishing corporation, Tokyo, Chapter-7, "The Eight Fold Path", pp,129-137.
3. Sinha, Jadunath, (2004), A Manual of Ethics, New Central Book Agency, Chapter-XXXVI, "Indian Ethics", pp,365-369.

4. Hiriyanna, M.(1950), Popular Essays In Indian Philosophy, Chapter-9, pp,65-68, Kavayalaya : Publishers: Mysore.

Suggested Readings:

1. Dasgupta, S.N (2004), A History of Indian Philosophy, vol.1, Delhi: MLBD Publishers
2. Kaveeshwar, G.W. (1971), The Ethics of Gita, Motilal Banarasi Dass Publications, Delhi, Chapter-12, "Ideal Action according to Gita", pp,197-220.

References

Additional Resources:

- Hartmann, N. (1950) *Moral Phenomena*, New Macmillan.
- Taylor, P.W., Problems of Moral Philosophy: An Introduction to Ethics, Dickenson Publishing Co. Inc. Belmont, California.
- Lillie, W., An Introduction to Ethics, Methuen & Co. Ltd. London, 1948
- Shelly Kagan,(1998) Normative Ethics , Westview Press.
- Kaveeshwar, G.W. (1971), The Ethics of Gita, Motilal Banarasi Dass Publications, Delhi, Chapter-12, "Ideal Action according to Gita", pp,197-220.

Keywords

- Ethics, Freewill, Virtue Ethics, Utilitarianism, Duty, Puruṣārthas, Niṣkāmakarma , Bhagavadgītā, Euthanasia, Punishment, Ahimsa, Imperatives, Moral

Semester VI

**Critical Thinking and Decision Making
(SEC (IV))
Skill-Enhancement Elective Course - (SEC)**

Course Objective

This course is primarily focused to develop thinking skills. It aims at enabling a person to take decision in difficult situations. It is the ability to analyze the way one thinks and presents the evidence for one's own ideas rather than simply accepting it. It is creative, clear and to some extent reflective thinking. This paper helps in developing ideas and ability to create a vision, plan for the future and anticipate and solve problems. .

Course Learning Outcomes

This course

1. Helps in generating productive/creative ideas for further use in difficult situation.
2. Creates enthusiasm for taking a risk of dealing with difficult issues and finding a way out for solution
3. Provides valuable intellectual traits like how to critically read, listen and write and develop faith in reason and encourage a flair for fairness and justice. As a result a learner learns step by step how to arrive at an ideal solution keeping in mind all situational factors.
4. Provides clarity in thinking as well as proper understanding of an issue to make it precise for further analysis.
5. Helps to use the skills of observation, analysis and evaluation and also provides sound reason for doubting and questioning.
6. Finally the learner becomes self-directed, self-monitored and self-corrective through this process of reflective thinking, and can proceed for right choice.

Unit 1 CRITICAL THINKING- BASIC COMPONENTS:

1. Critical Thinking: An Introduction
2. Cognitive Biases
3. Beliefs, Claims, issues and arguments.
4. Persuasion through Logic: Logos, Ethos and Pathos

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch 1-2.
2. Dewey, John, *How we think*. Mineola, N.Y. Dover Publications, 1997, Ch 6

Unit 2 CRITICAL THINKING: A SECOND ORDER ACTIVITY:

1. Clear thinking.
2. Vagueness, Ambiguity, Generality and Definition of terms
3. Argumentative essays
4. Credibility of claims and their sources

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch 3-4.

Unit 3 RHETORIC AND ITS FALLACIES:

1. Persuasion through rhetoric
2. Fallacies involved in rhetoric

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch 5.

Unit 4 CLEAR THINKING: KEYS FOR SOLUTION

1. Identification and analysis of the problem through case studies
2. Evaluating the Argument: Validity, Soundness and Strength; Reflecting upon the issue with Sensitivity and Fairness.
3. Evaluating Decision Options from Multiple Perspective.
4. Identifying Inconsistencies, Understanding Dilemma and Looking for Appropriate Solution within Limitations.

Recommended Reading:

1. Case Studies from both the recommended books
2. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch.2-5.
3. Dewey, John. *How we think*. Mineola, N.Y: Dover Publications, 1997, Ch.7, Ch 8.

References

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch1-4.
2. Dewey, John. *How we think*. Mineola, N.Y: Dover Publications, 1997, 68-14.

Additional Resources:

1. Watson, Jamie C. *Critical thinking : an introduction to reasoning well*. London/New York: Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc, 2015.

2.Kallet, Mike. *Think smarter : critical thinking to improve problem-solving and decision-making skills*. Hoboken, New Jersey: Wiley, 2014.

3.Bloom, Benjamin S., David R. Krathwohl, and Bertram B. Masia. *Taxonomy of educational objectives : the classification of educational goals*. New York: David McKay Company, 1956.

Teaching Learning Process

With the class room teaching for basic conceptual clarity the whole syllabus should be based on case studies from all walk of life, like social, economical, political, religious, gender, environment, global perspective as well as the surrounding local issues. Project works need to be encouraged Audio visuals should also encouraged with projector for direct interactive sessions and peer understanding. Logic games, e-learning methods, theme based movies and mock tests may be conducted for better understanding and better application of the skill.

Assessment Methods

Same as university rule of 75% exam and 25% of internal assessment.
Presentations based on case history and creative modules should be the evaluative procedure.
Peer evaluation should be encouraged.
Objective questions to test reasoning skill should be encouraged.

Keywords

Beliefs,
Claims,
Arguments,
Analysis and evaluation,
Cognitive bias,
Fallacy.

Jainism
(DSE (VI))
Discipline Specific Elective - (DSE)

Course Objective

This course aims at providing students' with a comprehensive understanding of Jain Philosophy comprising: historical relevance of Jain Trithankaras, Jain epistemology, Jain metaphysics, Jain ethics and its practical relevance in today's contemporary scenario.

Course Learning Outcomes

- At the end of the course, a student should be able to demonstrate a clear understanding of the background to the historical relevance of Jain philosophy.
- have acquired a good understanding of the key doctrines/concepts of Jain tradition .
- have the sound understanding of Jain epistemology, metaphysics, ethics, its practical relevance in today's contemporary scenario and shall be able to go for further studies in the subject.

Unit 1 Jainism: An overview

1. Historical relevance of tirthankars (with special reference to Mahāvīrā)
2. The sects: Digambar and Śvetāmbar
3. Symbols in Jainism and their Philosophical implications

Recommended Readings:

- Jain, J. P. (2005), Fundamentals of Jainism, Radiant Publishers, New Delhi, Chapter-1, pp,1-19.
- Chatterjee, S. & Datta. D.M. (1984), An Introduction to Indian Philosophy, 8th ed., University of Calcutta, Calcutta, Chapter-3, pp,68-70.
- Dasgupta, S.N. (2004), A History of Indian Philosophy, Vol.1, Motilal Banarasi Dass Publishers, Delhi, Chapter-4, pp,169-175.

Unit 2 Jain Epistemolog

1. Nature and Types of Knowledge
2. Syādvāda
3. Pramāṇa and Naya

Recommended Readings:

- Chatterjee, S. & Datta. D.M. (1984), An Introduction to Indian Philosophy, 8th ed., University of Calcutta, Calcutta, Chapter-3, pp,70-77.

- Dasgupta, S.N. (2004), A History of Indian Philosophy, vol.1, Motilal Banarasi Dass Publishers, Delhi, Chapter-4, pp,175-186.

Unit 3 Jain Metaphysics

1. Anekāntvāda
2. Concept of Substance
3. Jīva and Ajīva
4. Bondage and liberation

Recommended Readings:

- Chatterjee, S. & Datta. D.M. (1984), An Introduction to Indian Philosophy, 8th ed., University of Calcutta, Calcutta, Chapter-3, pp,81-93.
- Dasgupta, S.N. (2004), A History of Indian Philosophy, vol.1, Motilal Banarasi Dass Publishers, Delhi, Chapter-4, pp,187-203.
- Jain, J. P. (2005), Fundamentals of Jainism, Radiant Publishers, New Delhi, Chapter-2, pp,19-52, Chapter-5, pp,113-144 and Chapter-11, pp,265-295.

Unit 4 Jain Ethics

1. The triratna
2. Pañca-Mahāvratā
3. Practical Application of Jain Ethics

Recommended Readings:

- Chatterjee, S. & Datta. D.M. (1984), An Introduction to Indian Philosophy, 8th ed., University of Calcutta, Calcutta, Chapter-3, pp,94-103
- Jain, J. P. (2005), Fundamentals of Jainism, Radiant Publishers, New Delhi, Chapter-6, pp,145-169, Chapter-7, pp,170-191 and Chapter-8, pp,192-222.
- Mahapragya, Acharya. (2010), Anekanta: Philosophy of Co-Existence, Jain Vishva Bharti, Ladnun-Rajasthan, Chapter-12, pp,155-172.

References

Recommended Readings:

- Chatterjee, S. & Datta. D.M. (1984), An Introduction to Indian Philosophy, 8th ed., University of Calcutta, Calcutta.

- Dasgupta, S.N. (2004), A History of Indian Philosophy, Vol.1, Motilal Banarasi Dass Publishers, Delhi.
- Jain, J. P. (2005), Fundamentals of Jainism, Radiant Publishers, New Delhi.
- Mahapragya, Acharya. (2010), Anekanta: Philosophy of Co-Existence, Jain Vishva Bharti, Ladnun-Rajasthan.

Additional Resources:

Suggested Readings

- Jain, K. (1983), The Concept of Pancsila in Indian Thought, P VInstitute, Varanasi.
- Jain, K. (1998), Aparigraha- The Humane Solution, P V Institute, Varanasi.
- Jaini, J. L. (2014), Outlines of Jainism - Primary Source, Edition by F. W. Thomas.
- Jain, J. P. (2006), Art and Science of Self Realization, Radiant Publishers, New Delhi.
- Radhakrishnan, S., Moore, A. (1967), Sourcebook in Indian Philosophy, CA Princeton.
- Sharma, I C. (1965), Ethical Philosophies of India, Harper and Row, USA.
- Setia, T. Ahimsa. (2004), Anekanta and Aparigraha, Motilal Banarsidass Publishers, New Delhi.
- Sidhantacharya, Pt. Kailash Chandra Jain. (2015), Jain Dharam, Shrut Samvardhan Sansthan, Meerut.

Teaching Learning Process

Lectures and Tutorials as per University Guidelines

Assessment Methods

As per University system of semester exams for 75% and Internal assessment which comprises of class attendance, tests and assignment assessment forms the rest 25%

Keywords

Tirthankars, Digambar, Śvetāmbar, Syādvāda, Jīva and Ajīva, Anekāntvāda, Triratna, Pañca-Mahāvratā

**Philosophy of Religion
(DSE (VII))
Discipline Specific Elective - (DSE)**

Course Objective

The objective is to acquaint students with the basics of religion.

The students are then introduced to a systemic and comprehensive study of various approaches to concepts that are common across religions.

Course Learning Outcomes

Philosophy of religion develops a critical approach in the students whereby they are able to form an informed opinion regarding various issues concerning religion.

Unit 1 Concepts of Religion and Dharma

- 1) Nature of Religion and it's relation to Philosophy of Religion.
- 2) The Concept of Dharma (Purva Mimansa)

Recommended Readings-

Brody, Baruch A, Readings in Philosophy of Religion, Ed. Vol 1, New Jersey, PHI, 1974

Olivelle, Patrick, Dharma: Studies in its Semantic and Cultural and Religious History MLBD, 2009

Unit 2 Challenges to Religion

- 1) "God and Evil " - H.J. McCloskey
- 2) "The Ethics of Belief" - W.K.Clifford

Recommended Readings-

McCloskey, H.J. God and Evil, *Philosophical Quarterly*, Vol.10, 1960

Meister, Chad, Philosophy of Religion, Reader, Routledge, New York, 2008

Unit 3 Significance of Faith, Prayer and Revelation in Religion

1) Faith, Reason and Revelation.

2) The Concept of Prayer.

Recommended Readings-

Quinn, P.L. and Taliaferro, C. ed., *A Companion to Philosophy of Religion*, Blackwell Publishers, 1997

Unit 4 Overview of the concepts of Religious Diversity and Liberation

1) The Concept of Liberation: Indian Perspective

2) Religious Diversity-- Inclusivism, Exclusivism and Pluralism

Recommended Readings-

Dasgupta, S.N. *Introduction to Indian Philosophy*, Vol.1 Cambridge University Press, 1922-1955

Meister, Chad, *Philosophy of Religion Reader*, Routledge New York, 2008

References

- Brody B.A., *Readings in Philosophy of Religion*, Prentice Hall India, 1974
- Galloway, George, *The Philosophy of Religion*, C. Scribner's Son's, New York 1914
- Meister, Chad, *Philosophy of Religion Reader*, Routledge New York, 2008
- McCloskey, H.J., *God and Evil*, *Philosophical Quarterly*, Vol.10, 1960
- Verma V. P., *Dharma Darshan Ke Mool Siddhant*, Hindi Madhyam, Karyanvaya Nideshalaya, 1991
- Quinn P. L. and Taliaferro. C ed. *A Companion to Philosophy of Religion* Blackwell Publishers 1999.
- Olivelle, Patrick, *Dharma: Studies in its Semantic and Cultural and Religious History*, MLBD, 2009

Additional Resources:

Teaching Learning Process

Lectures, Seminars, Paper Presentation, Field Trips, PPT

Assessment Methods

Home Assignments

Class Tests

Paper Presentation

University Examination

Keywords

God, Philosophy of Religion, Prayer, Evil, Faith, Reason, Dharma

**Philosophy of Religion
(DSE (VII))
Discipline Specific Elective - (DSE)**

Course Objective

The objective is to acquaint students with the basics of religion.

The students are then introduced to a systemic and comprehensive study of various approaches to concepts that are common across religions.

Course Learning Outcomes

Philosophy of religion develops a critical approach in the students whereby they are able to form an informed opinion regarding various issues concerning religion.

Unit 1 Concepts of Religion and Dharma

1) Nature of Religion and it's relation to Philosophy of Religion.

2) The Concept of Dharma (Purva Mimansa)

Recommended Readings-

Brody, Baruch A, Readings in Philosophy of Religion,Ed. Vol 1,New Jersey,PHI, 1974

Olivelle, Patrick, Dharma: Studies in its Semantic and Cultural and Religious History MLBD, 2009

Unit 2 Challenges to Religion

1) "God and Evil " - H.J. McCloskey

2) "The Ethics of Belief" - W.K.Clifford

Recommended Readings-

McCloskey, H.J. God and Evil, *Philosophical Quarterly*, Vol.10, 1960

Meister, Chad, Philosophy of Religion, Reader, Routledge, NewYork, 2008

Unit 3 Significance of Faith, Prayer and Revelation in Religion

1) Faith, Reason and Revelation.

2) The Concept of Prayer.

Recommended Readings-

Quinn, P.L. and Taliaferro, C. ed., A Companion to Philosophy of Religion, Blackwell Publishers, 1997

Unit 4 Overview of R the concepts of Religious Diversity and Liberation

1) The Conept of Liberation: Indian Perspective

2) Religious Diversity-- Inclusivism, Exclusivism and Pluralism

Recommended Readings-

Dasgupta, S.N. Introduction to Indian Philosophy, Vol.1 Cambridge University Press, 1922-1955

Meister,Chad, Philosophy of Religion Reader, Routledge New York,2008

References

- Brody B.A., *Readings in Philosophy of Religion*, Prentice Hall India, 1974
- Galloway, George, *The Philosophy of Religion*, C. Scribner's Son's, New York 1914
- Meister, Chad, *Philosophy of Religion Reader*, Routledge New York, 2008
- McCloskey, H.J., *God and Evil, Philosophical Quarterly*, Vol. 10, 1960
- Verma V. P., *Dharma Darshan Ke Mool Siddhant*, Hindi Madhyam, Karyanvaya Nideshalaya, 1991
- Quinn P. L. and Taliaferro. C ed. *A Companion to Philosophy of Religion* Blackwell Publishers 1999.
- Olivelle, Patrick, *Dharma: Studies in its Semantic and Cultural and Religious History*, MLBD, 2009

Additional Resources:

Teaching Learning Process

Lectures, Seminars, Paper Presentation, Field Trips, PPT

Assessment Methods

Home Assignments

Class Tests

Paper Presentation

University Examination

Keywords

God, Philosophy of Religion, Prayer, Evil, Faith, Reason, Dharma

**Feminism
(DSE (VIII))
Discipline Specific Elective - (DSE)**

Course Objective

Course Objectives:

A course in Feminism is needed to sensitise students to a perspective of thought that acts as a filter—a lens through which all subjects must be studied. It seeks to create gender sensitisation and develops a wholistic approach towards education.

Course Learning Outcomes

Course Learning Outcomes:

Study of Feminism arms the student with analytical skills to develop valid arguments to counter gender discrimination, sexism and patriarchal dominance. Feminist theory has a social agenda i.e. to initiate transformation in social structures, customs and practices. Thus the study of Feminism is not only an empowering tool against gender oppression but also against other systems of oppression such as race, class and colour

Unit 1 Understanding Feminism

Recommended Reading

*Adichie, Chimamanda Ngozi. *We Should All Be Feminists*. London: Fourth Estate, 2014.

Unit 2 Gender and Patriarchy

Recommended Reading

*Nicholson, Linda. "Gender." In *Companion to Feminist Philosophy: Blackwell Companion to Philosophy*, edited by Alison M. Jaggar and Iris Marion Young 289-297. Oxford: Blackwell Publishers, 1998.

* Bhasin, Kamla. *What is Patriarchy*. New Delhi: Kali for Women, 1993.

Essay format available on:

<https://dullbonline.wordpress.com/2017/08/30/what-is-patriarchy-by-kali-for-women-1993-new-delhi-kamla-bhasin/>

Unit 3 Women and Society

Recommended Reading

Sanger, Margaret. "Woman's Error And Her Debt" Chapter I and "Birth Control: A Parent's Problem or Woman's" Chapter VII. In *Woman and the New Race*. New York: Brentano's Publishers, 1920.

Essay format available on:

https://www.norton.com/college/history/america-essential-learning/docs/MSanger-Woman_and_New_Race-1920.pdf

*Goldman, Emma. "Marriage & Love." In *Anarchism & Other Essays*, 233-242. New York: Gordon Press Publishers, 1914.

Essay format available on:

<https://theanarchistlibrary.org/library/emma-goldman-anarchism-and-other-essays>

Unit 4 Women, Body and Image

Recommended Reading

*Wolf, Naomi. "The Beauty Myth". In *The Beauty Myth*, 9-19. New York: Harper Collins, 1991.

E-book available on:

https://www.academia.edu/25264021/The_Beauty_Myth_-_Naomi_Wolf

*Silvers, Anita, "Disability". In *A Companion to Feminist Philosophy, Blackwell Companion to Philosophy*, edited by Alison M. Jaggar and Iris Marion Young, 330-340. Oxford: Blackwell Publishers, 1998.

*Bartey, Sandra Lee Bartey. "Body Politics". In *A Companion to Feminist Philosophy, Blackwell Companion to Philosophy*, edited by Alison M. Jaggar and Iris Marion Young, 321-329. Oxford: Blackwell Publishers, 1998.

References

Understanding Feminism

*Adichie, Chimamanda Ngozi. *We Should All Be Feminists*. London: Fourth Estate, 2014.

Unit 2

Gender and Patriarchy

*Nicholson, Linda. "Gender." In *Companion to Feminist Philosophy: Blackwell Companion to Philosophy*, edited by Alison M. Jaggar and Iris Marion Young 289-297. Oxford: Blackwell Publishers, 1998.

* Bhasin, Kamla. *What is Patriarchy*. New Delhi: Kali for Women, 1993

Essay format available on:

<https://dullbonline.wordpress.com/2017/08/30/what-is-patriarchy-by-kali-for-women-1993-new-delhi-kamla-bhasin/>

Unit 3

Women and Society

Sanger, Margaret. "Woman's Error And Her Debt" Chapter I and "Birth Control: A Parent's Problem or Woman's" Chapter VII. In *Woman and the New Race*. New York: Brentano's Publishers, 1920.

Essay format available on:

https://wnorton.com/college/history/america-essential-learning/docs/MSanger-Woman_and_New_Race-1920.pdf

*Goldman, Emma. "Marriage & Love." In *Anarchism & Other Essays*, 233-242. New York: Gordon Press Publishers, 1914.

Essay format available on:

<https://theanarchistlibrary.org/library/emma-goldman-anarchism-and-other-essays>

Unit 4

Women, Body and Image

*Wolf, Naomi. "The Beauty Myth". In *The Beauty Myth*, 9-19. New York: Harper Collins, 1991.

E-book available on:

https://www.academia.edu/25264021/The_Beauty_Myth_-_Naomi_Wolf

*Silvers, Anita, "Disability". In *A Companion to Feminist Philosophy, Blackwell Companion to Philosophy*, edited by Alison M. Jaggar and Iris Marion Young, 330-340. Oxford: Blackwell Publishers, 1998.

*Bartrey, Sandra Lee. "Body Politics". In *A Companion to Feminist Philosophy, Blackwell Companion to Philosophy*, edited by Alison M. Jaggar and Iris Marion Young, 321-329. Oxford: Blackwell Publishers, 1998.

Additional Resources:

*Kemp, Sandra and Judith Squires, eds. *Feminisms*. New York: OUP, 2009.

Teaching Learning Process

Lectures, tutorials, workshops and film-screenings.

Assessment Methods

As per the norms of University of Delhi.

Keywords

Sexism, gender, biological determinism, patriarchy, birth-control, marriage, beauty and body, feminist method.

**Aesthetics
(DSE (IX))
Discipline Specific Elective - (DSE)**

Course Objective

This course is for the undergraduate students pursuing a BA (P) course with Philosophy as one of the two main disciplines. The course is focused upon a comprehension of the Philosophy of art in relation to creativity, communication, culture and aesthetic experience.

Course Learning Outcomes

Course Learning Outcomes: The course with its inter-disciplinary content, and with the curriculum that offers an insight into art and culture, will ensure students with a foundational basis to find a career in the fields of art and media.

Unit 1 Nature and Meaning of Aesthetics

1. Introduction to Aesthetics: Philosophy of Art and Beauty
2. Definitions of art (Art as Significant Form with specific reference to Art as Intuition, Art as Communication, Art as Expression)

Recommended Readings:

Saxena, S K, Art and Philosophy: Seven Aestheticians (Pragati Publications, 1995). Chapter on 'Langer'

Shyamala Gupta, Art, Beauty and Creativity, (DK Printworld: New Delhi, 1999). Chapters 1, 4, 7, 8, 9.

Ghosh, R. K., Great Indian Thinkers on Art: Creativity, Aesthetic Communication, and Freedom, (Delhi: Sundeep Prakashan Black and White, 2006) Relevant sections for Art and Communication

Unit 2 Identity of a work of Art

1. Art as product and art as process
2. Art and emotion; Susanne Langer on "art as symbol of human emotion"
3. Aesthetic Delight with reference to Indian context.

Recommended Readings:

• Paul Valery, 'The Idea of Art' in Aesthetics by Harold Osborne (London: Oxford University Press, 1972).

• 'Form of Feeling': The Aesthetic Theory of Susanne K Langer' by Sam Reese in Music Educators Journal, Vol. 63, No. 8 (Apr., 1977), pp. 44-49 • Online Source: <https://www.jstor.org/stable/3395285>

• Hiriyanna, M. Art Experience, (Indira Gandhi National Centre for the Arts, Manohar: Delhi, 1997). Chapter-1

Unit 3 Art and Aesthetic Experience

Concepts of Rasa and Disinterestedness in relation to Aesthetics Explicated

Recommended Readings:

• 'Disinterestedness and Desire in Kant's Aesthetics' in The Journal of Aesthetics and Art Criticism, Paul Guyer (Vol. 36, No. 4 (Summer, 1978), pp. 449- 460

• Hiriyanna, M. Art Experience, (Indira Gandhi National Centre for the Arts, Manohar: Delhi, 1997). Chapters-1 and 5

Unit 4 Art, Religion, and Spirituality: Indian View

1. Ananda Coomaraswamy
2. Sri Aurobindo
3. Rabindranath Tagore.

Recommended Readings:

- Coomaraswamy, A. K , The Transformation of Nature in Art, (Sterling Publishers, 1995)
 - Ghosh , R. K. ,Great Indian Thinkers on Art: Creativity, Aesthetic Communication, and Freedom, (Delhi: Sundeep Prakashan (Black and White, 2006)
 - Online material available for Aurobindo and Tagore on shodhganga/inflib.net and jstor.
-

Practical

This course is for the undergraduate students pursuing a BA (P) course with Philosophy as one of the two main disciplines. The course is focused upon a comprehension of the Philosophy of art in relation to creativity, communication, culture and aesthetic experience.

References

Recommended Readings:

- Saxena, SK, Art and Philosophy: Seven Aestheticians (Pragati Publications,1995).
- Coomaraswamy, A. K , The Transformation of Nature in Art (Sterling Publishers, 1995).
- Ghosh, R. Great Indian Thinkers on Art: Creativity, Aesthetic Communication and Freedom, (Sandeep Prakashan (Black and White Delhi 2006).
- Gupta, S. Art Beauty and Creativity, (Delhi: D.K Printers, 1999).
- Gupta, S. Saundarya Tatva Mīmāṃsā, (Seema Sahitya Bhavan,1993).
- Hiriyan, M. Art Experience, (Indira Gandhi National Centre for the Arts,Manohar,1997)
- Online material available for Aurobindo and Tagore on shodhganga/inflib.net and jstor

Additional Resources:

- Aldrich, V.C, Philosophy of Art, (Prentice Hall,1963)
 - Gnoli,R. Aesthetic Experience according to Abhinavagupta, (Artibus Asiae Publishers, 1957).
 - Hanfling, O. ed. Philosophical Aesthetics: An Introduction, (Blackwell, 1999)
 - Coomaraswamy,A .K, The Dance of Shiva (Fourteen Indian Essays with an Introductory Preface by Romain Rolland), (Munshiram Manoharlal Publishers: Delhi, This edition,2012)
-
-

Teaching Learning Process

Teaching Learning Process Since it is a study of arts and beauty, students need to bring to class room discussions and in their assignments, a reference to artistic experience. Visit to museums and galleries etc. discussions about literature , music and cinema will add value to understanding of Aesthetics. _____

Assessment Methods

Assessment Methods

75% end of semester exams plus 25% of the Internal Assessment, as per University mandate.

Keywords

- Keywords, Art, Aesthetics, Emotions, Art and Identity, Form of Art, Experienc, Rasa, Disinterestedness
-

Analytic Philosophy (DSE (X)) Discipline Specific Elective - (DSE)

Course Objective

The Course entitled “Issues in Analytic Philosophy” is a DSE option for students pursuing a B.A. Program degree with philosophy as one of their core subjects. It aims at exposing students to Analytic Philosophy, a school of thought that has held a dominant position in Western Philosophy since the beginning of the twentieth century. As a philosophical tradition it is characterized by an emphasis on, scientific rigor, argumentative precision and logical clarity in the development of thought and concept. Its familiar tools are [formal logic](#), conceptual analysis, and, mathematics.

Course Learning Outcomes

The method and methodology of Analytic Philosophy allows it to register a presence in diverse domains of thought including epistemology, phenomenology, metaphysics, ethics, political philosophy and feminist discourse. The course, “Issues in Analytic Philosophy” seeks to help students understand its terminology and method via its workings in certain interconnected sub traditions such as metaphysics and epistemology, philosophy of mind and philosophy of language.

Unit 1 Metaphysics

A brief general survey of Analytic philosophy and its primary concerns and questions: philosophical analysis, the linguistic turn, logical positivism, language and its relation to Reality, Common sense philosophy, Logical Analysis, meaning and naming.

Recommended Reading

1) The Problems of Philosophy - Bertrand Russell (Chapters 1,2, and 3) in The Problems of Philosophy, OUP, 1980 reprint

Unit 2 Epistemology

Recommended Reading

:

1) Proof of an External World - G. E. Moore, in G. E. Moore Selected Writings, Thomas Baldwin, ed., Routledge, 1993

2) Knowledge by Acquaintance & Knowledge by Description - Bertrand Russell, The Problems of Philosophy, Chapter 5

Unit 3 PHILOSOPHY OF MIND

Recommended Readings

1) Can Computers Think? - John R. Searle, Analytic Philosophy: An Anthology, A. P. Martinich & David Sosa, eds., Wiley Blackwell , 4th edn., 2009, Part IV, Chapter 27

2) What is it Like to be a Bat? - Thomas Nagel, Analytic Philosophy: An Anthology, Part IV, Chapter 25

Unit 4 PHILOSOPHY OF LANGUAGE

Recommended Reading

The Elimination of Metaphysics Through Logical Analysis of Language - Rudolph Carnap, 1931, (Translated by Arthur Pap), Analytic Phil

www.ditext.com/carnap/elimination.html

References

Essential Readings

- 1) Martinich, Aloysius, and David Sosa. *Analytic Philosophy: An Anthology*. Chichester, West Sussex: Wiley-Blackwell, 2012.
- 2) Russell, Bertrand Arthur William. *The Problems of Philosophy*. Oxford: Oxford UP, 1980.

Additional Resources

- Ayer, A. J. *Language, Truth and Logic*. New York: Dover Publications, 2002.
- Beaney, Michael. *Analytic Philosophy: A Very Short Introduction*. Oxford, United Kingdom: Oxford University Press, 2017.
- Martinich, Aloysius, and David Sosa. *The Philosophy of Language*. New York: Oxford University Press, 2012.
- Rorty, Richard M. *The Linguistic Turn: Essays in Philosophical Method*. Chicago, IL: University of Chicago Press, 1992.
- Russell, Bertrand. *The Problems of Philosophy*. Bertrand Russell. London: Oxford University Press, 1912.
- Schwartz, Steve. *A Brief History of Analytic Philosophy: From Russell to Rawls*. Chichester: Wiley-Blackwell, 2013
- Glock, Hans-Johann. *What Is Analytic Philosophy?* Cambridge, UK: Cambridge University Press, 2008.

Teaching Learning Process

Traditional Lectures and Tutorials

Assessment Methods

Internal exams, class tests, quiz,

Keywords logic, metaphysics, knowledge, knowing, thinking, positivism, meaning, protocol sentences, metaphysics

**Analytic Philosophy
(DSE (X))
Discipline Specific Elective - (DSE)**

Course Objective

The Course entitled “Issues in Analytic Philosophy” is a DSE option for students pursuing a B.A. Program degree with philosophy as one of their core subjects. It aims at exposing students to Analytic Philosophy, a school of thought that has held a dominant position in Western Philosophy since the beginning of the twentieth century. As a philosophical tradition it is characterized by an emphasis on, scientific rigor, argumentative precision and logical clarity in the development of thought and concept. Its familiar tools are [formal logic](#), conceptual analysis, and, mathematics.

Course Learning Outcomes

The method and methodology of Analytic Philosophy allows it to register a presence in diverse domains of thought including epistemology, phenomenology, metaphysics, ethics, political philosophy and feminist discourse. The course, “Issues in Analytic Philosophy” seeks to help students understand its terminology and method via its workings in certain interconnected sub traditions such as metaphysics and epistemology, philosophy of mind and philosophy of language.

Unit 1 Metaphysics

A brief general survey of Analytic philosophy and its primary concerns and questions: philosophical analysis, the linguistic turn, logical positivism, language and its relation to Reality, Common sense philosophy, Logical Analysis, meaning and naming.

Recommended Reading

1) The Problems of Philosophy - Bertrand Russell (Chapters 1,2, and 3) in The Problems of Philosophy, OUP, 1980 reprint

Unit 2 Epistemology

Recommended Reading

:

- 1) Proof of an External World - G. E. Moore, in G. E. Moore Selected Writings, Thomas Baldwin, ed., Routledge, 1993
- 2) Knowledge by Acquaintance & Knowledge by Description - Bertrand Russell, The Problems of Philosophy, Chapter 5

Unit 3 PHILOSOPHY OF MIND

Recommended Readings

- 1) Can Computers Think? - John R. Searle, Analytic Philosophy: An Anthology, A. P. Martinich & David Sosa, eds., Wiley Blackwell, 4th edn., 2009, Part IV, Chapter 27
- 2) What is it Like to be a Bat? - Thomas Nagel, Analytic Philosophy: An Anthology, Part IV, Chapter 25

Unit 4 PHILOSOPHY OF LANGUAGE

Recommended Reading

The Elimination of Metaphysics Through Logical Analysis of Language - Rudolph Carnap, 1931, (Translated by Arthur Pap), Analytic Phil
www.ditext.com/carnap/elimination.html

References

Essential Readings

- 1) Martinich, Aloysius, and David Sosa. *Analytic Philosophy: An Anthology*. Chichester, West Sussex: Wiley-Blackwell, 2012.
- 2) Russell, Bertrand Arthur William. *The Problems of Philosophy*. Oxford: Oxford UP, 1980.

Additional Resources

- Ayer, A. J. *Language, Truth and Logic*. New York: Dover Publications, 2002.
- Beaney, Michael. *Analytic Philosophy: A Very Short Introduction*. Oxford, United Kingdom: Oxford University Press, 2017.
- Martinich, Aloysius, and David Sosa. *The Philosophy of Language*. New York: Oxford University Press, 2012.
- Rorty, Richard M. *The Linguistic Turn: Essays in Philosophical Method*. Chicago, IL: University of Chicago Press, 1992.
- Russell, Bertrand. *The Problems of Philosophy*. Bertrand Russell. London: Oxford University Press, 1912.

- Schwartz, Steve. *A Brief History of Analytic Philosophy: From Russell to Rawls*. Chichester: Wiley-Blackwell, 2013
- Glock, Hans-Johann. *What Is Analytic Philosophy?* Cambridge, UK: Cambridge University Press, 2008.

Teaching Learning Process

Traditional Lectures and Tutorials

Assessment Methods

As per University guidelines

Keywords

logic, metaphysics, knowledge, knowing, thinking, positivism, meaning, protocol sentences, metaphysics, analysis, mathematical logic, analysis, mathematical logic

Philosophical thoughts of Ambedkar (GE (III)) Generic Elective - (GE) Credit:6

Course Objective

The aim of this course is to introduce the alternative approaches of contemporary Indian philosophical thought with special focus on Philosophy of B.R. Ambedkar. This course is an exploration of democratic and normative philosophical thought in reconstruction Indian society. This course introduces the essential philosophical writings of contemporary Indian thinker B.R. Ambedkar by discussing the Philosophical method in general and Social-Political philosophy and philosophy of religion of Ambedkar in particular.

Course Learning Outcomes

CO1 Learn Ambedkar's alternative reading of Indian philosophy by interrogating dominant philosophical systems and its texts.

CO2 Critical engagement with social reality conditioned by the caste system

CO3 Learn the liberative and democratic potential of philosophy of Ambedkar in reconstructing Indian nation.

CO4 To make good citizen by understudying the indigenous democratic philosophical thought.

Unit 1 Ambedkar and Indian Philosophy

1. Socio-Political context of Ambedkar
2. Introduction to writings of Ambedkar
3. His method and interrogation of Indian Philosophy

Unit 2 Ambedkar's Social Philosophy and Philosophy of Religion

1. Critique of caste system and Hindu social order
2. Critical views on philosophy of Hinduism and its religious texts
3. Conception of philosophy of religion
4. Ideal society

Unit 3 Moral and Political Philosophy

1. Human dignity and social justice
2. Moral community
3. Constitutional morality
4. Democracy
5. State and rights of minority
6. State socialism

Unit 4 Ambedkar and Buddhism

1. Celebration of self-respect and religious conversion
2. Construction of rational, moral and humanistic religion
3. Comparison of Buddhism and Marxism

Unit 5 Contemporary Relevance of Ambedkar

1. Ambedkarism
2. Casteless society and Dalit movement
3. Ambedkar and nationalism

Practical

Not applicable

References

1. B.R. Ambedkar, 'Introduction', Rodrigues, Valerian (ed). *The Essential Writings of B.R. Ambedkar*. New Delhi: Oxford Press, 2002, p.10-40.
2. B.R. Ambedkar, 'Castes in India', Rodrigues, Valerian (ed). *The Essential Writings of B.R. Ambedkar*. New Delhi: Oxford Press, 2002, p.10-40.
3. B.R. Ambedkar, 'Annihilation of Caste', Rodrigues, Valerian (ed). *The Essential Writings of B.R. Ambedkar*. New Delhi: Oxford Press, 2002, p.10-40.
4. B.R. Ambedkar, 'Philosophy of Hinduism', Moon, Vasant (Compiled) *Dr. Babasaheb Ambedkar Writings and Speeches* Vol.3, Education Department, Government of Maharashtra, 1987.
5. 'Buddha or Karl Marx,' Moon, Vasant (Compiled) *Dr. Babasaheb Ambedkar Writings and Speeches* Vol.3, Education Department, Government of Maharashtra, 1987
6. B.R. Ambedkar, Krishna and His Gita, Rodrigues, Valerian.(Ed.) *The Essential Writings of B.R. Ambedkar*. New Delhi: Oxford Press, 2002, pp.193-204

7. B.R. Ambedkar . Democracy, Rodrigues, Valerian.(ed.) *The Essential Writings of B.R. Ambedkar*. New Delhi: Oxford Press, 2002 ,pp.60-65
8. B.R. Ambedkar Political safeguards for Depressed classes, Rodrigues, Valerian(Ed.). *The Essential Writings of B.R. Ambedkar*. New Delhi: Oxford Press, 2002, pp379-382
9. B.R. Ambedkar, *Basic Features of Indian constitution*, Rodrigues, Valerian(Ed.). New Delhi: Oxford Press, 2002, pp.473-495
10. B.R. Ambedkar , ‘*What the Buddha Taught,*’ from *Buddha and His Dhamma*, Dr. Babasaheb Ambedkar Writings and Speeches Vol.II, Education Department, Government of Maharastra,1979.

Additional Resources:

Same as above

Teaching Learning Process

1. Lectures
 2. Student participation
 3. Dialogue on issues debated by B.R. Ambedkar
 4. Comparative study with other Indian and Western thinkers
-

Assessment Methods

1. Internal evaluation
 2. Presentation by the students
 3. Group discussion
-

Keywords

- B.R. Ambedkar,
- Contemporary Indian Philosophy,
- Democracy,
- Philosophy of Religion,
- Philosophy of Hinduism, Buddhism
- Anti-caste movement

**Inductive Logic
(GE (IV A))
Generic Elective - (GE)**

Course Objective

The course is designed to provide an over all view on the application of logic both in science as well as in social sciences. It also enables the learner to know about analogy, experimental method and hypotheses.

Course Learning Outcomes

1. This paper provides a sketch for evaluation on the basis of observation and experiment.
2. It helps the student learn how to move forward or how to arrive at general conclusions on the basis of individual data.
3. It provides a well formulated background for Scientific studies

Unit 1 Introduction to Inductive Logic and Scientific method:

1. Kinds of Reasoning: Inductive Vs Deductive.
2. Scientific Induction
3. Conceptions of Probability

4, Probability in everyday life

Recommended Readings:

1. Chakraborti, Chhanda. *Logic : Informal, Symbolic and Inductive*. City: New Delhi Prentice Hall Of India, 2006. Ch 13, Ch-16
2. Copi, Irving M. *Introduction to logic*. 6th Ed. New York London: Macmillan Collier Macmillan, 1982. Ch 11. Ch- 14

Unit 2 Inductive Reasoning and Postulates of Induction:

1. Perfect and Imperfect induction
2. Scientific Induction & non-scientific methods of inquiry
- 3, Laws of Nature: Uniformity, Universal Causation and Unity of Nature

Recommended Readings:

- 1.Chakraborti, Chhanda. *Logic : Informal, Symbolic and Inductive*. New Delhi: Prentice Hall, 2007. Ch 14 & Ch 16.

Unit 3 Causality and Mill's Method:

1. Causal Reasoning and Induction
- 2.Scientific methods of establishing 'cause-effect relationship
- 3.Cause and Condition
- 4.J.S Mill's Experimental Method (all 5 methods)

Recommended Readings:

1. Chakraborti, Chhanda. *Logic : Informal, Symbolic and Inductive*. New Delhi: Prentice Hall, 2007. Ch1, Ch 14, Ch-15

Unit 4 Science, Hypothesis and Induction

1. Different kinds of Hypothesis
2. Conditions for good Hypothesis and its confirmation
- 3.Verification of Hypothesis

Recommended Readings:

- 1.Chakraborti, Chhanda. *Logic : Informal, Symbolic and Inductive*. New Delhi: Prentice Hall, 2007. Ch17.

References

1. Chakraborti, Chhanda. *Logic : Informal, Symbolic and Inductive*. New Delhi: Prentice Hall, 2007.
2. Copi, Irving M. *Introduction to logic*. 6th Ed. New York London: Macmillan Collier Macmillan, 1982.

Additional Resources:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016
-

Teaching Learning Process

Lectures and Tutorials as per University guidelines will be sufficient.

Assessment Methods

25% for internal assessment and 75% for University final examination is required

Keywords

Induction, Scientific induction, Probability, Experimental method, Hypothesis, Cause-Effect

Logic (GE 4B)
(GE (IV B))
Generic Elective - (GE)

Course Objective

This course primarily helps in developing ones skill in correct reasoning or argumentation. It trains the student to construct good and sound arguments rejecting the vague and unsound ones at any point of time and situation.

Course Learning Outcomes

This course

1. Helps in sharpening the reasoning and argumentation skill of a learner and

simultaneously helps in identifying the flaws.

2. Enhances the analytical skills, so that one can resolve the difficult issues and finally arrives at a reasonable solution.

3. Helps in good scoring for a better rank.

Unit 1 Basic Logical Concepts

1. Proposition and Sentence

2. Deductive and Inductive argument

3. Truth, Validity and Soundness

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. Introduction to Logic. 14th ed. Delhi: Pearson, 2016. Ch 1-2. .

Unit 2 Traditional Logic (A)

1. Terms and Distribution of terms

2. Categorical Propositions

3. Traditional Square of Opposition and Existential Import

4. Translating Ordinary Language Sentences into Standard form

Traditional Logic (B)

LOCF - Page: 1 of 3

1. Immediate Inferences- Conversion, Obversion and Contraposition

2. Categorical Syllogism: Figure and Mood

3. Syllogistic Rules and Fallacies

4. Venn Diagram

Recommended Readings:

1. 1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. Introduction to Logic. 14th ed. Delhi: Pearson, 2016. Ch 5-7.

Unit 3 Symbolization

1. Types of Truth functions: Negation, Conjunction, Disjunction(Alternation), Conditional (Implication) and Bi-Conditional (Equivalence)

2. Statements, Statement forms and Logical status

3. Decision procedures: Truth table Method and Reductio ad Absurdum

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. Introduction to Logic. 14th ed. Delhi: Pearson, 2016.. Ch 8.

Unit 4 INFORMAL FALLACIES

1. Fallacies of Relevance

2. Fallacies of Defective induction

3. Fallacies of Presumption

4. Fallacies of Ambiguity

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. Introduction to Logic. 14th ed. Delhi: Pearson, 2016. Ch 4.

References

1. Copi, Irving M. Introduction to logic. 6th Ed. New York London: Macmillan Collier Macmillan, 1982. Ch5-7.

Additional Resources:

1. Jain, Krishna. A Textbook of Logic. New Delhi: D.K. Printworld, 2018

Teaching Learning Process

Lectures and tutorial as per University norm is essential

Assessment Methods

75% for University exam and 25% for internal assessment as per University guidelines is required.

Keywords

Deduction and Induction, Truth, Validity & Soundness, Syllogism, Venn-Diagram, Informal Fallacies

UNIVERSITY OF DELHI

Bachelor of Arts (Programme) Political Science
PAPERS FOR SEMSTER - I

(Academic Year 2019-20)



**Applicable for students registered with Regular Colleges, Non
Collegiate Women's Education Board and School of Open Learning**

Paper for SEMESTER - I

A. Discipline Specific Core Course

1. Paper I - Introduction to Political Theory

STRUCTURE FOR SEMESTER - I

S. NO.	Course		Paper	
1.1	Subject - I Political Science - 1	Discipline Specific Core	Introduction to Political Theory	DSC IA
1.2	Subject - II (Any Other)	Discipline Specific Core		DSC IIA
1.3	English	Core (Compulsory)		CC
1.4	English/ MIL (Communication) / Environmental Science	Ability Enhancement (Compulsory)		AECC

Courses for B.A. (Programme) Political Science SEMESTER - I

Paper I - Introduction to Political Theory

(62321101)

Core Course - (CC) Credit:6

Course Objective

This course aims to introduce certain key aspects of conceptual analysis in political theory and the skills required to engage in debates surrounding the application of the concepts.

Course Learning Outcomes

After completing this course students will be able to:

- Understand the nature and relevance of Political Theory
- Understand different concepts like liberty, equality, justice and rights.
- Reflect upon some of the important debates in Political Theory

Unit 1

What is Political Theory and what is its relevance?

Unit 2

Concepts: Liberty, Equality, Justice, Rights

Unit 3

Debates in Political Theory:

- a. Protective discrimination and principles of fairness?
- b. The Public vs private debate: Feminist Perspective Censorship and its limits

References

Unit I

Bhargava, R. (2008) 'What is Political Theory', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction*. New Delhi: Pearson Longman, pp. 2-17.

Bhargava, R. (2008) 'Why Do We Need Political Theory', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction*. New Delhi: Pearson Longman, pp. 18-37.

Unit 2

Sriranjani, V. (2008) 'Liberty', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction*. New Delhi: Pearson Longman, pp. 40-57.

Acharya, A. (2008) 'Equality', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction*. New Delhi: Pearson Longman, pp. 58-73.

Menon, K. (2008) 'Justice', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction*. New Delhi: Pearson Longman, pp. 74-82.

Talukdar, P.S. (2008) 'Rights', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction*. New Delhi: Pearson Longman, pp. 88-105.

Unit 3

Acharya, A. (2008) 'Affirmative Action', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction*. New Delhi: Pearson Longman, pp. 298-307.

Frances E O. (1985) 'The Myth of State Intervention in the Family', *University of Michigan Journal of Law Reform*. 18 (4), pp. 835-64.

Sethi, A. (2008) 'Freedom of Speech and the Question of Censorship', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction*. New Delhi: Pearson Longman, pp. 308-319.

Additional Resources:

Berlin, I. "Two Concepts of Liberty"

Rawls, John, *A Theory of Justice*

Jaggar, Alison, "Introduction", *Feminist Politics and Human Nature*

Kukathas, Chandran, "The Demise and Rise of Political Theory"

Riley, J. (2008) 'Liberty', in McKinnon, C. (ed.) *Issues in Political Theory*, New York: Oxford University Press, pp. 103-125.

Casal, P. & William, A. (2008) 'Equality', in McKinnon, C. (ed.) *Issues in Political Theory*. New York: Oxford University Press, pp. 149- 165.

Wolf, J. (2008) 'Social Justice', in McKinnon, C. (ed.) *Issues in Political Theory*. New York: Oxford University Press, pp. 172-193.

Chambers, C. (2008) 'Gender', in McKinnon, C. (ed.) *Issues in Political Theory*. New York: Oxford University Press, pp. 241-288.

Swift, A. (2001) *Political Philosophy: A Beginners Guide for Students and Politicians*. Cambridge: Polity Press.

Jha, M. (2001) 'Ramabai: Gender and Caste', in Singh, M.P. and Roy, H. (eds.) *Indian Political Thought: Themes and Thinkers*, New Delhi: Pearson.

Menon, N. (2008) 'Gender', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction*. New Delhi: Pearson Longman, pp. 224-235.

Hindi Reading

भार्व, र. और अशोक आचार्य (एड.), *राजनीतिक सिधांत: एक परिचय*, दिल्ली: पिएर्सन, 2008.

कुमार, संजीव, "राजनीति क्या है : "राजनीतिक" का सिधान्तीकरण", संजीव कुमार (एड.), *राजनीति सिधांत की समझ*, दिल्ली: ओरिएंट ब्लैकस्वान, 2019, pp. 1-26.

संजीव कुमार (एड.), *राजनीति सिधांत की समझ*, दिल्ली: ओरिएंट ब्लैकस्वान, 2019.

Teaching Learning Process

The teaching-learning process for this course would involve class lectures, class discussion, class presentation, debates on contemporary issues and relevant cases. Teaching would also involve methods like power point and film screening.

Assessment Methods

Students will be assessed at different stages during the course learning process. After completing every unit they will be asked to take part in group discussions on any one important event or issue relevant for that unit. They will also do one presentation and one assignment.

Keywords

Political Theory, Liberty, Equality, Justice, Rights, Protective Discrimination, Censorship

UNIVERSITY OF DELHI

Bachelor of Arts (Programme) Political Science

(Effective from Academic Year 2019-20)

PAPERS FOR SEMESTER - II



Applicable for students registered with Regular Colleges, Non Collegiate Women's Education Board and School of Open Learning

List of Papers and Courses

A. Discipline Specific Core Course (4)

2. Paper II - Indian Government and Politics

Structure for Semester-II wise Distribution of Courses

S. NO.	Course		Paper	
2.1	Subject - I Political Science - 2	Discipline Specific Core	Indian Government and Politics	DSC IB
2.2	Subject - II (Any Other)	Discipline Specific Core		DSC IIB
2.3	MIL	Core (Compulsory)		CC
2.4	English/ MIL (Communication) / Environmental Science	Ability Enhancement (Compulsory)		AECC

Courses for B.A. (Programme) Political Science SEMESTER II

Paper II - Indian Government and Politics (62321201)

Core Course - (CC) Credit:6

Course Objective

The course aims to give students a thorough understanding of the structures of Indian government and politics. It equips the students with the different perspectives on studying Indian politics and the state in India, the constitutional principles on which the institutions of the state are founded and function, the social structures of power and salient features of the political process in India. It lays emphasis on understanding the inter-relationship between formal institutional structures, social movements, and political development to focus on the complex ways on which social and political power interact and have impact on political institutions and processes.

Course Learning Outcomes

On successful completion of the course, students would be able to:

- Demonstrate an understanding of the different viewpoints on Indian politics and the nature of Indian state
- Show knowledge of the text of the Indian Constitution and an awareness of constitutional and legal rights
- Understand the structure of society in India and how social inequalities have an impact on political institutions and processes
- Show awareness of the party system in India and the development policies adopted by various governments so far
- Understand how social movements are formed and how they impact the political processes

Unit 1

Approaches to the Study of Indian Politics and Nature of the State in India: Liberal, Marxist and Gandhian (09 lectures)

Unit 2

Indian Constitution: basic features, debates on Fundamental Rights and Directive Principles (09 lectures)

Unit 3

Institutional Functioning: Prime Minister, Parliament and Judiciary (09 lectures)

Unit 4

Power Structure in India: Caste, class and patriarchy (07 lectures)

Unit 5

Religion and Politics: debates on secularism and communalism (06 lectures)

Unit 6

Parties and Party systems in India (05 lectures)

Unit 7

Strategies of Development in India since Independence: Planned Economy and Neo-liberalism (05 lectures)

Unit 8

Social Movements: Workers, Peasants, Environmental and Women's Movement (10 lectures)

References:

S.K. Chaube (2010), *The Making and Working of the Indian Constitution*, New Delhi: National Book Trust (Chapter V: 'The Rights of the Indians', pp.33-61)

A. Thiruvengadam, (2017), *The Constitution of India, A Contextual Analysis*, Oxford: Bloomsbury (Ch.2 Parliament and the Executive, pp.39-70)

P. Chatterjee (2011), *The State*, in N G Jayal and P Mehta (eds) *The Oxford Companion to Politics in India*, OUP, New Delhi. pp. 3-14.

S. Palshikar, (2008) 'The Indian State: Constitution and Beyond', in R. Bhargava (ed.) *Politics and Ethics of the Indian Constitution*, New Delhi: Oxford University Press, pp. 143-163.

G. Austin (2010), *The Indian Constitution: Cornerstone of a Nation*, New Delhi: Oxford University Press, 15th print (Chapter 7: The Judiciary and the Social Revolution, pp.164-185)

Chakravarty, B. & Pandey, K. P. (2006) *Indian Government and Politics*. New Delhi: Sage.

E. Sridharan, (2012) 'Introduction: Theorizing Democratic Consolidation, Parties and Coalitions', in *Coalition Politics and Democratic Consolidation in Asia*, New Delhi: Oxford University Press.

Y. Yadav and S. Palshikar, (2006) 'Party System and Electoral Politics in the Indian States, 1952-2002: From Hegemony to Convergence', in P.R. DeSouza and E. Sridharan (eds.) *India's Political Parties*, New Delhi: Sage Publications, pp. 73-115.

R. Kothari, (1970) 'Introduction', in *Caste in Indian Politics*, Delhi: Orient Longman, pp.3- 25.

S. Deshpande (2016), 'Caste in and as Indian Democracy', New Delhi: Seminar, No.677, pp. 54-58.

U. Chakravarti. (2003) 'Caste and Gender in Contemporary India', in *Gendering Caste Through a Feminist Lens*. Calcutta: Stree, pp.139-317.

T. Pantham, (2004) 'Understanding Indian Secularism: Learning from its Recent Critics', in R. Vora and S. Palshikar (eds.) *Indian Democracy: Meanings and Practices*, New Delhi: Sage, pp. 235-256.

- A. Roy, (2010) 'The Women's Movement', in N.Jayal and P. Mehta (eds.) The Oxford Companion to Politics in India, New Delhi: Oxford University Press, pp.409-422.
- G. Shah, (2004) Social Movements in India: A Review of Literature, New Delhi: Sage Publications.
- Chandra, B., Mukherjee, A. & Mukherjee, M. (2010) India After Independence. New Delhi: Penguin.
- Singh, M.P. & Saxena, R. (2008) Indian Politics: Contemporary Issues and Concerns. New Delhi: PHI Learning.
- Vanaik, A. & Bhargava, R. (eds.) (2010) Understanding Contemporary India: Critical Perspectives. New Delhi: Orient Blackswan.
- Menon, N. and Nigam, A. (2007) Power and Contestation: India Since 1989. London: Zed Book.
- Austin, G. (1999) Indian Constitution: Corner Stone of a Nation. New Delhi: Oxford University Press.
- Austin, G. (2004) Working of a Democratic Constitution of India. New Delhi: Oxford University Press.
- Jayal, N. G. & Maheta, P. B. (eds.) (2010) Oxford Companion to Indian Politics. New Delhi: Oxford University Press.

Additional Resources:

Readings in Hindi

- अभय कुमार दुबे (सं०) राजनीति की किताब: रजनी कोठारी का कृतित्व, नई दिल्ली: वाणी प्रकाशन
- रजनी कोठारी एवं अभय कुमार दुबे, भारत में राजनीति: कल और आज, नई दिल्ली: वाणी प्रकाशन
- ग्रेनविल ऑस्टिन, भारतीय संविधान: राष्ट्र की आधारशिला, अनुवादक: नरेश गोस्वामी, नई दिल्ली: वाणी प्रकाशन, 2017
- माधव खोसला, भारत का संविधान, नई दिल्ली: ऑक्सफर्ड यूनिवर्सिटी प्रेस, 2018
- सुभाष काश्यप, संवैधानिक-राजनीतिक व्यवस्था: शासन प्रणाली और निर्वाचन प्रक्रिया, नई दिल्ली: राजकमल प्रकाशन, 2016
- सुभाष काश्यप, भारतीय राजनीति और संसद: विपक्ष की भूमिका, नई दिल्ली: राजकमल प्रकाशन, 2016
- सुभाष काश्यप, भारतीय राजनीति और संविधान: विकास, विवाद और निदान, नई दिल्ली: राजकमल प्रकाशन, 2016
- माधव गोडबोले, धर्मनिरपेक्षता: दोराहे पर भारत, नई दिल्ली: सेज भाषा, 2017
- शम्सुल इस्लाम, भारत में अलगाववाद और धर्म, नई दिल्ली: वाणी प्रकाशन
- जावीद आलम, लोकतंत्र के तलबगार?, अनुवादक: अभय कुमार दुबे, नई दिल्ली: वाणी प्रकाशन

आशुतोष वाष्णीय, अथूरी जीत: भारत का अप्रत्याशित लोकतंत्र, अनुवादक: जितेन्द्र कुमार, नई दिल्ली: ऑक्सफ़र्ड यूनिवर्सिटी प्रेस, 2018

गेल ओमवेट, दलित और प्रजातांत्रिक क्रांति: उपनिवेशीय भारत में डॉ॰ अम्बेडकर एवं दलित आंदोलन, नई दिल्ली: सेज भाषा, 2015

फ़िलिप कॉटलर, लोकतंत्र का पतन: भविष्य का पुनर्निर्माण, नई दिल्ली: सेज भाषा, 2017

घनश्याम शाह, भारत में सामाजिक आंदोलन: संबंधित साहित्य की एक समीक्षा, नई दिल्ली: सेज भाषा, 2015

अजय गुडावर्थी, भारत में राजनीतिक आंदोलनों का समकालीन इतिहास: नागरिक समाज के बाद की राजनीति, नई दिल्ली: सेज भाषा, 2017

ज्याँ ट्रेज़ एवं कमल नयन चौबे (सं॰), भारतीय नीतियों का सामाजिक पक्ष, लोकचेतना प्रकाशन, ई॰पी॰डब्ल्यू॰ रीडर, 2017

ज्याँ ट्रेज़ एवं अमर्त्य सेन, भारत और उसके विरोधाभास, अनुवादक: अशोक कुमार, नई दिल्ली: राजकमल प्रकाशन, 2018

बद्री नारायण, खंडित आख्यान: भारतीय जनतंत्र में अदृश्य लोग, नई दिल्ली: ऑक्सफ़र्ड यूनिवर्सिटी प्रेस, 2018

Teaching Learning Process

There will be interactive lectures on varied approaches to the study of Indian politics and Indian state. They will engage in detailed discussion on basic features of Indian constitution, particularly on the relationship between fundamental rights and directive principles enshrined in the Indian constitution. It provides them with basic understanding on the working of institutions in Indian polity and powers structures in Indian shaping society and politics. It also exposes students to the debates on secularism and communalism. It familiarizes the students with the evolution of party system in India. It enables students to analyse the strategies of development adopted by the state in post-colonial India and the impact of neo-liberal reforms on Indian economy. It also provides understanding on the dynamics of social movements in India and their significance as an alternative site of politics beyond the institutions.

Assessment Methods

Students will be assessed on continuous basis followed by end term examination. Internal assessment will be conducted at the end of each unit which may include written assignments, class presentations and participation in class discussions. Students will be assessed on the basis of their ability to think critically and creatively to solve the problems and application of conceptual understanding to field based variables. Students will be assessed on the basis of their reflexive thinking and engagement with peers and group discussion. Students will be evaluated on the basis of their participation in extra and co-curricular activities such as quiz. Before the end term examination, students will be required to submit a critical review of any book or a film that relates to any one unit of the syllabus.

Keywords

Approaches, Constitution, Development, Institutions, Secularism, Social Movements

Learning Outcomes based Curriculum Framework (LOCF)
for
(B.Sc. with Chemistry)
Undergraduate Programme: A Template
2019



UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002

1. Table of Contents

Preamble	5
Foreword	7
1. Introduction.....	8
2. Learning Outcome Based Curriculum <i>Vis- A -Vis</i> Objective Based Curriculum	10
a. Nature and extent of the B.Sc Chemistry Programme	10
b. Aims of Bachelor's degree programme in Chemistry.....	11
3. Program Learning Outcomes	13
4. Course Learning Outcomes.....	15
5. Teaching Learning Outcomes	20
6. Learning outcomes- based curriculum framework for B.Sc. Chemistry (Honours) and B.Sc. Chemistry (Pass)	22
a) Attributes of a Chemisry Graduate.....	22
b) Qualification Descriptors	23
c) Distribution of different types of courses with their credits for B.Sc. Chemistry (Hon Course).....	25
d) Distribution of different types of courses with their credits for B.Sc. Chemistry (Pass course)	26
7. List of Core Courses	27
8. List of Discipline Specific Elective Course	29
9. List of Generic Elective Courses	30
10. List of Ability Enhancement Courses	31
11. List of Skill Enhancement Courses	32
e) Assessment Methods	33
a) Suggested List of Seminar Topics.....	34
b) Suggested List of Topics for Group Discussion.....	35
c) Suggested Topics for Individual/ Team Projects	36
<i>CORE COURSES</i>	37
Core Course 1: Inorganic Chemisry-I.....	37
Core Course 2: Organic Chemistry-I	41
Core Course 3: Physical Chemistry-I	45
Core Course 4: Organic Chemistry-II.....	49
Core Course 5: Physical Chemistry-II	53
Core Course 6: Organic Chemistry-III	57

Core Course 7: Molecular Spectroscopy & Photochemistry.....	61
Core Course 8: Physical Chemistry-III.....	63
Core Course 9: Inorganic Chemistry-II	66
Core Course 10: Quantum Chemistry.....	69
Core Course 11: Inorganic Chemistry-III.....	72
Core Course 12: Analytical Chemistry.....	75
Core Course 13: Green Chemistr.....	79
Core Course 14: Materials Chemistry.....	83

<i>DISCIPLINE SPECIFIC ELECTIVE COURSES</i>	86
Discipline Specific Elective Course 1: Medicinal Chemistry.....	86
Discipline Specific Elective Course 2: Electro Chemistry	89
Discipline Specific Elective Course 3: Polymer Chemistry	92
Discipline Specific Elective Course 4: Environmental Chemistry	95
Discipline Specific Elective Course 5 : Advanced Materials Chemistry	98
Discipline Specific Elective Course 6: Advanced Analytical Chemistry	100
Discipline Specific Elective Course 7: Nuclear & Radiation Chemistry	102
Discipline Specific Elective Course 8: Organic Spectroscopy	104
Discipline Specific Elective Course 9: Heterocyclic Chemistry	106
Discipline Specific Elective Course 10: Biochemistry	108
Discipline Specific Elective Course 11: Organometallic and Bioinorganic Chemistry	110
Discipline Specific Elective Course 12: Introduction to Nanochem.& applications.....	113

<i>GENERIC ELECTIVE COURSES</i>	115
Generic Elective Course 1: Math-I:Mathematical methods in chemistry.....	115
Generic Elective Course 2: Life Sciences/Biology-I.....	117
Generic Elective Course 3: Physics-I	119
Generic Elective Course 4: Mathematics-II.....	121
Generic Elective Course 5: Physics-II	123

<i>ABILITY ENHANCEMENT COURSES</i>	125
Ability Enhancement Course 1: English for communications.....	125
Ability Enhancement Course 2: Intellectual Property Rights.....	126

Ability Enhancement Course 3: History of Indian Science	128
Ability Enhancement Course 4: Good Laboratory Practices (largely Practical based)	130
Ability Enhancement Course 5: Introduction to Forensic Sci. & Technology	131
Ability Enhancement Course 6: Renewable Energies (solar & biogas)	132
Ability Enhancement Course 7: Chemoinformatics.....	133
Ability Enhancement Course 8: Water remediation & conservation studies.....	134
Ability Enhancement Course 9: Research Methodology.....	135
Ability Enhancement Course 10: Chemisry in everyday life.....	137
Ability Enhancement Course 11: Chemistry of food, nutrition & preservation.....	139

<i>SKILL ENHANCEMENT COURSES</i>	141
Skill Enhancement Course 1: Personality Development	141
Skill Enhancement Course 2: Computer Applications for chemistry	143
Skill Enhancement Course 3: Science Communication and Popularization	145
Skill Enhancement Course 4: Biofertilizer	147
Skill Enhancement Course 5: Herbal Sci.& Technology.....	149
Skill Enhancement Course 6: Fermentation Sc.& Tech.....	152
Skill Enhancement Course 7: Envionment impact analysis	154
Skill Enhancement Course 8: IT skill for chemist.....	156
Skill Enhancement Course 9: IPR & business skill for chemist	Error! Bookmark not defined.
Skill Enhancement Course 10: Analytical clinical biochemistry	160
Skill Enhancement Course 11: Mushroom Culture Tech.....	162

Preamble

Over the past decades the higher education system of our country has undergone substantial structural and functional changes resulting in both quantitative and qualitative development of the beneficiaries. Such changes have gained momentum with the introduction of Choice Based Credit System (CBCS) which further expects learning outcome based curriculum in order to maximize the benefits of the newly designed curriculum. The learning outcome based curriculum in general and in Chemistry in particular will definitely help the teachers of the discipline to visualize the curriculum more specifically in terms of the learning outcomes expected from the students at the end of the instructional process. It is pertinent to mention here that the purpose of education is to develop an integrated personality of the individual and the educational system provides all knowledge and skills to the learner for this.

The Learning outcome-based curriculum framework (LOCF) has been prepared to support designing uniform, advanced and effective Chemistry curriculum for undergraduate studies in Chemistry. The recommendations related to curriculum development is applicable for college/university education system which includes heads of schools/departments, practising teachers, parents, employers, academics from tertiary institutions, professionals from related fields or related bodies and representatives from university/college examinations authorities. The LOCF guides are based on the consultation documents on curriculum framework of University Grants Commission and MOOCs. The concerns, needs and interests of students, teachers as well as societal expectations has been taken into consideration while developing these framework structure. Each subject content aims to present a curriculum framework, specifying the curriculum aims, learning targets and objectives, and thus providing suggestions regarding curriculum planning, learning and teaching strategies, assessment and resources. In addition, the curriculum framework also provides examples of effective learning, teaching and assessment practices. A coherent understanding of the whole-undergraduate chemistry (major and pass) curriculum planning and the planning of student learning ability at subject levels can be established. Curriculum development is a collaborative and an on-going enhancement process, therefore, the same shall be updated and improved from time to time to meet new needs of students, teachers and society at large.

The template as developed has the provision of ensuring the integrated personality of the students in terms of providing opportunity for exposure to the students towards core courses, discipline specific courses, generic elective courses, ability enhancement courses and skill enhancement courses with special focus on technical, communication and subject specific skills through practical and other innovative transactional modes to develop their employability skills. The template of learning outcome based curriculum has categorically mentioned very well defined expected outcomes for the programme like core competency, communication skills, critical thinking, affective skills, problem-solving, analytical, reasoning, research-skills, teamwork, digital literacy, moral and ethical awareness, leadership readiness and so on along with very specific learning course outcomes at the starting of each course. Therefore, this template on Learning Outcomes based Curriculum Framework (LOCF) for B.Sc. with Chemistry/Chemistry Honors will definitely be a landmark in the field of outcome based curriculum construction.

Introduction

Academics and research in India is a priority which depends upon the quality of education. Quality higher education include innovations that can be useful for efficient governance of higher education institutions, systems and society at large. Thus, fundamental approach to learning outcome-based curriculum framework emphasizes upon demonstration of understanding, knowledge, skills, attitudes and values in particular programme of study. The LOCF based programme intended to follow flexibility and innovation in design of the programme, its assessment, and expect graduate attributes demonstrating the level of learning outcome. It is further expected to provide effective teaching – learning strategies including periodic review of the programme and its academic standard. The learning outcome-based curriculum framework for B.Sc. degree in Chemistry is intended to provide a broad framework and hence designed to address the needs of the students with chemistry as the core subject of study. The framework is expected to assist in the maintenance of the standard of chemistry degrees/programmes across the country and periodic programme review within a broad framework of agreed/expected graduate attributes, qualification descriptors, programme learning outcomes and course-level learning outcomes. The framework is intended to allow flexibility and innovation in programme design, syllabi development, teaching-learning process and quality assessment of students learning levels.

This curriculum framework for the bachelor-level program in Chemistry is developed keeping in view of the student centric learning pedagogy, which is entirely outcome-oriented and curiosity-driven. To avoid rote-learning approach and foster imagination, the curriculum is more leaned towards self-discovery of concepts. The curriculum framework focuses on pragmatist approach whereby practical application of theoretical concepts is taught with substantial coverage of practical and field works. The platform aims at equipping the graduates with necessary skills for Chemistry-related careers, careers with general graduate-level aptitude and for higher education in Chemistry and allied subjects. Augmented in this framework are graduate attributes including critical thinking, basic psychology, scientific reasoning, moral ethical reasoning and so on, qualification descriptors that are specific outcomes pertinent to the discipline of chemistry, learning outcomes for the two programmes these frameworks have been

developed, learning outcomes for individual courses, pedagogical methods and assessment methods. While designing these frameworks, emphasis is given on the objectively measurable teaching-learning outcomes to ensure employability of the graduates. In line with recent trends in education sector, these frameworks foster implementation of modern pedagogical tools and concepts such as flip-class, hybrid learning, MOOCs and other e-learning platforms. In addition, the framework pragmatic to the core; it is designed such a way to enable the learners implementing the concepts to address the real world problems. A major emphasis of these frameworks is that the curriculum focuses on issues pertinent to India and also of the west; for example, green chemistry and biomaterials etc. Above all, these frameworks are holistic and aim to mould responsible Indian citizen to have reflective thinking, scientific temper, and digital literacy in order to acquire requisite skill to be self employed entrepreneurial.

Aims:

2. To transform curriculum into outcome-oriented scenario
3. To develop the curriculum for fostering discovery-learning
4. To equip the students in solving the practical problems pertinent to India
5. To adopt recent pedagogical trends in education including e-learning, flipped class, hybrid learning and MOOCs
6. To mold responsible citizen for nation-building and transforming the country towards the future

1. Learning Outcome Based Curriculum Vis- A -Vis Objective Based Curriculum:

Curriculum is the heart of any educational system. It can be focused either to achieve the objectives of each course of the programme or on the expected learning outcomes from each course. The objective based curriculum refers to the overall targets to be achieved through curriculum which may be long term or immediate. On the other hand, the learning outcome based curriculum is very specific in nature in terms of changes in the cognitive, affective and psychomotor behavior of the students as a result of their exposure to the curriculum. The outcome based curriculum provides the teacher very specific targets which he can achieve through the selected instructional process as compared to the objective based curriculum which provides general outcomes.

The learning outcome based curriculum has very close relationship with the learning of the students whereas objective based curriculum focusses on only providing knowledge to the students. In other words, higher cognitive skills are developed through learning outcome based curriculum. Hence, it is preferred to develop learning outcome based curriculum which will provide specific directions to the teacher with respect to the transaction process and expected changes in the behavior of the students as well.

a. Nature and extent of the B.Sc Chemistry Programme

Chemistry is referred to as the science that systematically study the composition, properties, and reactivity of matter at atomic and molecular level. The scope of chemistry is very broad. The key areas of study of chemistry comprise Organic chemistry, Inorganic Chemistry, Physical Chemistry and Analytical Chemistry. Organic chemistry deals with study of substances containing carbon mostly; inorganic chemistry deals with study of all other elements/compounds/substances and their chemical properties. Physical chemistry deals with applications of concepts, laws to chemical phenomena. Analytical chemistry, in general, deals with identification and quantification of materials. Development of new interdisciplinary subjects like nano-materials, biomaterials, etc. and their applications from chemistry point of view added new dimension to materials chemistry. Thus, the degree programme in chemistry also intended to cover overlapping areas of chemistry with physics, biology, environmental

sciences. Further, a broad range of subjects such as materials chemistry, biomaterials, nano-materials, environmental chemistry, etc., has also been introduced which can be helpful for students/faculty members to broaden the scope of their studies and hence applications from job prospective point of view. Therefore, as a part of efforts to enhance employability of graduates of chemistry, the curricula also include learning experience with industries and research laboratories as interns. In addition, industrial visits/industrial projects are encouraged and added to the curriculum in order to enhance better exposure to jobs/employment opportunities in industries, scientific projects and allied sectors.

This modified syllabus has been drafted to enable the students to equip for national level competitive exams that they may attempt in future. To ensure implementation of a holistic pedagogical model, several allied disciplines are covered/introduced in this framework, including Physics, Mathematics, Biology and a number of generic, and ability enhancement electives. In addition, employability of B.Sc. Chemistry graduate is given due importance such that their core competency in the subject matter, both theoretical and practical, is ensured. To expand the employability of graduates, a number of skill development courses are also introduced in this framework.

b. Aims of Bachelor's degree programme in Chemistry

The broad aims of bachelors degree programme in Chemistry are:

The aim of bachelor's degree programme in chemistry is intended to provide:

- (i). Broad and balance knowledge in chemistry in addition to understanding of key chemical concepts, principles and theories.
- (ii). To develop students' ability and skill to acquire expertise over solving both theoretical and applied chemistry problems.
- (iii). To provide knowledge and skill to the students' thus enabling them to undertake further studies in chemistry in related areas or multidisciplinary areas that can be helpful for self-employment/entrepreneurship.
- (iv). To provide an environment that ensures cognitive development of students in a holistic manner. A complete dialogue about chemistry, chemical equations and its significance is fostered in this framework, rather than mere theoretical aspects

(v).To provide the latest subject matter, both theoretical as well as practical, such a way to foster their core competency and discovery learning. A chemistry graduate as envisioned in this framework would be sufficiently competent in the field to undertake further discipline-specific studies, as well as to begin domain-related employment.

(vi).To mould a responsible citizen who is aware of most basic domain-independent knowledge, including critical thinking and communication.

(vii).To enable the graduate prepare for national as well as international competitive examinations, especially UGC-CSIR NET and UPSC Civil Services Examination.

2. Program Learning Outcomes

The student graduating with the Degree B.Sc (Honours) Chemistry should be able to acquire

- **Core competency:** Students will acquire core competency in the subject Chemistry, and in allied subject areas.

(i). Systematic and coherent understanding of the fundamental concepts in Physical chemistry, Organic Chemistry, Inorganic Chemistry, Analytical Chemistry and all other related allied chemistry subjects.

(ii). Students will be able to use the evidence based comparative chemistry approach to explain the chemical synthesis and analysis.

(iii). The students will be able to understand the characterization of materials.

(iv). Students will be able to understand the basic principle of equipments, instruments used in the chemistry laboratory.

(v). Students will be able to demonstrate the experimental techniques and methods of their area of specialization in Chemistry.

(vi). **Disciplinary knowledge and skill:** A graduate student is expected to be capable of demonstrating comprehensive knowledge and understanding of both theoretical and experimental/applied chemistry knowledge in various fields of interest like Analytical Chemistry, Physical Chemistry, Inorganic Chemistry, Organic Chemistry, Material Chemistry, etc. Further, the student will be capable of using of advanced instruments and related soft-wares for in-depth characterization of materials/chemical analysis and separation technology.

(vii). **Skilled communicator:** The course curriculum incorporates basics and advanced training in order to make a graduate student capable of expressing the subject through technical writing as well as through oral presentation.

(viii). **Critical thinker and problem solver:** The course curriculum also includes components that can be helpful to graduate students to develop critical thinking ability by way of solving problems/numerical using basic chemistry knowledge and concepts.

(ix). **Sense of inquiry:** It is expected that the course curriculum will develop an inquisitive characteristics among the students through appropriate questions, planning and reporting experimental investigation.

- (x). **Team player:** The course curriculum has been designed to provide opportunity to act as team player by contributing in laboratory, field based situation and industry.
- (xi). **Skilled project manager:** The course curriculum has been designed in such a manner as to enabling a graduate student to become a skilled project manager by acquiring knowledge about chemistry project management, writing, planning, study of ethical standards and rules and regulations pertaining to scientific project operation.
- (xii). **Digitally literate:** The course curriculum has been so designed to impart a good working knowledge in understanding and carrying out data analysis, use of library search tools, and use of chemical simulation software and related computational work.
- (xiii). **Ethical awareness/reasoning:** A graduate student requires to understand and develop ethical awareness/reasoning which the course curriculum adequately provide.
- (xiv). **Lifelong learner:** The course curriculum is designed to inculcate a habit of learning continuously through use of advanced ICT technique and other available techniques/books/journals for personal academic growth as well as for increasing employability opportunity.

3. Course Learning Outcomes

The course learning outcomes are aligned with program learning outcomes but these are specific-to-specific courses offered in a program. The course level learning shall be reflected as program level learning. The core courses shall be the backbone of this framework whereas discipline electives, generic electives and skill enhancement courses would add academic excellence in the subject together with multi-dimensional and multidisciplinary approach.

In course learning outcomes, the student will attain subject knowledge in terms of individual course as well as holistically. The example related to core courses and their linkage with each other is stated below:

				Core Course (CC)												
Program Outcome	CC1	CC2	CC3	CC4	CC5	CC6	CC7				CC8	CC9	CC10	CC11	CC12	CC13
Core competency	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Critical thinking	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analytical reasoning	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Research-skills	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Teamwork	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			Discipline elective Courses (DEC)/Discipline Specific Elective (DSE)													

Program Outcome s	DSE1	DSE-2	DSE-3	DSE-4	DSE-5	DSE-6	DSE-7				DSE-8	DSE-9	DSE-10	DSE-11	DSE-12			
Additional Academic Knowledge	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Problem-solving	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Additional analytical skills	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Additional Research - skills	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
		Generic Elective Courses (GEC)																
Program Outcome s	GEC-1	GEC-2	GEC-3	GEC-4	GEC-5	GEC-6												
Additional	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>												

Aca demi c Kno wled ge																				
Exp osur e beyo nd disci pline	☑		☑	☑	☑	☑	☑													
Prob lem- solvi ng	☑		☑	☑	☑	☑	☑													
Anal ytica l reas onin g	☑		☑	☑	☑	☑	☑													
	Ability enhancement Course																			
Prog ram me Outc ome s	A EC 1	AEC 2	AE C 3	AEC 4	A EC 5	A EC 6	A EC 7	A E C 8	A E C 9	AE C1 0	AE C11									
Addi tiona l Acad emic Kno wled ge	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑									
Psyc holo gical skills	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑									
Prob lem- solvi ng	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑									

	Skill Enhancement Course (SEC)										
Program Outcomes	SEC 1	SEC 2	SEC 3	SEC 4	SEC 5	SEC 6	SEC 7	SEC 8	SEC 9	SEC 10	SEC 11
Additional Knowledge enhancement	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Exposure beyond discipline	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Analytical reasoning	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Digital Literacy	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Moral and ethical awareness	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑

The core courses would fortify the students with in-depth subject knowledge concurrently; the discipline specific electives will add additional knowledge about applied aspects of the program as well as its applicability in both academia and industry. Generic electives will introduce integration among various interdisciplinary courses. The skill enhancement courses would further add additional skills related to the subject as well as other than subject. In brief the student graduated with this type of curriculum would be able to disseminate subject knowledge along with necessary skills to suffice their capabilities for academia, entrepreneurship and Industry.

4. Teaching Learning Outcomes

The learning outcomes based course curriculum framework of Chemistry is designed to persuade the subject specific knowledge as well as relevant understanding of the course. The academic and professional skills required for Chemistry-based professions and jobs are also offered by same course in an extraordinary way. In addition, the learning experiences gained from this course should be designed and implemented for cognitive development in every student. The practical associated with this course helps to develop an important aspect of the teaching-learning process. Various types of teaching and learning processes will need to be adopted to achieve the same. The important relevant teaching and learning processes involved in this course are;

- Class lectures
- Seminars
- Tutorials
- Group discussions and Workshops
- Peer teaching and learning
- Question preparation
- Subjective type
- Long answer
- Short answer
- Objective type
 - Multiple choice questions
 - One answer/two answer type questions
 - Assertion and reasoning
- Practicum, and project-based learning
- Field-based learning
- Substantial laboratory-based practical component and experiments
- Open-ended project work,
- Games
- Technology-enabled learning
- Internship in industry, and research establishments.

The effective teaching strategies will also need to be adopted to develop problem-solving skills, higher-order skills of reasoning and analysis. The designed course also encourages fostering the social values/responsibility for maintaining and protecting the surrounding environment for improved living conditions. A learner centric and active participatory pedagogy shall be introduced in this framework.

5. Learning outcomes- based curriculum framework for B.Sc. Chemisry and B.Sc. Chemistry (Honours)

a) Attributes of a Chemistry Graduate

Attributes of chemistry graduate under the outcome-based teaching-learning framework may encompass the following:

- **Core competency:** The chemistry graduates are expected to know the fundamental concepts of chemistry and applied chemistry. These fundamental concepts would reflect the latest understanding of the field, and therefore, are dynamic in nature and require frequent and time-bound revisions.
- **Communication skills:** Chemistry graduates are expected to possess minimum standards of communication skills expected of a science graduate in the country. They are expected to read and understand documents with in-depth analyses and logical arguments. Graduates are expected to be well-versed in speaking and communicating their idea/finding/concepts to wider audience
- **Critical thinking:** Chemistry graduates are expected to know basics of cognitive biases, mental models, logical fallacies, scientific methodology and constructing cogent scientific arguments.
- **Psychological skills:** Graduates are expected to possess basic psychological skills required to face the world at large, as well as the skills to deal with individuals and students of various sociocultural, economic and educational levels. Psychological skills may include feedback loops, self-compassion, self-reflection, goal-setting, interpersonal relationships, and emotional management.
- **Problem-solving:** Graduates are expected to be equipped with problem-solving philosophical approaches that are pertinent across the disciplines;
- **Analytical reasoning:** Graduates are expected to acquire formulate cogent arguments and spot logical flaws, inconsistencies, circular reasoning etc.
- **Research-skills:** Graduates are expected to be keenly observant about what is going on in the natural surroundings to awake their curiosity. Graduates are expected to design a scientific experiment through statistical hypothesis testing and other *a priori* reasoning including logical deduction.

- **Teamwork:** Graduates are expected to be team players, with productive co-operations involving members from diverse socio-cultural backgrounds.
- **Digital Literacy:** Graduates are expected to be digitally literate for them to enroll and increase their core competency via e-learning resources such as MOOC and other digital tools for lifelong learning. Graduates should be able to spot data fabrication and fake news by applying rational skepticism and analytical reasoning.
- **Moral and ethical awareness:** Graduates are expected to be responsible citizen of India and be aware of moral and ethical baseline of the country and the world. They are expected to define their core ethical virtues good enough to distinguish what construes as illegal and crime in Indian constitution. Emphasis be given on academic and research ethics, including fair Benefit Sharing, Plagiarism, Scientific Misconduct and so on.
- **Leadership readiness:** Graduates are expected to be familiar with decision-making process and basic managerial skills to become a better leader. Skills may include defining objective vision and mission, how to become charismatic inspiring leader and so on.

b) Qualification Descriptors

i. B.Sc. Chemistry (Honours)

The qualification descriptors for a Bachelor's degree in Chemistry (Honours) may include following:

- (i). Systematic and fundamental understanding of chemistry as a discipline.
- (ii). Skill and related developments for acquiring specialization in the subject.
- (iii). Identifying chemistry related problems, analysis and application of data using appropriate methodologies.
- (iv). Applying subject knowledge and skill to solve complex problems with defined solutions.
- (v). Finding opportunity to apply subject-related skill for acquiring jobs and self-employment.
- (vi). Understanding new frontiers of knowledge in chemistry for professional development.
- (vii). Applying subject knowledge for solving societal problems related to application of chemistry in day to day life.

- (ix). Applying subject knowledge for sustainable environment friendly green initiatives.
- (x). Applying subject knowledge for new research and technology.

ii. B.Sc. Chemistry (H) & Chemistry (Pass)

The qualification descriptors for a Bachelor's degree in Chemistry may also include following:

- (i).To demonstrate a systematic, extensive and coherent knowledge and understanding of academic fields of study as a whole and its applications and links to disciplinary areas of the study; including critical understanding of the established theories, principles and concepts of a number of advanced and emerging issues in the field of chemistry;
- (ii).To demonstrate procedural knowledge that creates different types of professionals in the field of chemistry. Further application of knowledge can enhance productivity of several economically important product. Knowledge of Chemistry is also necessary for the development and management of industry, manufacturing of fine chemicals, etc.
- (iii)Developing skills and ability to use knowledge efficiently in areas related to specializations and current updates in the subject
- (iv).Demonstrate comprehensive knowledge about chemistry, current research, scholarly and professional literature of advanced learning areas of Chemistry
- (v).Use knowledge understanding and skills for critical assessment of wide range of ideas and problems in the field of Chemistry.
- (vi).Communicate the results of studies in the academic field of Chemistry using main concepts, constructs and techniques
- (vii).Apply one's knowledge and understanding of Chemistry to new/unfamiliar contexts and to identify problems and solutions in daily life.
- (viii).To think any apply understanding of the subject of Chemistry, Chemical Sciences sciences in identifying the problems which can be solved through the use of chemistry knowledge.
- (ix).To think of the adopting expertise in chemical sciences and solve the problems of environment, green chemistry, ecology, sustainable development, hunger, etc.

c) Distribution of different types of courses with their credits for B.Sc. Chemistry (Pass Course) (PCM & PCB)

Semester	Core Courses (CC) Note: 12 CC each with 6 credits, (total no. of papers 12), 4 corec courses are compulsory to be selected from each subject A, B, C	Ability Enhancement Courses (AEC) Select any 02	Skill Enhancement Electives (SEC) (Select any 08 courses, choosing at least 2 and not more than 3, from each subject, A, B, C	Discipline Specific Elective (DSE) (Select any 02 courses from each subject A, B, C	Credit hour load
1.	CC-IA CC-IB CC-IC	AEC-1		-	22
2.	CC-IIA CC-IIB CC-IIC	AEC-2		-	22
3.	CC-IIIA CC-IIIB CC-IIIC		SEC-1A SEC-2B	-	22
4.	CC-IVA CC-IVB CC-IVC		SEC-2A SEC-2C	-	22
5.	-	-	SEC-2B SEC-2C	DSE-IA DSE-IB DSE-IC	22
6.	-	-	Any 02 SEC courses from	DSE-IIA DSE-IIB	22

			discipline A, B, C	DSE-IIC	
Credits	72	8	16	36	132

d) Distribution of different types of courses with their credits for B.Sc. Chemistry (Honors)

Semester	Core Courses (CC) Note: 14 CC are available. All courses are compulsory 6 credits each	Ability Enhancement Electives (AEC) (2x4=8) Select 2 of 4 credits each	Skill Enhancement Electives (SEC) (4x2=8) Note: Select 4 of 2 credits each	Discipline Specific Elective (DSE) (4x6=24) Note: 12 DSE are available. Choose any 4 having 6 credit each	Generic Elective (GEC) (4x6=24) Note: 6 GEC are available. Choose any 4 having 6 credits each (PCM/PCB combination)	Credit hour load
1.	CC-I CC-II	AEC-1	SEC-1	-	GEC-1	24
2.	CC-III CC-IV	AEC-2	SEC-2	-	GEC-2	24
3.	CC-V CC-VI CC-VII	-	-	-	GEC-3	24
4.	CC-VIII CC-IX CC-X	-	-	-	GEC-4	24
5.	CC-XI CC-XII	-	SEC-3	DSE-1 DSE-2	-	26
6.	CC-XIII CC-XIV		SEC-4	DSE-3 DSE-4	-	26
Credits	56+28 (P)=84	08	08	16+8 (P)=24	16+8(P)=24	148

Course Structure at a Glance

6. Core Courses (CC)

Sr. No.	Name of the course	Type of course	L	T	P	Credits
CC 1.	Inorganic Chemistry-I	Core course	3	1	0	4
	Inorganic Chemistry Practical	Core course	0	0	2	2
CC 2.	Organic Chemistry-I	Core course	3	1	0	4
	Organic Chemistry Practical	Core course	0	0	2	2
CC 3.	Physical Chemistry-I	Core course	3	1	0	4
	Physical Chemistry Practical	Core course	0	0	2	2
CC 4.	Organic Chemistry-II	Core course	3	1	0	4
	Organic Chemistry Practical	Core course	0	0	2	2
CC 5.	Physical Chemistry-II	Core course	3	1	0	4
	Physical Chemistry Practical	Core course	0	0	2	2
CC 6.	Organic Chemistry-III	Core course	3	1	0	4
	Organic Chemistry Practical	Core course	0	0	2	2
CC 7.	Molecular Spectroscopy & Photochemistry	Core course	3	1	0	4
	Spectroscopy practicals	Core course	0	0	2	4
CC 8.	Physical Chemistry-III	Core course	3	1	0	4
	Physical Chemistry practical	Core course	0	0	2	2
CC 9.	Inorganic Chemistry-II	Core course	3	1	0	4
	Inorganic Chemistry practical	Core course	0	0	2	2
CC 10.	Introduction to Quantum Chemistry	Core course	3	1	0	4
	Chemistry Practical	Core course	0	0	2	2
CC 11.	Inorganic Chemistry-III	Core course	3	1	0	4

CC 12.	Inorganic Chemistry practical	Core course	0	0	2	2
	Analytical Chemistry	Core course	3	1	0	4
	Analytical chemistry practical	Core course	0	0	2	2
CC 13.	Green Chemistry	Core course	3	1	0	4
	Green chemistry practical	Core course	0	0	2	2
CC 14.	Materials Chemistry	Core course	3	1	0	4
	Materials Chemistry practical	Core course	0	0	2	2

7. Discipline Specific Elective (DSE) Course

Sr No	Name of the course	Type of course	L	T	P	Credits
1	Medicinal Chemitry	Discipline Specific Elective Course	3	1	2	6
2	Electrochemistry	Discipline Specific Elective course	3	1	2	6
3	Polymer Chemistry	Discipline Specific Elective Course	3	1	2	6
4	Environmental Chemistry	Discipline Specific Elective Course	3	1	2	6
5	Advanced Material Chemistry	Discipline Specific Elective Course	3	1	2	6
6	Advaned Analytical Chemistry	Discipline Specific Elective Course	3	1	2	6
7	Nuclear & Radiation Chemistry	Discipline Specific Elective Course	3	1	2	6
8	Organic spectroscopy	Discipline Specific Elective Course	3	1	2	6
9	Heterocyclic chemistry	Discipline Specific Elective Course	3	1	2	6
10	Biochemistry	Discipline Specific Elective Course	3	1	2	6
11	Organometallics and Bioinorganic chemistry	Discipline Specific Elective Course	3	1	2	6
12	Introduction to Nanochemistry & applications	Discipline Specific Elecive Course	3	1	2	6

8. Generic Elective Courses (GEC) (for PCM & PCB combination)

Sr. No.	Name of the course	Type of course	L	T	P	Credits
1	Mathematics-I:Mathematical methods in Chemistry	Generic Elective Courses	3	1	2	6
2	Life Science/Biology-I	Generic Elective Courses	3	1	2	6
3	Physics-I	Generic Elective Courses	3	1	2	6
4	Mathematics-II	Generic Elective Courses	3	1	2	6
5	Biology/Life Science-II	Generic Elective Courses	3	1	2	6
6	Physics-II	Generic Elective Courses	3	1	2	6

9. Ability Enhancement Courses

Sr. No.	Name of the course	Type of course	L	T/P	P	Credits
1	English for communication	Ability Enhancement Courses	3	1	0	4
2	Intellectual Property Rights	Ability Enhancement Courses	3	1	0	4
3	History of Indian Science	Ability Enhancement Courses	3	1	0	4
4	Good Laboratory Practices	Ability Enhancement Courses	3	1	0	4
5	Introduction to Forensic Science & Technology	Ability Enhancement Courses	3	1	0	4
6	Renewable Energies (Solar & Biogas)	Ability Enhancement Courses	3	1	0	4
7	Cheminformatics	Ability Enhancement Courses	3	1	0	4
8	Water remediation and conservation studies	Ability Enhancement Course	3	1	0	4
9	Research methodology	Ability Enhancement Courses	3	1	0	4
10	Chemistry in Everyday life	Ability Enhancement Courses	3	1	0	4
11	Chemistry of food, nutrition and preservation	Ability Enhancement Courses	3	1	0	4

10. Skill Enhancement Courses

Sr. No.	Name of the course	Type of course	L/ P	T	P	Credits
1	Personality Development	Skill Enhancement Courses	2	0	0	2
2	Computer Applications in Chemistry	Skill Enhancement Courses	2	0	0	2
3	Science Communication and Popularization	Skill Enhancement Courses	2	0	0	2
4	Biofertilizer	Skill Enhancement Courses	2	0	0	2
5	Herbal Science & Technology	Skill Enhancement Courses	2	0	0	2
6	Fermentation Science & Technology	Skill Enhancement Courses	2	0	0	2
7	Environment Impact Analysis	Skill Enhancement Courses	2	0	0	2
8	IT Skill for Chemist	Skill Enhancement Courses	2	0	0	2
9	IPR and business skill for chemist	Skill Enhancement Courses	2	0	0	2
10	Analytical Clinical Biochemistry	Skill Enhancement Courses	2	0	0	2
11	Mushroom Culture Technology	Skill Enhancement Courses	2	0	0	2

e) Assessment Methods

Academic performance in various courses i.e. core, discipline electives, generic electives and skill enhancement courses are to be considered as parameters for assessing the achievement of students in Chemistry. A number of appropriate assessment methods of Chemistry will be used to determine the extent to which students demonstrate desired learning outcomes. Following assessment methodology should be adopted;

- The oral and written examinations (Scheduled and surprise tests),
- Closed-book and open-book tests,
- Problem-solving exercises,
- Practical assignments and laboratory reports,
- Observation of practical skills,
- Individual and group project reports,
- Efficient delivery using seminar presentations,
- *Viva voce* interviews are majorly adopted assessment methods for this curriculum.
- The computerized adaptive testing, literature surveys and evaluations, peers and self-assessment, outputs from individual and collaborative work are also other important approaches for assessment purposes.

A continuous assessment method throughout the programme shall inculcate regular reading habit in the students' and continuous observation about weaker aspect of the students'.

f) Suggested List of Seminar Topics (not limited to)

1. Carbon dating
2. Carbohydrate chemistry
3. Aliphatic Compounds
4. Biodiversity and climate change
5. Current Developments in Analytical Techniques
6. Boron Chemistry
7. Role of DNA sequencing in chemical analysis.
8. Catalytic converter
9. Chemistry of diamonds
10. DNA markers and Genetic diversity
11. Biomaterials
12. Polymers in drug delivery system
13. Hydrogels in medical applications
14. Adsorption techniques in industry
15. Chiral molecules
16. Water conservation
17. Renewable energy for sustainable developments
18. Fluoride in water.
19. Arsenic and its remediation.
20. Paint chemistry
21. Exotic molecules
22. Hybridization
23. Fuel chemistry
24. Nanomedicine
25. Advances in Supramolecular Chemistry
26. Functional materials
27. Quasi crystals

g) Suggested List of Topics for Group Discussion (not limited to)

1. Smart materials
2. Solid oxide fuels
3. Desalination technology
4. Surfactants, colloids and its applications in industry.
5. Water based polymers
6. Molecular spectroscopy and its application.
7. Explosive chemistry
8. CO₂ capture
9. Green house effects.
10. Chemistry and Biotechnology; Past present and Future
11. Mesoporous materials
12. CNT and its applications in future
13. Fullerene
14. Recent advances in atomic layer deposition
15. Thermoelectric materials
16. Origin of seeds
17. Chemistry of separation of small and complex molecules
18. Environmental Nanotoxicology
19. Bioconjugate chemistry
20. Intelligent molecules in biomedical applications
21. Chemical neuroscience
22. Atmospheric physical chemistry
23. Organic electronics
24. Climate change- a solution through application of Chemistry
25. Stratospheric Ozone depletion and marine productivity – a chemistry solution.
26. Good ozone vs. bad ozone
27. Air pollution and climate change
28. Biodiversity under climate changing scenarios
29. Inorganic reaction mechanism
30. Solution Chemistry

31. Biomolecular chemistry
32. Boron chemistry and its application in medical science and technology
33. Chemistry of wine and coffee.
34. Graphene – recent advancement.
35. Hydrogen storage.
36. Food chemistry

h) Suggested Topics for Individual/ Team Projects (not limited to)

1. Synthesis of Aspirin.
2. Finding EMF of electrochemical cells.
3. Preparation of biodiesel.
4. Study of chemistry of photography.
5. Water analysis of nearby areas; finding out the toxic/heavy metals, anions and purification of water using simple available lab technology.
6. Study of air-pollution parameters of a given locality.
7. Forensic analysis of given species.

CORE COURSES

These are 12 courses. All courses are compulsory. These courses have the following credit pattern.

For Theory papers:

L	T	P	Cr
3	1	0	4

For Practical based papers:

L	T	P	Cr
0	0	2	2

1.Inorganic Chemistry-I:

L	T	P	Cr
3	1	0	4

On completion of this course, the students will be able to understand:

Learning objective:

1. Atomic theory and its evolution.
2. Learning scientific theory of atoms, concept of wave function.
3. Elements in periodic table; physical and chemical characteristics, periodicity.
4. To predict the atomic structure, chemical bonding, and molecular geometry based on accepted models.
5. To understand atomic theory of matter, composition of atom.
6. Identity of given element, relative size, charges of proton, neutron and electrons, and their assembly to form different atoms.
7. Defining isotopes, isobar and isotone.
8. Physical and chemical characteristics of elements in various groups and periods according to ionic size, charge, etc. and position in periodic table.
9. Characterize bonding between atoms, molecules, interaction and energetics (ii) hybridization and shapes of atomic, molecular orbitals, bond parameters, bond- distances and energies.

10. Valence bond theory incorporating concepts of hybridization predicting geometry of molecules.
11. Importance of hydrogen bonding, metallic bonding.

Self-study:

1. Electronic configuration of various elements in periodic table
2. Predicting structure of molecules
3. How hydrogen bonding, metallic bonding is important in common materials' scientific applications to material fabrication

Atomic Structure: (10 classes of 60 minutes each)

Bohr's theory, its limitations and atomic spectrum of hydrogen atom. Wave mechanics: de Broglie equation, Heisenberg's Uncertainty Principle and its significance, Schrödinger's wave equation, significance of ψ and ψ^2 . Quantum numbers and their significance. Normalized and orthogonal wave functions. Sign of wave functions. Radial and angular wave functions for hydrogen atom. Radial and angular distribution curves. Shapes of *s*, *p*, *d* and *f* orbitals. Contour boundary and probability diagrams. Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, Aufbau's principle and its limitations, Variation of orbital energy with atomic number.

Periodicity of Elements: (10 classes of 60 minutes each)

s, *p*, *d*, *f* block elements, the long form of periodic table. Detailed discussion of the following properties of the elements, with reference to *s* and *p*-block.

- (a) Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.
- (b) Atomic radii (van'der Waals)
- (c) Ionic and crystal radii.
- (d) Covalent radii (octahedral and tetrahedral)
- (e) Ionization enthalpy, Successive ionization enthalpies and factors affecting ionization energy. Applications of ionization enthalpy.
- (f) Electron gain enthalpy, trends of electron gain enthalpy.

(g)Electronegativity, Pauling, Mullikan, Allred Rachow scales, electronegativity and bond order, partial charge, hybridization, group electronegativity. Sanderson electron density ratio.

Chemical Bonding: (14 classes of 60 minutes each)

(i) *Ionic bond*: General characteristics, types of ions, size effects, radius ratio rule and its limitations. Packing of ions in crystals. Born-Landé equation with derivation, expression for lattice energy. Madelung constant, Born-Haber cycle and its application, Solvation energy.

(ii) *Covalent bond*: Lewis structure, Valence Shell Electron Pair Repulsion Theory (VSEPR), Shapes of simple molecules and ions containing lone-and bond-pairs of electrons multiple bonding, sigma and pi-bond approach, Valence Bond theory, (Heitler-London approach). Hybridization containing s, p and s, p, d atomic orbitals, shapes of hybrid orbitals, Bents rule, Resonance and resonance energy, Molecular orbital theory. Molecular orbital diagrams of simple homonuclear and heteronuclear diatomic molecules, MO diagrams of simple tri and tetra-atomic molecules, e.g., N₂, O₂, C₂, B₂, F₂, CO, NO, and their ions; HCl, BeF₂, CO₂, HCHO, (idea of s-p mixing and orbital interaction to be given). Covalent character in ionic compounds, polarizing power and polarizability. Fajan rules, polarization. Ionic character in covalent compounds: Bond moment and dipole moment. ionic character from dipole moment and electronegativities.

Metallic bonding and Weak chemical forces: (6 classes of 60 minutes each)

(iii) *Metallic Bond*: Qualitative idea of free electron model, Semiconductors, Insulators.

(iv) *Weak Chemical Forces*: van'der Waals, ion-dipole, dipole-dipole, induced dipole dipole-induced dipole interactions, Lenard-Jones 6-12 formula, hydrogen bond, effects of hydrogen bonding on melting and boiling points, solubility, dissolution.

Recommended Books/References:

- 1.Lee, J. D. *Concise Inorganic Chemistry*, Wiley, 5th Edⁿ.
- 2.Douglas, B.E., McDaniel, D.H., Alexander J.J., *Concepts & Models of Inorganic Chemistry, (Third Edition)* John Wiley & Sons,1999.
- 3.Atkins, P. W. and DePaula, J. *Physical Chemistry*, Tenth Edition, Oxford University Press, 2014.
4. Rodger, G. E. *Inorganic and Solid State Chemistry*, Cengage Learning, 2002.

1.1. Inorganic Chemistry Practical

L	T	P	Cr
0	0	2	2

(A) Titrimetric Analysis

- (i) Calibration and use of apparatus.
- (ii) Preparation of solutions of different Molarity/Normality of titrants.
- (iii) Use of primary and secondary standard solutions.

(B) Acid-Base Titrations

- (i) Estimation of carbonate and hydroxide present together in mixture.
- (ii) Estimation of carbonate and bicarbonate present together in a mixture.
- (iii) Estimation of free alkali present in different soaps/detergents

(C) Oxidation-Reduction Titrimetry

- (i) Estimation of Fe(II) and oxalic acid using standardized KMnO_4 solution.
- (ii) Estimation of oxalic acid and sodium oxalate in a given mixture.
- (iii) Estimation of Fe(II) with $\text{K}_2\text{Cr}_2\text{O}_7$ using internal (diphenylamine, anthranilic acid) and external indicator.

Recommended Books/References:

1. Mendham, J., A. I. Vogel's *Quantitative Chemical Analysis* Sixth Edition, Pearson, 2009.
2. Svehala G. and Sivasankar I. B, Vogel's *Qualitative Inorganic Analysis*, Pearson, India, 2012.

2.Core course: Organic Chemistry-I

L	T	P	Cr
3	1	0	4

On completion of this course, the students will be able to understand:

Learning objectives:

1. Basic of organic molecules, structure, bonding, reactivity and reaction mechanisms.
2. Stereochemistry of organic molecules – conformation and configuration, asymmetric molecules and nomenclature.
3. Aromatic compounds and aromaticity, mechanism of aromatic reactions.
4. Understanding hybridization and geometry of atoms, 3-D structure of organic molecules, identifying chiral centers.
5. Reactivity, stability of organic molecules, structure, stereochemistry.
6. Electrophile, nucleophiles, free radicals, electronegativity, resonance, and intermediates along the reaction pathways.
7. Mechanism of organic reactions (effect of nucleophile/leaving group, solvent), substitution vs. elimination.

Self-study:

1. Design and syntheses of organic molecules.
2. Structure identification through IR, NMR and Mass spectroscopic data.
3. Lab/Instrumentation techniques used for analyzing reaction mechanisms.
4. Advanced soft-wares/Models used for predicting stereochemistry/study of energy minimization of organic molecules.

Basics of Organic Chemistry: (10 classes of 60 minutes each)

Organic Compounds: Classification, and Nomenclature, Hybridization, Shapes of molecules, Influence of hybridization on bond properties. Electronic Displacements: Inductive, electromeric,

resonance and mesomeric effects, hyperconjugation and their applications; Dipole moment; Organic acids and bases; their relative strength. Homolytic and Heterolytic fission with suitable examples. Curly arrow rules, formal charges; Electrophiles and Nucleophiles; Nucleophilicity and basicity; Types, shape and relative stabilities of reaction intermediates (Carbocations, Carbanions, Free radicals and Carbenes).

Organic reactions and their mechanism: Addition, Elimination and Substitution reactions.

Stereochemistry: (6 classes of 60 minutes duration each)

Concept of asymmetry, Fischer Projection, Newmann and Sawhorse projection formulae and their interconversions; Geometrical isomerism: cis-trans and, syn-anti isomerism E/Z notations with C.I.P rules. Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiral-centres, Distereoisomers, meso structures, Racemic mixtures, Relative and absolute configuration: D/L and R/S designations.

Chemistry of Aliphatic Hydrocarbons: (18 classes of 60 minutes duration each)

A. Carbon-Carbon sigma bonds

Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz- Fittig Reactions, Free radical substitutions: Halogenation - relative reactivity and selectivity.

B. Carbon-Carbon pi-bonds

Formation of alkenes and alkynes by elimination reactions, Mechanism of E1, E2, E1cb reactions. Saytzeff and Hofmann eliminations. Reactions of alkenes: Electrophilic additions their mechanisms (Markownikoff/ Anti Markownikoff addition), mechanism of oxymercuration-demercuration, hydroboration- oxidation, ozonolysis, reduction (catalytic and chemical), syn and anti-hydroxylation (oxidation). 1, 2- and 1, 4- addition reactions in conjugated dienes and, Diels-Alder reaction; Allylic and benzylic bromination and mechanism, e.g. propene, 1-butene, toluene, ethyl benzene. Reactions of alkynes: Acidity, Electrophilic and Nucleophilic additions.

C. Cycloalkanes and Conformational Analysis

Cycloalkanes and stability, Baeyer strain theory, Conformation analysis, Energy diagrams of cyclohexane: Chair, Boat and Twist boat forms.

Aromatic Hydrocarbons (6 classes of 60 minutes duration each)

Aromaticity: Huckel's rule, aromatic character of arenes, cyclic carbocations/carbanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directing effects of substituent groups.

Recommended Books/References:

1. Morrison, R. N. & Boyd, R. N. *Organic Chemistry*, 6th Edn., Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Pine S. H. *Organic Chemistry*, Fifth Edition, McGraw Hill, (2007)
3. F. A. Carey, *Organic Chemistry*, Seventh Edition, Tata McGraw Hill (2008).
4. J. Clayden, N. Greeves, S. Warren, *Organic Chemistry*, 2nd Ed., (2012), Oxford University Press.
5. F. A. Carey, R. J. Sundberg, *Advanced Organic Chemistry, Part A: Structure and mechanism*, Kluwer Academic Publisher, (2000).

2.1.Course course: Organic Chemistry Practical

L	T	P	Cr
0	0	2	2

1. Checking the calibration of the thermometer.
2. Purification of organic compounds by crystallization using the following solvents:
a. Water b. Alcohol c. Alcohol-Water
3. Determination of the melting points of given organic compounds and unknown organic compounds (using Kjeldahl method and electrically heated melting point apparatus).
4. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds.
5. Determination of boiling point of liquid compounds. (boiling point lower than and more than 100 °C by distillation and capillary method)
- 5.Chromatography

- a. Separation of a mixture of two amino acids by ascending and horizontal paper chromatography
- b. Separation of a mixture of two sugars by ascending paper chromatography
- c. Separation of a mixture of *o*-and *p*-nitrophenol or *o*-and *p*-aminophenol by thin layer chromatography (TLC).

Recommended Books/Reference:

- 1.Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education (2009)
- 2.Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. *Practical Organic Chemistry*, 5th Ed., Pearson (2012)

3.Core course: Physical Chemistry-I

L	T	P	Cr
3	1	0	4

On completion of this course, the students will be able to understand:

Learning objective:

1. Familiarization with various states of matter.
2. Physical properties of each state of matter and laws related to describe the states.
3. Calculation of lattice parameters.
4. Electrolytes and electrolytic dissociation, salt hydrolysis and acid-base equilibria.
5. Understanding Kinetic model of gas and its properties.
6. Maxwell distribution, mean-free path, kinetic energies.
7. Behavior of real gases, its deviation from ideal behavior, equation of state, isotherm, and law of corresponding states.
8. Liquid state and its physical properties related to temperature and pressure variation.
9. Properties of liquid as solvent for various household and commercial use.
10. Solids, lattice parameters – its calculation, application of symmetry, solid characteristics of simple salts.
11. Ionic equilibria – electrolyte, ionization, dissociation.
12. Salt hydrolysis (acid-base hydrolysis) and its application in chemistry.

Self-study:

1. Determination of lattice parameters of given salt.
2. Study of X-Ray diffraction pattern and finding out reference from JCPDI file.
3. Numerical related to salt hydrolysis, ionic equilibria.

Gaseous state: (12 classes of 60 minutes duration each)

Behavior of real gases: Deviations from ideal gas behavior, compressibility factor, and its variation with pressure for different gases. Causes of deviation from ideal behavior. van der Waals equation of state, its derivation and application in explaining real gas behaviour; van der Waals equation expressed in virial form, Boyle temperature. Isotherms of real gases and their

comparison with van der Waals isotherms, continuity of states, critical state, critical and van der Waals constants, law of corresponding states.

Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path and viscosity of gases, including their temperature and pressure dependence, relation between mean free path and coefficient of viscosity, calculation of σ from η ; variation of viscosity with temperature and pressure. Maxwell distribution and its use in evaluating molecular velocities (average, root mean square and most probable) and average kinetic energy, law of equipartition of energy, degrees of freedom and molecular basis of heat capacities.

Liquid state: (5 classes of 60 minutes duration each)

Structure and physical properties of liquids; vapour pressure, surface tension, viscosity, and their dependence on temperature, Effect of addition of various solutes on surface tension, cleansing action of detergents. Structure of water.

Ionic equilibria: (13 classes of 60 minutes duration each)

Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono-, di- and tri-protic acids.

Salt hydrolysis, hydrolysis constants, degree of hydrolysis and pH for different salts. Buffer solutions; Henderson equation, buffer capacity, buffer range, buffer action, applications of buffers in analytical chemistry, Solubility and solubility product.

Brönsted-Lowry concept of acid-base reactions, solvated proton, relative strength of acids, types of acid-base reactions, levelling solvents, Lewis acid-base concept, Classification of Lewis acids, Hard and Soft Acids and Bases (HSAB) Application of HSAB principle.

Qualitative treatment of acid – base titration curves (calculation of pH at various stages). Theory of indicators; selection of indicators and their limitations. Multistage equilibria in polyelectrolytes.

Solid state: (10 classes of 60 minutes duration each)

Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, qualitative

idea of point and space groups, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, a simple account of rotating crystal method and powder pattern method. Analysis of powder diffraction patterns of NaCl, CsCl and KCl. Various types of defects in crystals, Glasses and liquid crystals.

Recommended Text books/references:

1. Atkins, P. W. & Paula, J. de *Atkin's Physical Chemistry* 8th Ed., Oxford University Press (2006).
2. Ball, D. W. *Physical Chemistry* Thomson Press, India (2007).
3. Castellan, G. W. *Physical Chemistry* 4th Ed. Narosa (2004).
4. Mortimer, R. G. *Physical Chemistry* 3rd Ed. Elsevier: NOIDA, UP (2009).
- 5 G. M. Barrow, Tata McGraw Hill (Fifth Edition) (2007)

3.1. Physical chemistry Practical

L	T	P	Cr
0	0	2	2

1. Surface tension measurements.

- a. Determine the surface tension by (i) drop number (ii) drop weight method.
- b. Study the variation of surface tension of detergent solutions with concentration.

2. Viscosity measurements using Ostwald's viscometer.

- a. Determination of viscosity of aqueous solutions of (i) polymer (ii) ethanol and (iii) sugar at room temperature.
- b. Viscosity of sucrose solution with the concentration of solute.

3. pH metry

- a. Effect on pH of addition of HCl/NaOH to solutions of acetic acid,

sodium acetate and their mixtures.

b. Preparation of buffer solutions of different pH

i. Sodium acetate-acetic acid

ii. Ammonium chloride-ammonium hydroxide

c. pH metric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base.

d. Determination of dissociation constant of a weak acid.

Recommended text books/references:

1.Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).

2.Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. *Experiments in Physical Chemistry 8th Ed.*; McGraw-Hill: New York (2003).

3 Halpern, A. M. & McBane, G. C. *Experimental Physical Chemistry 3rd Ed.*; W.H. Freeman & Co.: New York (2003).

4 Athawale V. D. and Mathur P. *Experimental Physical Chemistry*, New Age International (2001)

4. Core course: Organic Chemistry-II

L	T	P	Cr
3	1	0	4

After completion of the course, the learner shall be able to understand:

Learning objective:

1. Familiarization about classes of organic compounds and their methods of preparation.
2. Basic uses of reaction mechanisms.
3. Name reactions, uses of various reagents and the mechanism of their action.
4. Preparation and uses of various classes of organic compounds.
5. Organometallic compounds and their uses.
6. Organic chemistry reactions and reaction mechanisms.
7. Use of reagents in various organic transformation reactions.

Self-study:

1. Elucidating reaction mechanisms for organic reactions.
2. Organometallic compounds and their uses.
3. Use of active methylene groups in organic mechanism and preparation of new organic compounds.

Chemistry of Halogenated Hydrocarbons: (8 classes of 60 minutes duration each)

Alkyl halides: Methods of preparation, nucleophilic substitution reactions – S_N1 , S_N2 and S_Ni mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution vs. elimination.

Aryl halides: Preparation, including preparation from diazonium salts. nucleophilic aromatic substitution; S_NAr , Benzyne mechanism.

Relative reactivity of alkyl, allyl/benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.

Organometallic compounds of Mg and Li and their use in synthesis.

Alcohols, Phenols, Ethers and Epoxides: (6 classes of 60 minutes duration each)

Alcohols: preparation, properties and relative reactivity of 1°, 2°, 3° alcohols, Bouvaelt-Blanc Reduction; Preparation and properties of glycols: Oxidation by periodic acid and lead tetraacetate, Pinacol-Pinacolone rearrangement.

Phenols: Preparation and properties; Acidity and factors effecting it, Ring substitution reactions, Reimer–Tiemann and Kolbe’s–Schmidt Reactions, Fries and Claisen rearrangements with mechanism.

Ethers and Epoxides: Preparation and reactions with acids. Reactions of epoxides with alcohols, ammonia derivatives and LiAlH_4

Carbonyl Compounds: (10 classes of 60 minutes duration each)

Structure, reactivity and preparation; Nucleophilic additions, Nucleophilic addition-elimination reactions with ammonia derivatives with mechanism; Mechanisms of Aldol and Benzoin condensation, Knoevenagel condensation, Claisen-Schmidt, Perkin, Cannizzaro and Wittig reaction, Beckmann and Benzil-Benzilic acid rearrangements, haloform reaction and Baeyer Villiger oxidation, α -substitution reactions, oxidations and reductions (Clemmensen, Wolff-Kishner, LiAlH_4 , NaBH_4 , MPV, PDC and PGC);

Addition reactions of unsaturated carbonyl compounds: Michael addition.

Active methylene compounds: Keto-enol tautomerism. Preparation and synthetic applications of diethyl malonate and ethyl acetoacetate.

Carboxylic Acids and their Derivatives: (10 classes of 60 minutes duration each)

Preparation, physical properties and reactions of monocarboxylic acids: Typical reactions of dicarboxylic acids, hydroxy acids and unsaturated acids: succinic/phthalic, lactic, malic, tartaric, citric, maleic and fumaric acids; Preparation and reactions of acid chlorides, anhydrides, esters and amides; Comparative study of nucleophilic substitution at acyl group -Mechanism of acidic and alkaline hydrolysis of esters, Claisen condensation, Dieckmann and Reformatsky reactions, Hofmannbromamide degradation and Curtius rearrangement.

Sulphur containing compounds: (6 classes of 60 minutes duration each)

Preparation and reactions of thiols, thioethers and sulphonic acids.

Recommended Books/references:

- 1 Solomons, T.W G., Fryhle, B. Craig. *Organic Chemistry*, John Wiley & Sons, Inc (2009).
- 2 McMurry, J.E. *Fundamentals of Organic Chemistry*, Seventh edition Cengage Learning, 2013.
- 3 P Sykes, *A Guide Book to Mechanism in Organic Chemistry*, 6th Edition (1997), Orient Longman, New Delhi.
- 4 Morrison R. T. and Boyd R. N. *Organic Chemistry*, Sixth Edition Prentice Hall India, 2003.

4.1.Core course: Organic Chemistry-Practical

L	T	P	Cr
0	0	2	2

(List of experiments given are suggestive. One experiment from each group to be demonstrated)

1. Identification of elements (N, S, and halogen) and Functional group tests for alcohols, phenols, carbonyl, carboxylic acid and amine group of compounds.
2. Organic preparations:
 - i. Acetylation of one of the following compounds: amines (aniline, *o*-, *m*-, *p*-toluidines and *o*-, *m*-, *p*-anisidine) and phenols (β -naphthol, vanillin, salicylic acid) by any one method: (Using conventional method and Using green chemistry approach)
 - ii. Benzoylation of one of the amines (aniline, *o*-, *m*-, *p*-toluidines and *o*-, *m*-, *p*-anisidine) and one of the phenols (β -naphthol, resorcinol, *p*-cresol) by Schotten-Baumann reaction.
 - iii. Oxidation of ethanol/ isopropanol (Iodoform reaction).
 - iv. Bromination (any one)
 - a. Acetanilide by conventional methods
 - b. Acetanilide using green approach (Bromate-bromide method)
 - v. Nitration: (any one)
 - a. Acetanilide/nitrobenzene by conventional method
 - b. Salicylic acid by green approach (using ceric ammonium nitrate).
 - vi. Selective reduction of *meta* dinitrobenzene to *m*-nitroaniline.
 - vii. Reduction of *p*-nitrobenzaldehyde by sodium borohydride.
 - viii. Hydrolysis of amides and esters.

- ix. Semicarbazone of any one of the following compounds: acetone, ethyl methyl ketone, cyclohexanone, benzaldehyde.
- x. *S*-Benzylisothiuronium salt of one each of water soluble/ insoluble acids (benzoic acid, oxalic acid, phenyl acetic acid and phthalic acid).
- xi. Aldol condensation with either conventional or green method.
- xii. Benzil-Benzilic acid rearrangement.

Collected solid samples may be used for recrystallization, melting point and TLC.

Recommended Books/References:

- 1 Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education (2009)
- 2 Furniss, B.S., Hannaford, A.J., Smith, P.W.G. & Tatchell, A.R. *Practical Organic Chemistry*, 5th Ed. Pearson (2012)
- 3 Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis*, University Press (2000)
- 4 Ahluwalia, V.K. & Dhingra, S. *Comprehensive Practical Organic Chemistry: Qualitative Analysis*, University Press (2000).

5. Core course: Physical Chemistry-II

L	T	P	Cr
3	1	0	4

After completion of the course, the learner shall be able to understand:

Learning objective:

1. Laws of thermodynamics and concepts.
2. Partial molar quantities and its attributes.
3. Dilute solution and its properties.
4. Understanding the concept of system, variables, heat, work, and laws of thermodynamics.
5. Understanding the concept of heat of reactions and use of equations in calculations of bond energy, enthalpy, etc.
6. Understanding the concept of entropy; reversible, irreversible processes. Calculation of entropy using 3rd law of thermodynamics.
7. Understanding the application of thermodynamics: Joule Thompson effects, partial molar quantities.
8. Understanding theories/thermodynamics of dilute solutions.

Self-study:

1. Use of thermochemical equations for calculation of energy and related terms.
2. Use of thermodynamics in explaining chemical behavior of solute/solvent and reactions.
3. Study of calorimeter principle and its use.

Introduction to thermodynamics: (6 classes of 60 minute duration each)

Intensive and extensive variables; state and path functions; isolated, closed and open systems; zeroth law of thermodynamics. *First law*: Concept of heat, q , work, w , internal energy, U , and statement of first law; enthalpy, H , relation between heat capacities, calculations of q , w , U and H for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabatic conditions.

Thermochemistry: (6 classes of 60 minutes duration each)

Heats of reactions: standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, effect of temperature (Kirchhoff's equations), pressure on enthalpy of reactions.

Second Law: (6 classes of 60 minutes duration each)

Concept of entropy; thermodynamic scale of temperature, statement of the second law of thermodynamics; molecular and statistical interpretation of entropy. Calculation of entropy change for reversible and irreversible processes.

Third law of thermodynamics: (4 classes of 60 minutes duration each)

Third Law of thermodynamics, residual entropy, calculation of absolute entropy of molecules.

Free Energy Functions: (6 classes of 60 minutes duration each)

Gibbs and Helmholtz energy; variation of S , G , A with T , V , P ; Free energy change and spontaneity. Relation between Joule-Thomson coefficient and other thermodynamic parameters; inversion temperature; Gibbs-Helmholtz equation; Maxwell relations; thermodynamic equation of state.

Partial molar quantities: (6 classes of 60 minutes duration each)

Partial molar quantities, dependence of thermodynamic parameters on composition; Gibbs-Duhem equation, chemical potential of ideal mixtures, change in thermodynamic functions in mixing of ideal gases.

Dilute solutions: (6 classes of 60 minutes duration each)

Dilute solutions; lowering of vapour pressure, Raoult's and Henry's Laws and their applications. Excess thermodynamic functions. Thermodynamic derivation using chemical potential to derive relations between the four colligative properties: [(i) relative lowering of vapour pressure, (ii) elevation of boiling point, (iii) Depression of freezing point, (iv) osmotic pressure] and amount

of solute. Applications in calculating molar masses of normal, dissociated and associated solutes in solution.

Recommended Books/References

- 1 Atkins P. and De Paula, J. *Physical Chemistry* Tenth Ed., OUP, 2014.
- 2 Castellan, G. W. *Physical Chemistry 4th Ed.*, Narosa, 2004.
- 3 Engel, T. and Reid, P. *Physical Chemistry 3rd Ed.*, Prentice Hall, 2012.
- 4 McQuarrie, D. A. and Simon, J. D. *Molecular Thermodynamics* Viva Books, 2004.
- 5 Roy, B. N. *Fundamentals of Classical and Statistical Thermodynamics* Wiley, 2001
- 6 *Commonly Asked Questions in Thermodynamics*. CRC Press, 2011.
- 7 Levine, I. N. *Physical Chemistry* 6th Ed., Tata Mc Graw Hill, 2010.
- 8 Metz, C.R. *2000 solved problems in chemistry*, Schaum Series, 2006.

5.1.Core course: Physical Chemistry-Practical

L	T	P	Cr
0	0	2	2

(A list of suggested experiments are given. However, more experiments can be added based on facilities available in the laboratories).

1. Determination of critical solution temperature and composition of the phenol-water system and to study the effect of impurities on it.
2. Study the equilibrium of at least one of the following reactions by the distribution method:
 - (i) $I_2(aq) + I^- \rightleftharpoons I_3^-(aq)$
 - (ii) $Cu^{2+}(aq) + nNH_3 \rightarrow Cu(NH_3)_n$
3. Study the kinetics of the following reactions.
 - a. Acid hydrolysis of methyl acetate with hydrochloric acid.
 - b. Saponification of ethyl acetate.

Adsorption

Verification of Freundlich and Langmuir isotherms for adsorption of acetic acid and selected organic dye(s) on activated charcoal.

(Use of calorimeter for calculation of heat of reactions may be demonstrated)

Recommended Books/References:

1. Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand, New Delhi, 2011.
2. Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. *Experiments in Physical Chemistry*, Eighth Edition, McGraw-Hill(2003).
- 3 Halpern, A. M. and McBane, G. C. *Experimental Physical Chemistry*, Third Edition, W, H. Freeman (2003).

6.Core course: Organic Chemistry-III

L	T	P	Cr
3	1	0	4

After completion of the course, the learner shall be able to understand:

Learning objective:

1. Nitrogen containing functional groups and their reactions.
2. Familiarization with polynuclear hydrocarbons and their reactions.
3. Heterocyclic compounds and their reactions.
4. Alkaloids and Terpenes
5. Understanding reactions and reaction mechanism of nitrogen containing functional groups.
6. Understanding the reactions and mechanisms of diazonium compounds.
7. Understanding the structure and their mechanism of reactions of selected polynuclear hydrocarbons.
8. Understanding the structure, mechanism of reactions of selected heterocyclic compounds.
9. Classification, structure, mechanism of reactions of few selected alkaloids and terpenes.

Self-study:

1. Use of benzene diazonium salt in organic synthesis.
2. Applications of heterocyclic compounds in pharmaceuticals/drugs and the mechanism of actions.
3. Pharmaceuticals/Biomedical applications of alkaloids and terpenes.
4. Nitrogen containing organic compounds/heterocyclic compounds in synthetic chemistry.

Nitrogen Containing Functional Groups (8 classes of 60 minutes duration each).

Preparation and important reactions of nitro and compounds, nitriles and isonitriles Amines: Effect of substituent and solvent on basicity; Preparation and properties: Gabriel phthalimide synthesis, Carbylamine reaction, Mannich reaction, Hoffmann's exhaustive methylation, Hofmann-elimination reaction; Distinction between 1°, 2° and 3° amines with Hinsberg reagent and nitrous acid. Diazonium salts: Preparation and synthetic applications.

Polynuclear Hydrocarbons: (8 classes of 60 minutes duration each)

Reactions of naphthalene phenanthrene and anthracene Structure, Preparation and structure elucidation and important derivatives of naphthalene and anthracene; Polynuclear hydrocarbons.

Heterocyclic Compounds: (12 classes of 60 minutes duration each)

Classification and nomenclature, Structure, aromaticity in 5-numbered and 6-membered rings containing one heteroatom; Synthesis, reactions and mechanism of substitution reactions of Furan, Pyrrole (Paal-Knorr synthesis, Knorr pyrrole synthesis, Hantzsch synthesis), Thiophene, Pyridine (Hantzsch synthesis), Pyrimidine, Structure elucidation of indole, Fischer indole synthesis and Madelung synthesis), Structure elucidation of quinoline and isoquinoline, Skraup synthesis, Friedlander's synthesis, Knorr quinoline synthesis, Doebner-Miller synthesis, Bischler-Napieralski reaction, Pictet-Spengler reaction, Pomeranz-Fritsch reaction Derivatives of furan: Furfural and furoic acid.

Alkaloids (6 classes of 60 minutes duration each)

Natural occurrence, General structural features, Isolation and their physiological action Hoffmann's exhaustive methylation, Emde's modification, Structure elucidation and synthesis of Hygrine and Nicotine. Medicinal importance of Nicotine, Hygrine, Quinine, Morphine, Cocaine, and Reserpine.

Terpenes (6 classes of 60 minutes duration each)

Occurrence, classification, isoprene rule; Elucidation of structure and synthesis of Citral, Neral and α -terpineol.

Recommended Text Books/references:

1. Morrison, R. T., Boyd, R. N., Bhatnagar, S.K., Organic Chemistry, 7th Edn., Pearson.
2. Acheson, R.M. *Introduction to the Chemistry of Heterocyclic compounds*, John Wiley & Sons (1976).
3. Solomons, T.W., Fryhle Craig, *Organic Chemistry*, John Wiley & Sons, Inc (2009).
4. McMurry, J.E. *Fundamentals of Organic Chemistry*, 7th Ed. Cengage Learning India Edition, 2013.
5. Kalsi, P. S. *Organic reactions and their mechanisms*, New Age Science (2010).
6. Clayden, J.; Greeves, N.; Warren, S.; Wothers, P.; *Organic Chemistry*, Oxford University Press Inc., New York (2001).

- 7 Singh, J.; Ali, S.M. & Singh, J. *Natural Product Chemistry*, Prajati Parakashan (2010).
- 8 Bansal R. K. *Heterocyclic Chemistry: Syntheses, Reactions and Mechanisms*, New Age, Third Edition (1999).
9. Clayden J., Greeves N., Warren S., *Organic Chemistry*, (2nd Ed.), (2012), Oxford University Press.

6.1. Core course: Organic Chemistry Practical

L	T	P	Cr
0	0	2	2

1. Qualitative analysis of unknown organic compounds containing monofunctional groups (carbohydrates, aryl halides, aromatic hydrocarbons, nitro compounds, amines and amides) and simple bifunctional groups, for e.g. salicylic acid, cinnamic acid, nitrophenols, etc.
2. Identification of functional groups of simple organic compounds by IR spectroscopy and NMR spectroscopy (IR and NMR of simple organic compounds may be done wherever facilities are available, otherwise sample spectra may be provided for simple organic compounds like Ethanol, Aniline, Phenol, acetic acid, other simple aldehydes, carboxylic acid, etc., for identification of functional groups. References from standard spectroscopy books may also be taken for such purpose for enhancing students understanding and skill).
3. Preparation of methyl orange.
4. Extraction of caffeine from tea leaves.
5. Analysis of Carbohydrate: aldoses and ketoses, reducing and non-reducing sugars using simple lab procedures.

Recommended Books/References:

1. Vogel, A.I. *Quantitative Organic Analysis*, Part 3, Pearson (2012).
2. Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education (2009)
3. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. *Practical Organic Chemistry*, 5th Ed., Pearson (2012)

4. Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis*, University Press (2000).
5. Ahluwalia, V.K. & Dhingra, S. *Comprehensive Practical Organic Chemistry: Qualitative Analysis*, University Press (2000).

7. Core course: Molecular Spectroscopy & Photochemistry

L	T	P	Cr
3	1	0	4

Unit-I: (15 classes of 60 minutes duration each)

Interaction of electromagnetic radiation with molecules and various types of spectra; Born-Oppenheimer approximation. Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic and linear triatomic molecules, isotopic substitution.

Vibrational spectroscopy: Classical equation of vibration, computation of force constant, amplitude of diatomic molecular vibrations, anharmonicity, Morse potential, dissociation energies, fundamental frequencies, overtones, hot bands, degrees of freedom for polyatomic molecules, modes of vibration, concept of group frequencies. Vibration-rotation spectroscopy: diatomic vibrating rotator, P, Q, R branches.

Unit-II: (10 classes of 60 minutes duration each)

Raman spectroscopy: Qualitative treatment of Rotational Raman effect; Effect of nuclear spin, Vibrational Raman spectra, Stokes and anti-Stokes lines; their intensity difference, rule of mutual exclusion.

Electronic spectroscopy: Franck-Condon principle, electronic transitions, singlet and triplet states, fluorescence and phosphorescence, dissociation and predissociation.

Unit-III: (15 classes of 60 minutes duration each)

Photophysical and photochemical processes: laws of photochemistry, quantum yield. Jablonski diagrams: Franck-Condon principle, Law of photochemical equivalence, quantum efficiency, low and high quantum efficiency. kinetics of photochemical reactions ($\text{H}_2 + \text{Br}_2 = \text{HBr}$, $2\text{HI} = \text{H}_2 + \text{I}_2$), energy transfer in photochemical reactions (photosensitization and quenching), fluorescence, phosphorescence, chemiluminescence, Discussion of Electronic spectra and photochemistry (Lambert-Beer law and its applications).

Recommended books/References:

1. Laideler K. J. and Meiser J. M. *Physical Chemistry* Third Edition (International) 1999
2. Levine I. N., *Physical Chemistry*, Fourth Edition), McGraw-Hill (International), 1995.
3. McQuarrie D. A. and Simon J. D. *Physical Chemistry- A Molecular Approach*, University Science Books, 1998
4. Rohatgi-Mukherjee K. K. *Fundamentals of Photochemistry*, New age (revised second edition).
5. Banwell, C. N. & McCash, E. M. *Fundamentals of Molecular Spectroscopy* 4th Ed. Tata McGraw-Hill: New Delhi (2006).

7.1.Suggested laboratory experiments:

L	T	P	Cr
0	0	2	2

- (i). Determination of indicator constant - colorimetry. (instructor may vary indicators available in the lab).
- (ii). Verification of Beer's Law - Determination of concentration of solution by colorimetry. (Instructor may explain the principle of using colorimeter, its handling drawing standard calibration curve, and its application in finding unknown concentration of dyes, concentration of metal solutions (*e.g.* Ni, Cu using appropriate reagent) from standard calibration curve.

Suggested books/reference books:

1. Practicals in physical chemistry – a modern approach, P.S.Sindhu, Macmillan,
2. Experiments in Physical Chemistry, J.M.Wilson, R.J.Newcomb, A.R.Denaro, 2nd Edn., Elsevier.

8. Core course: Physical Chemistry-III

L	T	P	Cr
3	1	0	4

After completion the course, the learner shall be able to understand:

Learning objective:

1. Phases, components, Gibbs phase rule, Phase diagrams and applications.
2. Chemical kinetics: type of reactions, determination of rate, theories of reaction rate, steady state approximation.
3. Catalyst – mechanism, acid base catalysis, enzyme catalysis.
4. Adsorption isotherms.
5. Understanding phases, components, Gibb's phase rule and its applications, construction of phase diagram of different systems, the application of phase diagram.
6. Understanding the basics of chemical kinetics: determination of order, molecularity, and understanding theories of reaction rates, determination of rate of opposing/parallel/chain reactions with suitable examples, application of steady state kinetics, Steady-state approximation.
7. Catalyst – mechanism of catalytic action, enzyme catalysis.
8. Langmuir, Freundlich – adsorption isotherms, significance, multilayer adsorption – theory and significance.

Self-study:

1. Application of phase diagram.
2. Study of reaction kinetics, Fast reactions.
3. Heterogeneous catalysis used in industry and its mechanism of action.
4. Application of adsorption isotherms in metal adsorption, significance.

Phase Equilibria: (10 classes of 60 minutes duration each)

Concept of phases, components and degrees of freedom, derivation of Gibbs Phase Rule for nonreactive and reactive systems; Clausius-Clapeyron equation and its applications to solid-liquid, liquid-vapour and solid-vapour equilibria, phase diagram for one component systems,

with applications. Phase diagrams for systems of solid-liquid equilibria involving eutectic, congruent and incongruent melting points, solid solutions. Three component systems, water-chloroform-acetic acid system, triangular plots. *Binary solutions*: Gibbs-Duhem-Margules equation, its derivation and applications to fractional distillation of binary miscible liquids (ideal and nonideal), azeotropes, lever rule, partial miscibility of liquids, CST, miscible pairs, steam distillation. Nernst distribution law: its derivation and applications.

Chemical Kinetics: (10 classes of 60 minutes duration each)

Order and molecularity of a reaction, rate laws in terms of the advancement of a reaction, differential and integrated rate laws for first, second and fractional order reactions, pseudounimolecular reactions, determination of the order, kinetics of complex reactions (limited to first order): (i) Opposing reactions (ii) parallel reactions and (iii) consecutive reactions and their differential rate equations (steady-state approximation in reaction mechanisms) (iv) chain reactions. Temperature dependence of reaction rates; Arrhenius equation; activation energy. Collision theory of reaction rates, Lindemann mechanism, qualitative treatment of the theory of absolute reaction rates.

Catalysis: (10 classes of 60 minute duration each)

Types of catalyst, specificity and selectivity, mechanisms of catalyzed reactions at solid surfaces; effect of particle size and efficiency of nanoparticles as catalysts. Enzyme catalysis, Michaelis-Menten mechanism, acid-base catalysis.

Surface chemistry: (10 classes of 60 minutes duration each)

Physical adsorption, chemisorption, adsorption isotherms (Freundlich, Temkin, Derivation of Langmuir adsorption isotherms, surface area determination), BET theory of multilayer adsorption (no derivation), Adsorption in solution.

Recommended books/References:

1. Atkins P. W. and De Paula J., *Physical Chemistry*, (tenth edition) Oxford University Press, 2014.
- 2 Castellan, G. W. *Physical Chemistry*, 4th Ed., Narosa , 2004.

- 3 McQuarrie, D. A. & Simon, J. D., *Molecular Thermodynamics*, Viva Books, 2004.
- 4 Engel, T. & Reid, P. *Physical Chemistry* Third Edition, Prentice-Hall, 2012.
- 5 Zundhal, S.S. *Chemistry concepts and applications* Cengage India, 2011
- 6 Ball, D. W. *Physical Chemistry* Cengage India, 2012.
- 7 Mortimer, R. G. *Physical Chemistry 3rd Ed.*, Elsevier: NOIDA, UP, 2009.
8. Levine, I. N. *Physical Chemistry 6th Ed.*, Tata McGraw-Hill, 2011.
9. Metz, C. R. *Physical Chemistry 2nd Ed.*, Tata McGraw-Hill, 2009.

8.1. Core course: Physical Chemistry Practical

L	T	P	Cr
0	0	2	2

Conductometry

- 1 Determination of cell constant
- 2 Equivalent conductance, degree of dissociation and dissociation constant of a weak acid.
3. Conductometric titrations of: Strong acid Vs. strong base (ii) Weak acid vs. strong base, (iii) Mixture of strong acid and (iv) weak acid vs. strong base, Strong acid vs. weak base.

Potentiometry

Potentiometric titrations of: (i) Strong acid vs. strong base (ii) Weak acid vs. strong base (iii) Dibasic acid vs. strong base (iv) Potassium dichromate vs. Mohr's salt.

Recommend books/References:

- 1 Khosla, B. D.; Garg, V. C. and Gulati, A. *Senior Practical Physical Chemistry*, R. Chand New Delhi, 2011.
 - 2 Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. *Experiments in Physical Chemistry* Eighth Edition; McGraw-Hill: New York, 2003.
 - 3 Halpern, A. M. and McBane, G. C. *Experimental Physical Chemistry 3rd Ed.*; W.H. Freeman & Co.: New York, 2003.
- (List of experiments and references are suggestive. However, more experiments can be added/list of experiments can be revised as per available facilities).

9. Core course : Inorganic Chemistry-II

L	T	P	Cr
3	1	0	4

After completion of the course, the learner shall be able to understand:

Learning objective:

1. Oxidation-Reductions and their use in metallurgy.
2. Chemistry of s and p-block elements.
3. Chemistry of noble gases.
4. Inorganic polymers and their use.
5. Understanding redox reactions in hydrometallurgy processes.
6. Structure, bonding of s and p block materials and their oxides/compounds.
7. Understanding chemistry of boron compounds and their structures.
8. Chemistry of noble gases and their compounds; application of VSEPR theory in explaining structure and bonding.
9. Understanding chemistry of inorganic polymers, their structures and uses.

Self-study:

1. Extraction of metals through metallurgical operations and their uses.
2. Bonding of various s and p block elements.
3. Use of boron compounds.
4. Chemistry of inorganic polymers and their uses.

Oxidation-Reduction and general principle of metallurgy: (8 classes of 60 minutes duration each)

Redox equations, Standard Electrode Potential and its application to inorganic reactions. Occurrence of metals based on standard electrode potentials. Ellingham diagrams for reduction of metal oxides using carbon or carbon monoxide as reducing agent. Electrolytic Reduction, Hydrometallurgy. Methods of purification of metals: Electrolytic Kroll process, Parting process, van Arkel- de Boer process and Mond's process, Zone refining.

Chemistry of *s* and *p* Block Elements: (16 classes of 60 minutes duration each)

Inert pair effect, Relative stability of different oxidation states, diagonal relationship and anomalous behavior of first member of each group. Allotropy and catenation. Complex formation tendency of *s* and *p* block elements. Hydrides and their classification ionic, covalent and interstitial. Basic beryllium acetate and nitrate.

Structure, bonding, preparation, properties and uses. Boric acid and borates, boron nitrides, borohydrides (diborane) carboranes and graphitic compounds, silanes, Oxides and oxoacids of nitrogen, Phosphorus and chlorine. Per-oxo acids of Sulphur inter-halogen compounds, polyhalide ions, pseudo-halogens, properties of halogens.

Noble Gases: (8 classes of 60 minutes duration each)

Occurrence and uses, rationalization of inertness of noble gases, Clathrates; preparation and properties of XeF₂, XeF₄ and XeF₆; Bonding in noble gas compounds (Valence bond and MO treatment for XeF₂), Shapes of noble gas compounds (VSEPR theory).

Inorganic Polymers: (8 classes of 60 minutes duration each)

Types of inorganic polymers, comparison with organic polymers, synthesis, structural aspects and applications of silicones and siloxanes. Borazines, silicates and phosphazenes, and polysulphates.

Recommended books/references:

- 1 Lee, J.D. *Concise Inorganic Chemistry*, ELBS, 1991.
- 2 Douglas, B.E; Mc Daniel, D.H. & Alexander, J.J. *Concepts & Models of Inorganic Chemistry 3rd Ed.*, John Wiley Sons, N.Y. 1994.
- 3 Greenwood, N.N., Earnshaw. *Chemistry of the Elements*, Butterworth-Heinemann. 1997.
- 4 Cotton, F.A. & Wilkinson, G. *Advanced Inorganic Chemistry*, Wiley, VCH, 1999.
- 5 Rodger, G.E. *Inorganic and Solid State Chemistry*, Cengage Learning India Edition, 2002.
- 6 Miessler, G. L. & Donald, A. Tarr. *Inorganic Chemistry* Fourth Ed., Pearson, 2010
- 7 Atkins, P. W and Shriver D. N. *Atkins' Inorganic Chemistry* 5th Ed. Oxford University Press (2010).

9.1.Course course: Inorganic Chemistry-practical

L	T	P	Cr
0	0	2	2

(A) Iodo / Iodimetric Titrations

- (i) Estimation of Cu(II) and $K_2Cr_2O_7$ using sodium thiosulphate solution (Iodimetrically).
- (ii) Estimation of (i) arsenite and (ii) antimony iodimetrically
- (iii) Estimation of available chlorine in bleaching powder iodometrically.

(B) Inorganic preparations

- (i) Cuprous Chloride, Cu_2Cl_2
- (ii) Preparation of Aluminium potassium sulphate (Potash alum) or Chrome alum.

Recommended books/references:

Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis* Sixth Edition Pearson, 2009.

(The above list of experiments are suggestive. Faculty/academic bodies may incorporate revision/may incorporate text and reference books as per need).

10. Introduction to Quantum Chemistry:

L	T	P	Cr
3	1	0	4

Unit-I: Introduction to black-body radiation and distribution of energy, photo-electric effect, concept of quantization, wave particle duality (de-Broglie's hypothesis), The uncertainty principle, The wave function: wave function and its interpretation, conditions of normalization and Orthogonality and its significance. Basic idea about operators, eigen function and values, Schrodinger equation and application to free-particle and particle in a box, boundary conditions, wave functions and energies, degeneracy, hydrogen atom, Schrodinger equation in polar coordinates, radial and angular parts of the hydrogenic orbitals, degeneracies, spherical harmonics, representations of hydrogenic orbitals. **(15 classes of 60 minutes durations)**

Unit-II: Quantitative treatment of simple harmonic oscillator model, setting up of Schrodinger equation and discussion of solution of wave functions. Rigid rotator model and discussion of application of Schrodinger equation. idea about transformation to spherical polar coordinate, discussion on solution, **(15 classes of 60 minutes durations)**

Unit-III: (10 classes of 60 minutes durations)

Qualitative treatment of hydrogen atom and hydrogen-like ions: setting up of Schrödinger equation in spherical polar coordinates, radial part, quantization of energy (only final energy expression). Average and most probable distances of electron from nucleus. Valence bond and molecular orbital approaches, LCAO-MO treatment of H_2 , H_2^+ ; bonding and anti-bonding orbitals, Comparison of LCAO-MO and VB treatments of H_2 (only wavefunctions, detailed solution not required) and their limitations.

Recommended books/References:

1. Laideler K. J. and Meiser J. M. *Physical Chemistry* Third Edition (International) 1999
2. Levine I. N., *Physical Chemistry*, Fourth Edition), McGraw-Hill (International), 1995.
3. McQuarrie D. A. and Simon J. D. *Physical Chemistry- A Molecular Approach*, University

Science Books, 1998.

4.Chandra, A. K. *Introductory Quantum Chemistry* Tata McGraw-Hill (2001).

5. House, J. E. *Fundamentals of Quantum Chemistry* 2nd Ed. Elsevier: USA (2004).

10.1.Suggested laboratory experiments:

L	T	P	Cr
0	0	2	2

(i)The students may be demonstrated hyperchem lab activities – building a molecular model (leveling of atoms, editing individual atoms, changing bond order, centering, rotation of atoms), Selection of calculation method (*e.g.*force field calculation, ab-initio set up), displaying calculated properties, (instructor may demonstrate Computer programs that calculate the energy of various conformations of molecules and predict the lowest energy, to learn how to construct or draw representations of molecules using a molecular modeling program called HyperChem (HyperCube, Inc.), to perform geometry optimizations (energy minimizations) to determine the lowest energy conformations of molecules).

(Depending upon the availability of infrastructure facilities, instructor can demonstrate the students use of hyperchem software, Gaussian software – geometry optimization). They can be allowed for academic visit to computational labs to gain knowledge and a report may be considered for viva voce/examination). Open source softwares may be used for lab demonstration and students may prepare a report along with viva-voce shall constitute practical examination. Instructor may encourage the students to gain hand-on experience in using open-source softwares (for performing various calculation as mentioned) in lab computers, periodic evaluation of which can also be accepted as conducting lab practical examination. Basic idea is to encourage the students to get knowledge without keeping any rigid practical syllabus framework).

(Examples of the computational work that can be done: Compare the optimized C-C bond lengths in ethane, ethene, ethyne and benzene. Visualize the molecular orbitals of the ethane σ bonds and ethene, ethyne, benzene and pyridine π bonds.

ii. (a) Perform a conformational analysis of butane. (b) Determine the enthalpy of isomerization of *cis* and *trans* 2-butene.

iii. Visualize the electron density and electrostatic potential maps for LiH, HF, N₂, NO and CO and comment. Relate to the dipole moments. Animate the vibrations of these molecules.

(Software: ChemSketch, ArgusLab (www.planaria-software.com), TINKER 6.2 (dasher.wustl.edu/ffe), WebLab Viewer, Hyperchem, or any similar software.

(ii). Determination of indicator constant - colorimetry.

(iii). Verification of Beer's Law - Determination of concentration of solution by colorimetry.

Suggested books/reference books:

1. Essentials of computational chemistry – Theories and models, C. J. Crammer, Wiley, 2nd Edn.,
2. Principle and applications of quantum chemistry, V.K.Gupta, Elsevier, 2016.
3. Practicals in physical chemistry – a modern approach, P.S.Sindhu, Macmillan,
4. Experiments in Physical Chemistry, J.M.Wilson, R.J.Newcomb, A.R.Denaro, 2nd Edn., Elsevier.
5. A.R. Leach, *Molecular Modelling Principles and Application*, Longman, 2001.
6. J.M. Haile, *Molecular Dynamics Simulation Elementary Methods*, John Wiley and Sons, 1997.
7. Gupta, S.P. *QSAR and Molecular Modeling*, Springer - Anamaya Publishers, 2008.

11.Course course: Inorganic Chemistry-III

L	T	P	Cr
3	1	0	4

After completion of the course, the learner shall be able to understand:

Learning objective:

1. Coordination compounds – its nomenclature, theories, d-orbital splitting in complexes, chelate.
2. Transition metals, its stability, color, oxidation states and complexes.
3. Lanthanides, Actinides – separation, color, spectra and magnetic behavior
4. Bioinorganic chemistry – metal ions in biological system, its toxicity; hemoglobin.
5. Understanding the nomenclature of coordination compounds/complexes, Molecular orbital theory, d-orbital splitting in tetrahedral, octahedral, square planar complexes, chelate effects.
6. Understanding the transition metals stability in reactions, origin of colour and magnetic properties.
7. Understanding the separation of Lanthanoids and Actinoids, its color, spectra and magnetic behavior.
8. Understanding the bioinorganic chemistry of metals in biological systems.
9. Hemoglobin and its importance in biological systems.

Self-study:

1. IUPAC nomenclature of coordination compounds/complexes.
2. Prediction of structure of complexes using various theories; color and magnetic properties of different complexes.
3. Use of lanthanide/actinide compounds in industries.
4. Toxicity of various metals and mechanism of metal-biological system interactions.

Coordination Chemistry: (10 classes of 60 minutes duration each)

Werner's theory, EAN rule, piano-stool compounds, valence bond theory (inner and outer orbital complexes), Crystal field theory, d-orbital splitting, , weak and strong fields, pairing energies, factors affecting the magnitude of (Δ). Octahedral vs. tetrahedral coordination, tetragonal distortions from octahedral geometry Jahn-Teller theorem, square planar complexes, d orbital

splitting in trigonal bipyramidal, square pyramidal and cubic ligand field environments, CFSE, Variation of lattice energies, enthalpies of hydration and crystal radii variations in halides of first and second row transition metal series, Qualitative aspect of Ligand field theory, MO diagrams of representative coordination complexes, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. Stereochemistry of complexes with the coordination number 4 and 6, Chelate effect,

Transition Elements: (10 classes of 60 minutes duration each)

General group trends with special reference to electronic configuration, colour, variable valency, magnetic and catalytic properties, and ability to form complexes. Stability of various oxidation states and e.m.f. (Latimer & Bsworth diagrams). Difference between the first, second and third transition series. Chemistry of Ti, V, Cr Mn, Fe and Co in various oxidation states (excluding their metallurgy)

Lanthanoids and Actinides: (10 classes of 60 minutes duration each)

Electronic configuration, oxidation states, color, spectra and magnetic behavior, lanthanide contraction, separation of lanthanides (ion-exchange method only).

Bioinorganic Chemistry: (10 classes of 60 minutes duration each)

Metal ions present in biological systems, classification of elements according to their action in biological system. Geochemical effect on distribution of metals. Sodium / K-pump, carbonic anhydrase and carboxypeptidase. Excess and deficiency of some trace metals. Toxicity of metal ions (Hg, Pb, Cd and As), toxicity, chelating agents in medicine. Iron and its application in bio-systems, Haemoglobin; Storage and transfer of iron.

Recommended text books/References:

Purcell, K.F & Kotz, J.C. *Inorganic Chemistry* W.B. Saunders Co, 1977.

Huheey, J.E., *Inorganic Chemistry*, Prentice Hall, 1993.

Lippard, S.J. & Berg, J.M. *Principles of Bioinorganic Chemistry* Panima Publishing Company 1994.

Cotton, F.A. & Wilkinson, G, *Advanced Inorganic Chemistry* Wiley-VCH, 1999

Basolo, F, and Pearson, R.C. *Mechanisms of Inorganic Chemistry*, John Wiley & Sons, NY, 1967.

Greenwood, N.N. & Earnshaw A. *Chemistry of the Elements*, Butterworth-Heinemann, 1997.

11.1.Core course: Inorganic Chemistry Practical

L	T	P	Cr
0	0	2	2

1. Qualitative semimicro analysis of mixtures containing 3 anions and 3 cations. Emphasis should be given on understanding of the chemistry of different reactions. Following radicals may be analyzed:

Carbonate, nitrate, nitrite, sulphide, sulphate, sulphite, acetate, fluoride, chloride, bromide, iodide, borate, oxalate, phosphate, ammonium, potassium, lead, copper, cadmium, bismuth, tin, iron, aluminum, chromium, zinc, manganese, cobalt, nickel, barium strontium, calcium, magnesium. Mixtures containing one interfering anion, or insoluble component (BaSO_4 , SrSO_4 , PbSO_4 , CaF_2 or Al_2O_3) **or** combination of anions e.g. CO_3^{2-} and SO_3^{2-} , NO_2^- and NO_3^- , Cl^- and Br^- , Cl^- and I^- , Br^- and I^- , NO_3^- and Br^- , NO_3^- and I^- . Spot analysis/tests should be done whenever possible.

2. Controlled synthesis of two copper oxalate hydrate complexes: kinetic vs thermodynamic factors.

3. Preparation of acetylacetonato complexes of $\text{Cu}^{2+}/\text{Fe}^{3+}$. (Also find the λ_{max} of the prepared complex using instrument).

4. Synthesis of ammine complexes of Ni(II) and its ligand exchange reactions (e.g. bidentate ligands like acetylacetone, DMG, glycine) by substitution method.

Recommended text books/references:

1. Vogel's *Qualitative Inorganic Analysis*, Revised by G. Svehla. Pearson Education, 2002.

2. Marr & Rockett *Practical Inorganic Chemistry*. John Wiley & Sons 1972.

12.Core course: Analytical Chemistry

L	T	P	Cr
3	1	0	4

After completion of the course, the student shall be able to understand:

Learning objective:

1. Familiarization with fundamentals of analytical chemistry.
2. Basics of spectroscopic, thermal, electrochemical techniques
3. Learning basics of separation techniques and its applications.
4. Understanding analytical tools, statistical methods applied to analytical chemistry.
5. Understanding principle of UV-Vis spectroscopy and its applications.
6. Understanding principles of thermo-gravimetric analysis and study of thermal decomposition of materials/characterization of materials.
7. Understanding basics of electro-analytical techniques and its applications.
8. Understanding principles of separation technology and its use in advanced instrumentations.

Self-study:

1. Thermo-gravimetric Analysis of different compounds and application of mathematical models.
2. Study of different kinds of chromatograms; calculation of R_f ,
3. Analysis of GC/HPLC data for known materials/compounds.

Qualitative and quantitative aspects of analysis: (4 classes of 60 minutes duration each)

Tools in analytical chemistry and their applications, Sampling, evaluation of analytical data, errors, accuracy and precision, statistical test of data; F, Q and t-test, rejection of data, and confidence intervals.

Spectroscopy: (8 classes of 60 minutes duration each)

Origin of spectra, interaction of radiation with matter, fundamental laws of spectroscopy and selection rules, validity of Beer-Lambert's law.

Vibration spectroscopy: Basic principles of instrumentation, sampling techniques. Application of IR spectroscopy for characterization through interpretation of data, Effect and importance of isotope substitution. Introduction to Raman spectra

UV-Visible Spectrometry: Basic principles of instrumentation, principles of quantitative analysis using estimation of metal ions from aqueous solution, Determination of composition of metal complexes using Job's method of continuous variation and mole ratio method.

Thermal analysis: (6 classes of 60 minutes duration each)

Theory of thermogravimetry (TG and DTG), instrumentation, estimation of Ca and Mg from their mixture.

Electroanalytical methods: (6 classes of 60 minutes duration each)

Classification of electroanalytical methods, basic principle of pH metric, potentiometric and conductometric titrations. Techniques used for the determination of equivalence points. determination of pK_a values.

Separation techniques: (16 classes of 60 minutes duration each)

Solvent extraction: Classification, principle and efficiency of the technique. Mechanism of extraction: extraction by solvation and chelation. Technique of extraction: batch, continuous and counter current extractions. Qualitative and quantitative aspects of solvent extraction: extraction of metal ions from aqueous solution, extraction of organic species from the aqueous and non-aqueous media.

Chromatography techniques: Classification, principle and efficiency of the technique. Mechanism of separation: adsorption, partition & ion exchange. Development of chromatograms: frontal, elution and displacement methods. Qualitative and quantitative aspects of chromatographic methods of analysis using LC, GLC, TLC and HPLC.

Recommended Books/Reference Books:

- 1 Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis 6th Ed.*, Pearson, 2009.
- 2 Willard, H.H. *et al.*: *Instrumental Methods of Analysis*, 7th Ed. Wardsworth Publishing California, USA, 1988.
- Christian, G.D, *Analytical Chemistry*, 6th Ed. John Wiley & Sons, New York, 2004.
- 4 Harris, D.C.: *Exploring Chemical Analysis*, 9th Ed. New York, W.H. Freeman, 2016.
- 5 Skoog, D.A. Holler F.J. & Nieman, T.A. *Principles of Instrumental Analysis, Saunder College Publications, (1998).*
- 6 Mikes, O. *Laboratory Hand Book of Chromatographic & Allied Methods*, Elles Harwood John Wiley 1979.
- 7 Ditts, R.V. *Analytical Chemistry; Methods of separation*, van Nostrand, 1974.
- 8 Khopkar, S. M., *Basic Concepts of Analytical Chemistry*, New Age (Second edition)1998
- 9.Skoog D.A., Holler F.J., Nieman T.A., *Principles of instrumental analysis*, 5th Edn., Brooks & Cole (1997).

12.1.Core course: Analytical Chemistry Practical

L	T	P	Cr
0	0	2	2

(Recommended to carry out at least two experiments from each section)

I. Chromatography:

- (i) Paper chromatographic separation of Fe^{3+} , Al^{3+} , and Cr^{3+} .
- (ii) Separation and identification of the monosaccharides present in the given mixture (glucose & fructose) by paper chromatography. Reporting the R_f values.
- iii. Separate a mixture of Sudan yellow and Sudan Red by TLC technique and identify them on the basis of their R_f values.
- (iv) Chromatographic separation of the active ingredients of plants, flowers and juices by TLC

II. Solvent Extractions:

- (i) To separate a mixture of Ni^{2+} & Fe^{2+} by complexation with DMG and extracting the Ni^{2+} -DMG complex in chloroform, and determine its concentration by spectrophotometry.
- ii. Determine the pH of the given aerated drinks fruit juices, shampoos and soaps.
- iii. Determination of Na, Ca, Li in cola drinks and fruit juices using flame photometric techniques.

III. Analysis of soil:

- (i) Determination of pH of soil.
- (ii) Total soluble salt
- (iii) Estimation of calcium, magnesium, phosphate, nitrate

IV. Ion exchange:

- (i) Determination of exchange capacity of cation exchange resins and anion exchange resins.
- (ii) Separation of metal ions from their binary mixture.
- (iii) Separation of amino acids from organic acids by ion exchange chromatography.

V. Spectrophotometry

- (i). Determination of pKa values of indicator using spectrophotometry.
- (ii) Structural characterization of compounds by infrared spectroscopy.
- (iii) Determination of dissolved oxygen in water.
- (iv) Determination of chemical oxygen demand (COD).
- (v) Determination of Biological oxygen demand (BOD).
- (vi) Determine the composition of the Ferric-salicylate/ ferric-thiocyanate complex by Job's method.

Recommended text books/references:

1. Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis 6th Ed.*, Pearson, 2009.
2. Willard, H.H. *et al.: Instrumental Methods of Analysis*, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.
3. Christian, G.D. *Analytical Chemistry*, 6th Ed. John Wiley & Sons, New York, 2004.
4. Harris, D.C. *Exploring Chemical Analysis*, 9th Ed. New York, W.H. Freeman, 2016.
5. Khopkar, S.M. *Basic Concepts of Analytical Chemistry*. New Age International Publisher, 2009.
6. Skoog, D.A. Holler F.J. and Nieman, T.A. *Principles of Instrumental Analysis*, Cengage Learning India Edition.
7. Mikes, O. & Chalmes, R.A. *Laboratory Handbook of Chromatographic & Allied Methods*, Elles Harwood Ltd. London.
8. Ditts, R.V. *Analytical Chemistry: Methods of separation*. Van Nostrand, New York, 1974.

13.Core course: Green Chemistry

L	T	P	Cr
3	1	0	4

After completion of the course, the learner shall be able to understand:

Learning objective:

1. Green chemistry and its principles.
2. Green synthesis and reactions.
3. Green chemistry for sustainable solutions.
4. Understanding principles of green chemistry.
5. Understanding design of chemical reactions/chemical synthesis using green chemistry principles.
6. Atom economy and design of chemical reactions using the principle.
7. Understanding the use of green chemistry principle and processes in laboratory reactions.

Self-study:

1. Use of green chemistry in designing new laboratory experiments.
2. Use of principle of atom economy and design experiments using the principle.
3. Use of green chemistry in combinatorial chemistry and biomimetic catalyst.

Introduction to Green Chemistry (4 classes of 60 minutes duration each)

Basic introduction and explaining goals of Green Chemistry. Limitations/Obstacles in the pursuit of the goals of Green Chemistry

Principles of Green Chemistry and Designing a Chemical synthesis (12 classes of 60 minutes duration each)

Twelve principles of Green Chemistry with their explanations and examples and special emphasis on Designing a Green Synthesis using these principles (Prevention of Waste/byproducts; maximum incorporation of the materials used in the process into the final products,

Atom Economy, calculation of atom economy of the rearrangement, addition, substitution and elimination reactions).

Green Synthesis / Reactions: (16 classes of 60 minutes duration each)

1. Green Synthesis of adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis).
2. Microwave assisted reactions in water: (Hofmann Elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols) and reactions in organic solvents (Diels-Alder reaction and Decarboxylation reaction).
3. Ultrasound assisted reactions: sonochemical Simmons-Smith Reaction (Ultrasonic alternative to Iodine)
- 4 Surfactants for carbon dioxide – replacing smog producing and ozone depleting solvents with CO₂ for precision cleaning and dry cleaning of garments.
- 5 Designing of Environmentally safe marine antifoulant.
- 6 An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.
- 7 Healthier Fats and oil by Green Chemistry: Enzymatic Inter esterification for production of no Trans-Fats and Oils

Future Trends in Green Chemistry (8 classes of 60 minutes duration each)

Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions; co crystal controlled solid state synthesis (C₂S₃); Green chemistry in sustainable development.

Recommended Books/References:

- 1.Ahluwalia, V.K., Kidwai, M.R. *New Trends in Green Chemistry*, Anamalaya Publishers (2005).
2. Anastas, P.T. & Warner, J.K, *Green Chemistry- Theory and Practical*, Oxford University Press (1998).
3. Matlack, A.S. *Introduction to Green Chemistry*, Marcel Dekker (2001).
4. Cann, M.C.and Connely, M.E. *Real-World cases in Green Chemistry*, ACS (2000).

5. Ryan, M.A. and Tinnesand, M. *Introduction to Green Chemistry*, American Chemical Society, (2002).

6. Lancaster, M. *Green Chemistry: An Introductory Text* RSC Publishing, Second Edition, 2010.

13.1.Core course: Green Chemistry Practical

L	T	P	Cr
0	0	2	2

(Following is the list of suggestive experiments. However, depending upon available resources, experiments may be added/changes may be incorporated): (six experiments may be conducted)

1. Preparation and characterization of nanoparticles of gold using tea leaves.
2. Preparation of biodiesel from vegetable/ waste cooking oil.
3. Use of molecular model kit to stimulate the reaction to investigate how the atom economy illustrates Green Chemistry.
4. Reactions like addition, elimination, substitution and rearrangement may also be studied for the calculation of atom economy.
5. Benzoin condensation using Thiamine Hydrochloride as a catalyst (instead of cyanide).
6. Extraction of D-limonene from orange peel using liquid CO₂ prepared from dry ice.
7. Mechanochemical solvent free synthesis of azomethines
8. Solvent free, microwave assisted one pot synthesis of phthalocyanine Cu(II) complex.
9. Photoreduction of benzophenone to benzopinacol in presence of sunlight.

Recommended Books/References:

1. Anastas, P.T & Warner, J.C. *Green Chemistry: Theory and Practice*, Oxford University Press (1998).
2. Kirchoff, M. & Ryan, M.A. *Greener approaches to undergraduate chemistry experiment*. American Chemical Society, Washington DC (2002).
3. Ryan, M.A. *Introduction to Green Chemistry*, Tinnesand; (Ed), American Chemical Society, Washington DC (2002).

4. Sharma, R.K.; Sidhwani, I.T. and Chaudhari, M.K. I.K. Green Chemistry Experiment: A monograph, International Publishing ISBN 978-93-81141-55-7 (2013).
5. Cann, M.C. and Connelly, M. E. *Real world cases in Green Chemistry*, American Chemical Society (2008).
6. Cann, M. C. and Thomas, P. *Real world cases in Green Chemistry*, American Chemical Society (2008).
7. Lancaster, M. *Green Chemistry: An Introductory Text* RSC Publishing, Second Edition, 2010.
8. Pavia, D. L., Lampman, G.M., Kriz, G.S. & Engel, R.G. *Introduction to Organic Laboratory Techniques: A Microscale and Macro Scale Approach*, W.B.Saunders, 1995.

14.Core course: Chemistry of Materials

L	T	P	Cr
3	1	0	4

After completion of the course, the learner shall be able to understand:

Learning objective:

1. Crystalline solids – parameters, symmetry.
2. Silica based materials in applications.
3. Technological importance of ionic liquids, preparation of materials– using sol-gel technique.
4. Nano-structured materials, self-assembled structure.
5. Composites and its applications
6. Understanding basic parameters of crystalline solids, symmetry and crystal structures.
7. Mesoporous/microporous silica based materials, functionalized hybrid materials and its applications.
8. Preparation of inorganic solids, host-guest chemistry, ionic liquids and its significance.
9. Understanding self-assembled structures, nano-structured materials, carbon nanotubes, applications.
10. Understanding composites and their industrial applications.

Self-study:

1. Hybrid materials/functionalized hybrid materials and their applications in industry.
2. Applications of nano-structured materials in targeted drug delivery/pharmaceutical applications/industrial applications.
3. Use of composites in industry.

Basics of crystalline solids (8 classes of 60 minutes duration each)

Crystalline solids, crystal systems, Bravais lattices, coordination number, packing factors – cubic, hexagonal, diamond structures, lattice planes, Miller indices, interplanar distances, directions, types of bonding, lattice energy, Madelung constants, Born Haber cycle, cohesive energy, Symmetry elements, operations, translational symmetries - point groups, space groups, equivalent positions, close packed structures, voids, crystal structures, Pauling rules, defects in crystals, polymorphism, twinning.

Silica based materials: (8 classes of 60 minutes duration each)

Introduction to Zeolites, metallosilicates, silicalites and related microporous materials, Mesoporous silica, metal oxides and related functionalized mesoporous materials: Covalent organic frameworks, Organic-Inorganic hybrid materials, periodic mesoporous organo silica, metal organic frameworks: H₂ /CO₂ gas storage and catalytic applications

Inorganic solids/ionic liquids of technological importance: (8 classes of 60 minutes duration each)

Preparation of inorganic solids: Conventional heat and beat methods, Co-precipitation method, Sol-gel methods, Hydro-thermal method, Ion-exchange and Intercalation methods. Introduction to Solid electrolytes, inorganic liquid crystals. Ionic liquids, forces responsible for ionic liquids, synthesis and application of imidazolium and phosphonium based ionic liquids. Host-guest chemistry (elementary ideas).

Nanomaterials: (8 classes of 60 minutes duration each)

Overview of nanostructures and nano-materials: classification. Preparation of gold and silver metallic nanoparticles, self-assembled nanostructures-control of nano-architecture-one dimensional control. Carbon nanotubes and inorganic nanowires.

Composite materials: (8 classes of 60 minutes duration each)

Introduction, limitations of conventional engineering materials, role of matrix in composites, classification, matrix materials, reinforcements, metal-matrix composites, polymer-matrix composites, fibre-reinforced composites, environmental effects on composites, applications of composites.

Recommend books/References:

1. Atkins P, Overton T., Rourke J. Weller M. and Armstrong F *Shriver and Atkins. Inorganic Chemistry* Oxford University Press, Fifth Edition, 2012.
3. Adam, D.M. *Inorganic Solids: An introduction to concepts in solid-state structural chemistry*. John Wiley, 1974.
4. Poole, C.P. & Owens, F.J. *Introduction to Nanotechnology* John Wiley 2003.

5. Rodger, G.E. *Inorganic and Solid State Chemistry*, Cengage Learning, 2002.

14.1. Materials Chemistry Practical

L	T	P	Cr
0	0	2	2

(The list of experiments are suggestive. However, faculties/academic bodies may add more experiments/references or incorporate suitable revisions based on infrastructure facilities available).

1. Preparation of urea-formaldehyde resin
2. Preparations of novalac resin/resol resin
3. Synthesis of materials/porous materials (Sol-gel, hydrothermal, microwave). (Similarly other materials synthesis can be designed).
4. Preparation of silver nano material. (Similarly other nano materials of other metals synthesis can be designed).
5. Analysis of XRD pattern of crystals.
6. Interpretation of FTIR, NMR and UV-Vis data of given material.
7. Estimation of particle size from the BET, SEM techniques.
8. Density measurement of ionic liquids
9. Determining dynamic viscosities of given ionic liquids
10. Determination of hydration number IR spectra.

DISCIPLINE SPECIFIC ELECTIVE COURSES

These courses have the following credit pattern.

For Theory based courses:

L	T	P	Cr
3	1	0	3

For laboratory based courses:

L	T	P	Cr
0	0	2	2

1. Medicinal Chemistry

L	T	P	Cr
3	1	2	6

After completion of the course, the learner can be able to understand:

1. The basics of medicinal chemistry, biophysical properties
2. Biological activity parameters
3. Drug metabolism
4. Biophysical and chemical properties of enzymes, hormones, vitamins
5. Concept of rational drug design

Bio-physicochemical properties

Acidity/Basicity, Solubility, Ionization, Hydrophobic properties, Hydrophilic properties, Lipinski Rule, Drug-like properties, Understanding of the biological activity parameters such as K_i , K_d , LD_{50} , EC_{50} , IC_{50} , CC_{50} , ADMET properties

Structural properties

Isosterism, Bioisosterism, Nonclassical isosteres, Understanding of the 3D-structure along with bond length, bond angle and dihedral angle, Concept of Configuration and Conformation with

examples, Concept of stereochemistry in terms of biological response with examples, Stereoselective receptors or enzymes such as muscarinic receptor, Stereochemically pure drug and recemates, Examples such as catecholamines, etc.

Drug target understanding

Metabolism, Drug metabolism, Anti-metabolite, Enzyme inhibitor, Agonist, Antagonist, Examples.

Medicinal Chemistry of Therapeutic Agent

Structure, Chemistry, Mode of action and adverse effect of the representative therapeutic agents such as Anti-infective agent, Antimalarials, Antibacterial, Antiviral, Anticancer, CNS acting drugs, Adrenergic Agents, Cholinergic Drugs, Diuretics, Cardiovascular, local anesthetic agent, Analgesic Agents, Histamine and Antihistamine agents

Steroids, Prostaglandins, Enzyme, Hormone and Vitamins

Biophysics-chemical properties, Steroid Hormone Receptors, Chemical Contraceptive agents, COX-2 inhibitors, Prostaglandins for Ophthalmic use, pharmaceutically important enzyme products such as Pancreatin, Trypsin, Insulin. Classification of vitamins with examples.

Concept of rational drug design

Structure activity relationship, Drug-receptor understanding, Molecular modeling, Structure based drug design. QSAR.

Recommended books/References:

1. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical ...by Charles Owens Wilson, John H. Block, Ole Gisvold, John Marlowe Beale
2. Foye's Principles of Medicinal Chemistry by David A. Williams, Thomas L. Lemke, William O. Foye (2008), Kluwer publication.
3. Remington: The Science and Practice of Pharmacy Vol 1, Ed. 19 by Joseph Price Remington, Alfonso R. Gennaro. (1995), MACK Publishing.
4. Burgers Medicinal Chemistry by Manfred E. Wolff, Alfred Burger
5. Burgers Medicinal Chemistry and Drug Discovery by Abraham D. J., Lewis F. L., Burger A., vol.5, 6th Edn., 2003, Hoboken N.J.Wiley,
6. The Organic Chemistry of Drug Design and Drug Action by Silverman R. B., 2nd Edn., Academic Press. 2012.

7. Exploring QSAR: Fundamental and applications in Chemistry and Biology by Hansch C. and Leo, A American Chemical Society (1995)
8. Patrick, G. Medicinal Chemistry, Oxford.University Press (2000)

Practical wok suggested:

- 1.Purification Techniques of Solvents by Fractional Distillation and Vacuum Distillation
- 2.Thin Layer Chromatography Technique and Purification of commercially available drugs/Synthesized Compounds by Column Chromatography.
3. Preparation of Acid/Basic Salts of Drugs and Evaluation of their Physicochemical Properties.(Benzilic Acid & Sodium Benzoate)
- 4.Synthesis & Purification of following Compounds using:
 - (i)Precipitation or Recrystallization.
 - (ii)Synthesis of Benzimidazole.
 - (iii)Synthesis of Anthranilic Acid.
 - (iv)Synthesis of Sulphanilamide.
 - (v)Synthesis of benzoic acid from benzyl alcohol.
 - (vi)Synthesis of 1,4 – dihydropyridine.
- 5.Computational modeling of drug design/use of softwares may be demonstrated to students.

Suggsted books/references:

- 1.Vogel's Textbook of Quantitative Chemical Analysis, J. Mendham, R.C. Denney, J. D. Barnes, M. J. K Thomas, 6th Edition, Pearson's Education Ltd.
- 2.Advanced Practical Medicinal Chemistry, Ashutosh Kar, New Age International Ltd. (2004).
- 3.Vogel's Textbook of Practical Organic Chemistry, B. S. Furniss, A. J. Hannaford , P.W.G. Smith, A. R Tatchell, 5th edition (2008), Pearson's Education Ltd

(The list of experiments and books are purly suggestive; University/institute may incorporate further changes in number of experiments and books/references (updated version from time to time) based on course design and available infrastructure facilities).

2. Electrochemistry

L	T	P	Cr
3	1	2	6

After completion of the course, the learner can be able to understand:

1. Basic principle of laws of electrochemistry.
- 2 Understanding about chemical cells and their function
- 3 Understanding about electrodes, EMF measurement.
- 4 Understanding about potentiometric titrations and their applications.

Unit-I

Arrhenius theory of electrolytic dissociation. Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Molar conductivity at infinite dilution. Kohlrausch law of independent migration of ions. Debye-Hückel-Onsager equation, Wien effect, Debye-Falkenhagen effect, Walden's rules. Ionic velocities, mobilities and their determinations, transference numbers and their relation to ionic mobilities, determination of transference numbers using Hittorf and Moving Boundary methods. Applications of conductance measurement: (i) degree of dissociation of weak electrolytes, (ii) ionic product of water (iii) solubility and solubility product of sparingly soluble salts, (iv) conductometric titrations, and (v) hydrolysis constants of salts.

Unit-II

Quantitative aspects of Faraday's laws of electrolysis, rules of oxidation/reduction of ions based on half-cell potentials, applications of electrolysis in metallurgy and industry. Chemical cells, reversible and irreversible cells with examples. Electromotive force of a cell and its measurement, Nernst equation; Standard electrode (reduction) potential and its application to different kinds of half-cells. Application of EMF measurements in determining (i) free energy, enthalpy and entropy of a cell reaction, (ii) equilibrium constants, and (iii) pH values, using hydrogen, quinone-hydroquinone, glass and SbO/Sb₂O₃ electrodes. Concentration cells with and without transference, liquid junction potential; determination of activity coefficients and

transference numbers. Qualitative discussion of potentiometric titrations (acid-base, redox, precipitation).

Unit-III: Electroanalytical methods: Classification of electroanalytical methods, basic principle of pH metric, potentiometric and conductometric titrations. Techniques used for the determination of equivalence points. Techniques used for the determination of pK_a values.

Unit-IV: Electrical & Magnetic Properties of Atoms and Molecules: Basic ideas of electrostatics, Electrostatics of dielectric media, Clausius-Mosotti equation, Lorenz-Laurentz equation, Dipole moment and molecular polarizabilities and their measurements. Diamagnetism, paramagnetism, magnetic susceptibility and its measurement, molecular interpretation.

Recommended books/reference books

1. Atkins, P.W & Paula, J.D. Physical Chemistry, 10th Ed., Oxford University Press (2014).
2. Castellan, G. W. Physical Chemistry 4th Ed., Narosa (2004).
3. Mortimer, R. G. Physical Chemistry 3rd Ed., Elsevier: NOIDA, UP (2009).
4. Barrow, G. M., Physical Chemistry 5th Ed., Tata McGraw Hill: New Delhi (2006).
5. Engel, T. & Reid, P. Physical Chemistry 3rd Ed., Prentice-Hall (2012).
6. Rogers, D. W. Concise Physical Chemistry Wiley (2010).
7. Silbey, R. J.; Alberty, R. A. & Bawendi, M. G. Physical Chemistry 4th Ed., John Wiley & Sons, Inc. (2005).

List of suggested laboratory experiments

1. Determination of pH of a given solution using glass electrode.
2. Determination of cell constant.
3. Determination of equivalent conductance, degree of dissociation, and dissociation constant of weak acid.
3. Conductometric titration : strong acid vs. strong base, weak acid vs. strong base.
4. Potentiometric titration : strong acid vs. strong base, weak acid vs. strong base, potassium dichromate vs. mohl's salt.

Recommended books/reference books:

- 1.Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).
- 2.Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry*, Universities Press.
- 3.Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. *Experiments in Physical Chemistry 8th Ed.*; McGraw-Hill: New York (2003).
4. Halpern, A. M. & McBane, G. C. *Experimental Physical Chemistry 3rd Ed.*; W.H. Freeman & Co.: New York (2003).

3. Polymer Chemistry

L	T	P	Cr
3	1	2	6

After completion of the course, the learner can be able to understand:

1. The mechanism of polymer material formation.
2. Molecular weight and structure property relationship
3. Polymerization procedure and Ziegler-Natta catalysis.
4. Characterization of polymers

Introduction

Polymer, monomer, examples of polymers, biopolymers, classification, polymerization process, degree of polymerization, condensation, addition polymers, kinetics of addition polymerization process.

Polymeric Structure and Property Relationship

Structure of polymers - Linear, branched, cross linked, and network polymers, molecular weight (number average, weight average, viscosity average) and distribution of molecular weight, polydispersity index, crystallinity in polymer, melting temperature and glass transition temperature, Volumetric properties - molar volume, density, Van der Waals volume - Coefficient of linear thermal expansion and volumetric thermal expansion - Pressure volume temperature (PVT) relationship.

Polymerization Chemistry

Industrial methods of polymerization such as a bulk, solution, emulsion, suspension. Stereochemistry of polymers and stereo-specific polymerization, Catalysts-their utility in polymers and stereo-specific polymerizations, Catalysts their utility in polymer manufacture, Ziegler-Natta, Metallocene and others.

Characterization of Polymers

Molecular Weight Determination by Light Scattering, Osmometry, End-Group Analysis, Viscosity, Gel Permeation Chromatography; Application, of FTIR, UV-visible, NMR, and Mass Spectroscopy for Identification of polymers.

Recommended books/References:

1. D.W. Van Krevelen and P.J. Hoftyzen, "Properties Of Polymer, 3rd Edition Elsevier Scientific, Publishing Company Amsterdam - Oxford - Newyork. 1990.
2. J.E. Mark Ed.AIP, Physical Properties Of Polymers Hand Book, Williston, Vt, 1996.
3. Reaction Engineering of Step Growth Polymerization, S K Gupta and Anil Kumar, Plenum Press, 1987
4. Odian; George, Principles of Polymerization, McGraw-Hill Book Co., New York (1970).
5. W. Billmeyer, Text book of polymer science, 3rd Edn., 2007, Wiley.
6. J.R.Fried, Polymer Science and Technology, (2005), PHI publication.
7. Billmeyer Jr.; Fred W., Textbook of Polymer Science, Wiley- Interscience Publishers, New York (1962).

List of suggested laboratory practicals

- 1.Free radical solution polymerization of any one: Styrene, methylmethacrylate, methyl acrylate, methacrylic acid (using free radical initiators). (purification of monomer should be taught)
2. Preparation of phenol-formaldehyde resins
3. Emulsion polymerization of polymethylmethacrylate.
4. Use of viscometer for molecular weight determination – (any known polymer, example: polyvinyl pyrrolidone in water/polyacrylamide in NaNO₂ solution) by viscometry. (students should be explained regarding principles and use of ubblohde/ostwald viscometer).
5. Estimation of amount of HCHO in a given solution by sodium bisulphite method.
6. Use of FTIR/TGA/DSC – for polymer characterization (may be demonstrated to students)
7. Determination of exchange capacity of cation exchange resins and anion exchange resins.

Recommended Books/Reference books

- 1.P. Munk & T.M. Aminabhavi, *Introduction to Macromolecular Science*, 2nd ed. John Wiley & Sons (2002).
- 2.M.P. Stevens, *Polymer Chemistry: An Introduction* 3rd ed. Oxford University Press (2005).
3. L. H. Sperling, *Introduction to Physical Polymer Science*, 4th ed. John Wiley & Sons (2005)

(The list of experiments and books are purly suggestive; University/institute may incorporate further changes in number of experiments and books/references (updated version from time to time) based on course design and available infrastructure facilities).

4. Environmental Chemistry

L	T	P	Cr
3	1	2	6

After completion of the course, the learner can be able to understand:

- 1.Compositon of atmosphere
- 2.Biogeochemical cycles
- 3.Hydrological cycle
4. Water quality parameters
- 5.Atomospheric chemical phenomon and environmental pollution
6. Water pollution, parameters of water pollution, treatment of polluted water.

Environment

Composition of atmosphere, temperature variation of earth atmospheric system (temperature vs. altitude curve), biogeochemical cycles of C, N, P, S and O system.

Hydrosphere: Hydrological cycle, aquatic pollution and water quality parameters – Dissolve oxygen, biochemical oxygen demand, chemical oxygen demand, Analytical methods for the determination fluoride, chromium and arsenic, residual chlorine and chlorine demand, purification and treatment of municipal water and waste water.

Atmosphere

Chemical composition of atmosphere – particle, ions, and radicals in their formation, chemical and photochemical reactions in atmosphere, smog formation, oxides of N, C, S, and O and their effect, pollution by chemicals, CFC, Green House effect, acid rain, air pollution and control.

Aquatic chemistry

Water and its necessities, various water quality parameters (DO, BOD, COD, conductivity, pH, alkalinity, hardness) and its determination, Industrial, municipal water treatment processes, Waste water treatment procedure (primary, secondary and tertiary), Solid waste treatment. Soil pollution and Noise pollution.

Recommended Books/References:

1. De.A.K.Environmental Chemistry, Wiley Eastern Ltd, 1990.
2. Miller T.G.Jr., Environmental Science, Wadsworth publishing House, Meerut Odum.E.P.1971.
3. Odum, E.P. (1971) Fundamentals of Ecology. Third Edition, W.B. Saunders Co., Philadelphia
4. S. E. Manahan, Environmental chemistry, 1993, Boca Raton, Lewis publisher
5. Environmental chemistry, Sharma and Kaur, 2016, Krishna publishers
6. Environmental Pollution, Monitoring and control, S.M. Khopker, 2007, New Age International.
7. Environmental chemistry, C. Baird, M. Cann, 5th Edn, 2012, W.H.Freeman publication.
- 9 G. S. Sodhi Fundamental Concepts of Environmental Chemistry (Third Edition) Narosa (2009).
10. Principles of instrumental analysis: D. A. Skoog, Fifth Edition, Sauns College Publishing (London)
- 11 Basic concepts of analytical chemistry: S. M. Khopkar, Wiley Eastern (1995)

List of suggested laboratory practicals

Determination of water quality parameters in following aspect:

1. Determination of dissolved oxygen in given water (chemical method/instrumentation method).
- 2.Determination of Biological Oxygen Demand (BOD₅).
3. Determination of Chemical Oxygen Demand (COD).
4. Finding out percentage of available chlorine in bleaching powder.
5. Measurement of chloride, sulphate and salinity of water samples by titration method (AgNO₃ and potassium chromate).
6. Estimation of total alkalinity of water samples (carbonate, bicarbonate) by titration method.
7. Estimation of SPM in air samples.

List of Recommended books/Reference Books:

1. R.M. Felder, R.W. Rousseau: *Elementary Principles of Chemical Processes*, John Wiley & Sons, Inc. Publishers, New Delhi.(2005 edition).
3. J. A. Kent: Riegel's *Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
4. S. S. Dara: *A Textbook of Engineering Chemistry*, S. Chand & Company Ltd. New Delhi.
5. A. K. De, *Environmental Chemistry*: New Age International Pvt., Ltd, New Delhi.
6. S. M. Khopkar, *Environmental Pollution Analysis*: New Age Int. Publisher, New Delhi.

(The list of experiments and books are purly suggestive; University/institute may incorporate further changes in number of experiments and books/refererences (updated version from time to time) based on course design and available infrastructure facilities).

5. Advanced Materials Chemistry

L	T	P	Cr
3	1	2	6

Crystal structure of solids

Fundamental of lattices, unit cell, atomic coordinates, Bravais lattices, crystal direction and planes, types of close packing, packing efficiency, radius ratios; few important crystal structures. Synthesis of Inorganic solids; solid state, solution phase and vapor phase synthesis; precipitation, hydrothermal, sol-gel, surfactant based synthesis. Growth of single crystals.

Crystal structure determination by X-ray diffraction, d-spacing formula, symmetrically absent reflections, Multiplicities, Scattering of X-rays by an atom and a crystal. Single crystal and powder diffraction. Electron and neutron diffraction. Concept of reciprocal lattice. Electron microscopy techniques.

Nanomaterial fundamentals

Synthesis: Bottom-up vs. Top-down Methods. Solution phase synthetic methods. Role of surfactant in shape and size control of nanomaterials. Synthesis of nanowires and nanotubes by CVD and MOCVD method.

Nanomaterials Characterization: XRD of nanomaterials, Electron microscopy (SEM, TEM, HRTEM and EDX) of nanomaterials, Scanning probe microscopy.

Nanomaterial properties and applications: Magnetic properties of nanoparticles; superparamagnetism, ferromagnetism in antiferromagnetic nanoparticles and single domain to multidomain transition. magnetic nanoparticles as MRI contrast agents.

Frontier areas of polymer science and technology

Conducting polymers: basic principles of conducting polymers, delocalized electronic states of conjugated polymers, polyanilines, polyacetylenes, polythiophene, applications of conducting polymers.

Biodegradable polymers: Definition classification of natural biodegradable polymers, cellulose, cellulose acetate, cellophane, soy protein, corn, zein protein, wheat gluten protein, synthetic biodegradable polymers, polyhydroxy alkanoates, polycaprolactone, poly(vinyl alcohol), polyacetic acid, application of biodegradable and biomedical polymers, contact lens, dental polymers, artificial heart, kidney, skin, and blood cells.

Fibers: natural fibers, cotton, wool, silk, rayon, artificial fibers, polyamides, acrylic acid, PVC, PVA.

Rubber: Compounding and elastomeric properties, vulcanization, reinforcement.

Recommended books/References:

1. Zhen Guo and Li Tan, *Fundamentals and Applications of Nanomaterials*.2009, Artech House, London Publication.
2. Physical methods for chemistry: R. S. Drago, 1992, Saunders college publication.
3. Polymer science, V. R. Gowariker, N. V.Viswanathan, J. Sreedhar, New Age International (P) Ltd., 2015.
4. P. J. Flory, Principle of polymer chemistry, Cornell University Press.
5. Polymer Science and technology, Plastics, Rubber and composites, P. Ghosh, Tata McGraw Hill.
6. V. Gowriker, N. V. Viswanathan, J. Sreedhar, Polymer Science, New Age Int.Publication, 2019.

List of suggested Laboratory Experiment.

(The list of experiments are suggestive. However, faculties/academic bodies may add more experiments/references or incorporate suitable revisions based on infrastructure facilities available).

1. Preparation of gold and silver nano-particles.
2. Interfacial polymerization, preparation of polyester from isophthaloyl chloride (IPC) and phenolphthalein
3. Determination of composition of dolomite (by complexometric titration).
4. Analysis of XRD pattern of few selected crystals like NaNO_3 , CaCl_2 , etc.; Indexing of a given powder diffraction pattern of a cubic crystalline system.
5. Interpretation of FTIR, NMR and UV-Vis data of given material.
6. Estimation of particle size from the BET, SEM techniques.

Recommended books/Reference Book:

- 1.Fahlman, B.D. *Materials Chemistry*, Springer, 2004.

6. Advanced Analytical Chemistry

L	T	P	Cr
3	1	2	6

Statistical methods in chemical analysis

Theory of error and treatment of quantitative data, accuracy and precision, ways of expressing accuracy and precision, Normal error curve and its equation. Useful statistical tests with equation, test of significance, the F-test, the students t-test, the Chi-test, the correlation coefficient, confidence limit of the mean, comparison of two standard values, comparison of two standard values, comparison of standard deviation with average deviation, comparison of mean with true values, regression analysis (least square method).

Polarography

Current-voltage relationship, theory of polarographic waves, instrumentation, qualitative and quantitative applications.

Atomic spectroscopy

Atomic absorption spectroscopy, theory and application (with some examples).

Thermal analysis

Theory, methodology, instruments and applications of thermogravimetric analysis (TGA/DTA), and differential scanning calorimetry (DSC).

Chromatography

Principles of chromatography, paper, column and thin layer chromatography, Gas-liquid chromatography, HPLC.

Analysis of fuel and drugs

Fuel analysis: Solid, liquid and gaseous fuels, ultimate and proximate analysis of solid fuel, Determination of calorific value of solid, liquid and gaseous fuels, Flash point and fire point.

Drug analysis: Classification of drugs, Analysis of some standard drug using various chromatographic techniques.

Recommended books/references:

1 Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis 6th Ed.*, Pearson, 2009.

- 2 Willard, H.H. *et al.*: *Instrumental Methods of Analysis*, 7th Ed. Wardsworth Publishing California, USA, 1988.
- 3.Christian, G.D, *Analytical Chemistry*, 6th Ed. John Wiley & Sons, New York, 2004.
- 4 Harris, D.C.: *Exploring Chemical Analysis*, 9th Ed. New York, W.H. Freeman, 2016.
- 5 Skoog, D.A. Holler F.J. & Nieman, T.A. *Principles of Instrumental Analysis*
- 6 Mikes, O. *Laboratory Hand Book of Chromatographic & Allied Methods*, Elles Harwood John Wiley 1979.
- 7 Ditts, R.V. *Analytical Chemistry; Methods of separation*, van Nostrand, 1974.
- 8 Khopkar, S. M., *Basic Concepts of Analytical Chemistry*, New Age (Second edition) 1998

List of suggested laboratory experiments

- 1.Study the effect on pH of addition of HCl/NaOH to solutions of acetic acid, sodium acetate and their mixtures. Preparation of buffer solutions of different pH (i. Sodium acetate-acetic acid, ii. Ammonium chloride-ammonium hydroxide)
2. Principles involved in chromatographic separations. Paper chromatographic separation of following metal ions:
 - i. Ni (II) and Co (II)
 - ii. Fe (III) and Al (III)
- 3.Chromatographic separation of the active ingredients of plants, flowers and juices by TLC.
4. IR/DSC analysis of known polymer sample (for students demonstration only)
5. Determination of flash point & fire point of given fuel sample.
6. Determination of viscosity index, cloud point, pour point of given fuel sample.
7. Determination of calorific value of given fuel sample/coal sample using bomb calorimeter.
8. Proximate analysis of given coal sample.
9. Determination of the iodine number of oil.
10. Determination of the saponification number of oil.

Recommended books/Reference books:

- Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis 6th Ed.*, Pearson, 2009.
- Jain, P.C. & Jain, M. *Engineering Chemistry* Dhanpat Rai & Sons, Delhi.
- Khopkar, S.M. *Basic Concepts of Analytical Chemistry*. New Age International Publisher, 2009
- Skoog, D.A. Holler F.J. and Nieman, T.A. *Principles of Instrumental Analysis*, Cengage Learning India Edition.

7. Nuclear & Radiation Chemistry

L	T	P	Cr
3	1	2	6

Nucleus and its classification, nuclear forces, nuclear stability, binding energy, nuclear models. Radioactive decay (Radioactive elements, general characteristics of radioactive decay, decay kinetics - decay constant, half life, mean life period), units of radioactivity, Transient and secular equilibria, Carbon dating and its usefulness.

Nuclear reactions: Bethe notation, types of nuclear reactions (n, p, α , d and γ), conservation of quantities (mass-energy and linear momentum) in nuclear reactions, reaction cross-section, compound nucleus theory and nuclear reactions. Nuclear fission: the process, fragments, mass distribution, and fission energy.

Measurement of radioactivity, idea about accelerator and detectors, Van de Graaf and linear accelerators, synchrotrons, Geiger-Muller detector, Scintillation detectors, Type of nuclear reactions, Nuclear fission, Nuclear fusion, Nuclear reactor: classification of reactors, the natural uranium reactor, breeder reactor. Nuclear fusion and stellar energy.

Radiation chemistry: Elementary ideas of radiation chemistry, radiolysis of water and aqueous solutions, unit of radiation chemical yield (G-value), radiation dosimetry (Fricke's dosimeter), units of radiation energy (Rad, Gray, Rontgen, RBE, Rcm, Sievert)

Nuclear pollution and Radiological safety: Interaction of radiation with matter, Radiolysis of water, Radiation dosimetry. Radioactive isotopes and their applications, Isotopic dilution analysis, Neutron activation analysis, disposal of nuclear waste, nuclear disaster and its management (nuclear accidents and holocaust – discussion about case studies).

Recommended Books/references:

1. Friendlander G, Kennedy G and Miller J. M. Nuclear and Radiochemistry, Wiley Interscience
2. Harvey, B. G. Introduction to Nuclear Physics & Chemistry, Prentice – Hall,
3. Overman R. T, Basic concept of Nuclear Chemistry, Chapman & Hall.
4. A. N. Nesmeyanov, Radiochemistry, MIR Publication, Moscow.
5. Spinks J. W. T. and Woods R. J. An Introduction to Radiation Chemistry, Wiley
6. Arnikaar H. J., Essentials of Nuclear Chemistry, Wiley Eastern, Second Edition.

Suggested laboratory practicals:

1. The safe laboratory use of radionuclide and radioisotopes
2. demonstration of activity on Geiger-Muller and scintillation based counter.
3. liquid scintillation counting, alpha spectrometry, gamma spectrometry – to identify and quantify radioisotopes
4. occurrence of radon daughter particles in environmental samples.
5. Liquid-liquid separation/extraction of radio nuclide from environmental samples/water samples.
6. Isotopic application in removal process adsorption / ion exchange.

(The above list is just suggestive. More experiments can be added/incorporated based on facility/expertise available. Since above experiments require certified labs which may not be available at all places, therefore, it is advised that institute/university/teacher may arrange/allow academic visit of students to nuclear chemistry labs in the country following proper procedure and to prepare comprehensive report of the visit/viva voce of students which can also form a lab course until available facilities are available).

8. Organic Spectroscopy

L	T	P	Cr
3	1	2	6

Basic Principles of UV Spectroscopy:

Application of Woodward-Fieser rule in interpretation of Organic compounds: Application of visible, ultraviolet and infrared spectroscopy in organic molecules. Electromagnetic radiation, electronic transitions, λ_{max} & ϵ_{max} , chromophore, auxochrome, bathochromic and hypsochromic shifts. Application of electronic spectroscopy and Woodward rules for calculating λ_{max} of conjugated dienes and α, β – unsaturated compounds.

Basic principles of IR Spectroscopy:

Identification of Functional groups of various classes of organic compounds: Infrared radiation and types of molecular vibrations, functional group and fingerprint region. IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding), aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on $>\text{C}=\text{O}$ stretching absorptions).

NMR (^1H and ^{13}C NMR):

Application of Chemical Shifts, Splitting of signals, Spin coupling and Over Houser effect in interpretation of NMR spectra, Isotopic exchange

Basic principles Mass Spectrometry:

Application of fragmentation rule in characterization of organic compounds. Problems on structure elucidation of organic compounds based on spectral data.

Recommended Books/References:

1. R.M. Silverstein, G.C. Bassler & T.C. Morrill: *Spectroscopic Identification of Organic Compounds*, John Wiley & Sons.
2. John R. Dyer, Applications of absorption spectroscopy of organic compounds, Prentice Hall India (2012).

Suggested laboratory experiments

1. Purification method for liquid, solid organic substance (distillation, recrystallization, chromatography)

2. Analysis of spectra of UV-Vis, FTIR, NMR and Mass of simple organic compounds. (students may encourage to prepare simple organic compounds following given protocol (azodyes, acetanilides, benzoic acid, etc.) (or may use commercially available organic compounds) and can be trained to identify/analyze important peaks/functionality, determine mass of the molecules (mass-spectra). They can submit a report regarding their analysis to course teacher.

9. Heterocyclic Chemistry

L	T	P	Cr
3	1	2	6

Heterocyclic Chemistry

Three-membered rings with one heteroatom: Chemistry of oxiranes, aziridines and episulphides - synthetic approaches and reactivities.

Three-membered heterocycles with two heteroatoms: oxaziranes, diaziridines and diazirines - synthetic approaches and reactivities.

Four-membered heterocycles: oxitanes, azatidanes and thietanes - synthetic approaches and reactivities. natural products: synthesis of Peniciline and cephalosporine.

Five-membered aromatic heterocycles:

1. With one heteroatom: furans, pyrroles and thiophenes - general synthetic approaches, properties and reactivities.
2. With two heteroatoms: oxazoles, isoxazoles, imidazoles, thiazoles, pyrazoles and isothiazoles - general synthetic approaches and reactivities.
3. With three and four heteroatoms: triazoles and tetrazoles - synthetic approaches, properties and reactivity.

Condensed five-membered Heterocycles:

Benzofuran, indoles and benzothiazoles - general synthetic approaches, with greater emphasis on the chemistry of Indoles.

Recommended Books/references:

1. Heterocyclic Chemistry, J.A. Joule, K. Mills, Wiley, 2010.
2. The Essence of heterocyclic Chemistry, A. R. Parikh, H. Parikh, R. Khunt, New Age Int. Publication,
3. Principles of Modern Heterocyclic Chemistry, L. A. Paquette, W. A. Benjamin, New York, 1968.
4. Heterocyclic Chemistry, J.A. Joule and G. F. Smith, van Nostrand, London, 1978.

5. Comprehensive Heterocyclic Chemistry. The structure, reactions, synthesis and use of Heterocyclic compounds, (Ed. A.R. Katritzky and C. W. Rees),. Vol 1-8, Pergamon Press, 1984.
6. Handbook of Heterocyclic Chemistry, A. R. Katritzky, Pergamon Press, 1985.
7. Van der plas, H. C. Ring transformations of Heterocycles, Vols 1 and 2, Academic Press, 1974.

List of suggested laboratory experiments

1. Identification of hetero atoms (S, N, X) in given organic compounds in lab.
2. Identification/separation of simple organic compounds containing hetero atoms using column chromatography/TLC in lab.
3. Spectroscopic identification of simple organic compounds (spectra may be provided to the students and teachers may help the students to identify the compounds using spectra). Melting point/boiling point of the compounds may be checked for its purity.
4. Teacher may guide the students for preparation of : Indigo (using aldol condensation reaction of 2-nitrobenzaldehyde with acetone in basic condition);
(Depending upon laboratory facilities, more preparation of heterocyclic group of compounds may be incorporated by teacher).

10. Biochemistry

L	T	P	Cr
3	1	2	6

Carbohydrates: (8 classes of 60 minutes duration each)

Biological importance of carbohydrates, Metabolism, Cellular currency of energy (ATP), Glycolysis, Alcoholic and Lactic acid fermentations, Krebs cycle.

Proteins: (8 classes of 60 minutes duration each)

Classification, biological importance; Primary, secondary and tertiary structures of proteins: α -helix and β -pleated sheets, Denaturation of proteins.

Enzymes: (8 classes of 60 minutes duration each)

Nomenclature, Characteristics (mention of Ribozymes), Classification; Active site, Mechanism of enzyme action, Stereospecificity of enzymes, Coenzymes and cofactors, Enzyme inhibitors, Biocatalysis in Green Chemistry” and Chemical Industry

Lipids: (8 classes of 60 minutes duration each)

Biological importance of triglycerides and phosphoglycerides and cholesterol; Lipid membrane, Liposomes and their biological functions and underlying applications.

Structure of DNA/RNA: (8 classes of 60 minutes duration each)

Structure of DNA (Watson-Crick model) and RNA, Genetic Code, Biological roles of DNA and RNA: Replication, Transcription and Translation, Introduction to Gene therapy.

Recommended Books/References:

1. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2006) Biochemistry. VI the Edition. W.H. Freeman and Co.
2. Nelson, D. L., Cox, M. M. and Lehninger, A. L. (2009) principles of Biochemistry. IV Edition. W.H. Freeman and Co.
3. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009) Harper's Illustrated Biochemistry. XXVIII edition. Lange medical Books/ McGraw-Hill

(The above course structure/number of classes are suggestive. Faculty/academic bodies may incorporate revision/may incorporate text and reference books as per need).

Suggested Practical in Biochemistry

1. Quantitative estimation of protein using Lowry's method. Determine the concentration of the unknown sample.
2. Action of salivary amylase at optimum conditions
3. Effect of pH on the action of salivary amylase
4. Effect of temperature on salivary amylase
5. Effect of inhibitor on salivary amylase
6. Study of the activity of Trypsin using fresh tissue extracts.
7. Effect of temperature, organic solvents, on semi-permeable membrane.
8. Isolation of Genomic DNA from E Coli

(The above course structure/number of classes are suggestive. Faculty/academic bodies may incorporate revision/may incorporate text and reference books as per need).

11. Organometallic and Bioinorganic Chemistry

L	T	P	Cr
3	1	2	6

Chemistry of 3d metals: Oxidation states displayed by Cr, Fe, Co, Ni and Cu. A study of the following compounds (including preparation and important properties); Peroxo compounds of Cr, $K_2Cr_2O_7$, $KMnO_4$, $K_4[Fe(CN)_6]$, sodium nitroprusside, $[Co(NH_3)_6]Cl_3$, $Na_3[Co(NO_2)_6]$.

Organometallic Compounds

Definition and classification of organometallic compounds on the basis of bond type. Concept of hapticity of organic ligands. Metal carbonyls: 18 electron rule, electron count of mononuclear, polynuclear and substituted metal carbonyls of 3d series. General methods of preparation (direct combination, reductive carbonylation, thermal and photochemical decomposition) of mono and binuclear carbonyls of 3d series. Structures of mononuclear and binuclear carbonyls of Cr, Mn, Fe, Co and Ni using VBT. π -acceptor behaviour of CO (MO diagram of CO to be discussed), synergic effect and use of IR data to explain extent of back bonding.

Zeise's salt: Preparation and structure, evidences of synergic effect and comparison of synergic effect with that in carbonyls.

Metal Alkyls: Important structural features of methyl lithium (tetramer) and trialkyl aluminium (dimer), concept of multicentre bonding in these compounds. Role of triethylaluminium in polymerisation of ethene (Ziegler – Natta Catalyst). Species present in ether solution of Grignard reagent and their structures, Schlenk equilibrium.

Ferrocene: Preparation and reactions (acetylation, alkylation, metallation, Mannich Condensation). Structure and aromaticity. Comparison of aromaticity and reactivity with that of benzene.

Definition and Classification with appropriate examples based on nature of metal-carbon bond (ionic, s, p and multicentre bonds). Structures of methyl lithium, Zeiss salt and ferrocene. EAN rule as applied to carbonyls. Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d metals. p-acceptor behaviour of carbon monoxide. Synergic effects (VB approach)- (MO diagram of CO can be referred to for synergic effect to IR frequencies). Organometallic compounds of Mg and Li – Use in synthesis of organic compounds.

Bioinorganic chemistry

A brief introduction to bio-inorganic chemistry. Role of metal ions present in biological systems with special reference to Na^+ , K^+ and Mg^{2+} ions: Na/K pump; Role of Mg^{2+} ions in energy production and chlorophyll. Role of Ca^{2+} in blood clotting, stabilization of protein structures and structural role (bones).

Recommended books/reference books

1. Lippard, S.J. & Berg, J.M. *Principles of Bioinorganic Chemistry* Panima Publishing Company 1994.
2. Cotton, F.A. & Wilkinson, G, *Advanced Inorganic Chemistry* Wiley-VCH, 1999
3. Basolo, F, and Pearson, R.C. *Mechanisms of Inorganic Chemistry*, John Wiley & Sons, NY, 1967.
4. Greenwood, N.N. & Earnshaw A. *Chemistry of the Elements*, Butterworth-Heinemann, 1997

List of Laboratory experiments

(necessary infrastructure may be developed and adequate precaution should be maintained to conduct such experiments; instructor may demonstrate the experiment to students)

1. Reaction of metal with halide – preparation of Grignard reagent. (only demonstration purpose)
2. Grignard preparation of dye (malachite green (using methylbenzoate)/crystal violet (using diethylcarbonate) (starting material as p-bromo N, N-dimethyl aniline) (only demonstration purpose)
3. Preparation of various Schiff base-metal complexes and their identification using spectroscopy.

4. Preparation of any two of the following complexes and measurement of their conductivity measurement:

- a. tetraamminecarbonatocobalt (III) nitrate
- b. tetraamminecopper (II) sulphate
- c. potassium trioxalatoferrate (III) trihydrate

Recommended books/reference books

- 1. Synthesis of organometallic compounds: A practical guide, S. Komiya, Wiley.
- 2. A.I. Vogel: Qualitative Inorganic Analysis, Prentice Hall, 7th Edn.
- 3. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., *Textbook of Practical Organic Chemistry*, Prentice-Hall,

12. Introduction to Nanochemistry & Applications

L	T	P	Cr
3	1	2	6

Unit-I: Introduction to nanoscience, nanostructure and nanotechnology (basic idea), Overview of nanostructures and nano-materials, classification, (cluster, colloid, nanoparticles, and nanostructures -Spheroid, Wire, Rod, Tube, and Quantum Dot); Calculation of percentage of surface atom and surface to volume ratio of spherical, wire, rod, and disc shapes nanoparticles.

Unit-II: Size dependent properties of nanomaterials (basic idea with few examples only): Quantum confinement, Electrical, Optical (Surface Plasmon resonance), variation in colors (Blue shift & Red shift), Magnetic, thermal and catalytic properties.

Unit-III: Synthesis of Nanomaterials: Brief introduction about Top-down and Bottom-up approaches & self-assembly techniques of nanoparticles synthesis, Solvothermal process, Examples of preparation of gold and silver metallic nanoparticles, self-assembled nanostructures-control of nanoarchitecture-one dimensional control. Carbon nanotubes and inorganic nanowires.

Unit-IV: Material characterization techniques (basic idea of use of following instruments in nanomaterial characterization need to be emphasized): Electron microscopic technique, diffraction technique, photoelectron spectroscopy, zeta-potential measurement; Examples of use of nanomaterials in environmental remediation and biology (few practical examples of use of materials can be discussed).

Recommended Books/References books:

- 1.C. N. R. Rao, A. Muller, A. K. Cheetam, The Chemistry of Nanomaterials: Synthesis, Properties and Applications, Willey-VCH Verlag, Germany, 2005.
- 2.G. Cao, Nanostructures and Nanomaterials: Synthesis, Properties and Applications, Imperial College Press, London, 2004
- 3.R. W. Kelsall, I. W. Hameley, M. Geoghegan, Nanoscale Science and Technology, John Wiley & Sons, England, 2005

4. Charles P. Poole and Frank J Owens, *Introduction to nano technology*, Wiley Interscience, 2003.

5. Pradeep, T., A text of book of nanoscience and nanotechnology, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2012.

List of Laboratory Experiments suggested:

1. Synthesis of ZnO nanoparticles.

2. Preparation of Silver nanoparticles.

(diverse nanoparticles can be prepared by various routes)

3. verification of Beer-Lambert law using nano-particles (above prepared nano-particles may be used for the study).

(Depending upon the availability of infrastructure facilities, instructor may encourage the students to prepare bimetallic nano-particles, etc. and characterized them, study their various properties like magnetism, adsorption, etc.)

Recommended/Ref. Books:

1. Pradeep T., A text book of nanoscience and nanotechnology, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2012 edition.

GENERIC ELECTIVE COURSES

Generic elective courses are both theory and practical based. Both Honours and Pass students can choose the course as outlined in the pattern of modeled credit distribution. Some of the courses are based largely on practical. These courses shall have the following credit pattern.

L	T	P	Cr
3	1	2	6

1. Mathematical Methods in Chemistry

L	T	P	Cr
3	1	2	6

Fundamentals of mathematics: (10 classes of 60 minutes duration each)

Mathematical functions, polynomial expressions, logarithms, exponential function, units of a measurement, inter-conversion of units, constants and variables, equation of a straight line, plotting graphs, data representation, pie-charts, histogram.

Uncertainty in experimental techniques: Displaying uncertainties and measurements in chemistry, decimal places, significant figures, combining quantities.

Uncertainties in measurement: types of uncertainties, combining uncertainties. Use of statistical tools, Data reduction and the propagation of errors, binomial, Poisson and Gaussian distributions, Graphical and numerical data reduction. Numerical curve fitting: the method of least squares (regression).

Algebraic operations on real scalar variables, Roots of quadratic equations analytically and iteratively, Numerical methods of finding roots (Newton-Raphson, binary –bisection).

Mathematical series: (10 classes of 60 minutes duration each)

Power series, Maclaurin, Taylor series, convergence (e.g. pressure virial equation of state, colligative properties). Pythagoras theorem in three dimensions. Trigonometric functions, identities.

Differential calculus: (10 classes of 60 minutes duration each)

The tangent line and the derivative of a function, numerical differentiation, differentials of higher order derivatives, discontinuities, stationary points, maximum-minimum problems, inflexion points, limiting values of functions: L'Hopital's rule, combining limits.

Calculus of several variables: Functions, change of variables, total differential, chain rule, partial differentiation, Euler's theorem, exact and inexact differentials (applications in the domains of thermodynamics, surface chemistry), line/surface-integrals.

Integral calculus: (10 classes of 60 minutes duration each)

Integration, odd-even functions, indefinite integrals, standard integrals, methods of integration (by parts, substitution, partial fractions and others. Examples from kinetics, thermodynamics, nuclear chemistry and surface chemistry, numerical integration (Trapezoidal and Simpson rules, e.g. entropy/enthalpy change from heat capacity data), probability distributions and mean values. Tri-gonometric functions (applications in chemistry need to be emphasized throughout)

Recommended Books/References:

1 Chemical Maths Book, E. Steriner, Oxford University Press (1996).

2 Maths for Chemists, Vols 1 and 2 M. C. R. Cockett and G. Dogget, Royal Society of Chemistry, Cambridge (2003).

(The above course structure, number of classes and recommended books/references are suggestive. Faculty/academic bodies may incorporate revision as per need).

(PRACTICALS/COMPUTATIONAL TOOL WORKS NEED TO BE DESIGNED BY FACULTIES BASED ON THE AVAILABLE FACILITIES)

2. Life Science/Biology-I

L	T	P	Cr
3	1	2	6

Cell and Cellular Processes: (14 classes of 60 minutes)

The Cell Theory; Prokaryotic and eukaryotic cells; Cell size and shape; Eukaryotic Cell components

Cell Organelles

Mitochondria: Structure, marker enzymes, composition; mitochondrial biogenesis; Semiautonomous organelle; Symbiont hypothesis; Proteins synthesized within mitochondria; mitochondrial DNA

Chloroplast: Structure, marker enzymes, composition; semiautonomous nature, chloroplast DNA

ER, Golgi body & Lysosomes: Structures and roles. Signal peptide hypothesis, N-linked glycosylation, Role of golgi in O-linked glycosylation. Cell secretion, Lysosome formation.

Peroxisomes and Glyoxisomes: Structures, composition, functions in animals and plants and biogenesis.

Nucleus (10 classes of 60 minutes duration each)

Nuclear Envelope- structure of nuclear pore complex; chromatin; molecular organization, DNA packaging in eukaryotes, euchromatin and heterochromatin, nucleolus and ribosome

The functions of membranes; Models of membrane structure; The fluidity of membranes; Membrane proteins and their functions; Carbohydrates in the membrane; Faces of the membranes; Selective permeability of the membranes; Cell wall

Cell Cycle: (6 classes of 60 minutes duration each)

Role of Cell division; Overview of Cell cycle; Molecular controls; Meiosis Interphase, Mitosis and Meiosis.

Instrumentation techniques: (10 classes 60 minutes duration each)

Principles of microscopy; Light Microscope; Phase contrast microscopy; Fluorescence microscopy; Confocal microscopy; Sample Preparation for light microscopy; Introduction to Electron microscopy (EM)- Scanning EM and sample analysis with examples.

Recommended books/References:

1. Campbell, N.A. and Reece, J. B. Biology (Eighth edition) Pearson Benjamin Cummings, San Francisco, (2008).
2. Raven, P.H *et al* Biology, Seventh edition Tata McGraw Hill, New Delhi (2006).
- 3 Sheeler, P and Bianchi, D.E. Cell and Molecular Biology (Third edition) John Wiley (2006)

(The above course structure, number of classes and recommended books/references are suggestive. Faculty/academic bodies may incorporate revision as per need).

Tutorials/practical for Biology (preferably any six from the following list)

1. Study of prokaryotic cells (bacteria), viruses, eukaryotic cells using microscope.
2. Study of the photomicrographs of cell organelles
3. To study the structure of plant cell through temporary mounts.
4. To study the structure of animal cells by temporary mounts-squamous epithelial cell and nerve cell.
5. Preparation of temporary mounts of striated muscle fiber
6. To prepare temporary stained preparation of mitochondria from striated muscle cells/ cheek epithelial cells using vital stain Janus green.
7. To prepare temporary stained squash from root tips of *Allium cepa* and to study the various stages of mitosis.
8. Study the effect of temperature, organic solvent on semi permeable membrane.
9. Demonstration of dialysis of starch and simple sugar.
10. Study of plasmolysis and deplasmolysis on *Rhoeo* leaf.
11. Measure the cell size (either length or breadth/diameter) by micrometry.
12. Study the structure of nuclear pore complex by photograph (from Gerald Karp)

3. Physics-I

L	T	P	Cr
3	1	2	6

Mathematical Physics: (8 classes of 60 minutes duration each)

Scalar and vector products, polar and axial vectors, triple and quadruple products.

Vector calculus:

Scalar and vector fields, differentiation of a vector, gradient, divergence, curl and ∇ operations and their meaning, idea of line, surface and volume integrals, Gauss and Stokes' theorem.

Classical Mechanics: (18 classes of 60 minutes duration each)

Particle dynamics: Newton's laws of motion, conservation of linear momentum, center of mass, conservative forces, work energy theorem, particle collision.

Rotational kinematics and dynamics: Rotational motion, forces and pseudo forces, torque and angular momentum, kinetic energy of rotation, rigid body rotation dynamics, moment of inertia, conservation of angular momentum, comparison of linear and angular momentum, motion of a top.

Oscillations: Linearity and superposition principle, free oscillation with one and two degrees of freedom, simple pendulum, combination of two simple harmonic motions. Lissajous figures, free and damped vibrations, forced vibrations and resonance, Q factor; wave equation, travelling and standing waves, superposition of waves, phase and group velocity.

Wave optics: (14 classes of 60 minutes duration each)

Interference, division of amplitudes, Young's double split, Fresnel's biprism, interference in thin films and wedged shaped films. Fresnel diffraction: Diffraction at a single slit and a circular aperture, diffraction at a double split, plane transmission grating, resolving power of a telescope and a microscope, resolving and dispersive power of a plane diffraction grating. Polarization: Polarization by reflection and refraction, Brewster's law, double refraction, nicol prism, quarter and half-wave plates, Production and analysis of circularly and elliptically polarized light.

Recommended Text books/references:

1. Spiegel, M. R. *Vector Analysis* Schaum Outline Series. McGraw-Hill (1974)
2. Beiser, A. *Concepts of Modern Physics* McGraw-Hill (2002).
3. Resnick, R., Halliday, D. and Krane, K. S. *Physics I and II* Fifth Ed. John Wiley (2004)
4. Serway, R. A. & Jewett, J. W. *Physics for Scientists and Engineers* Sixth Ed.

(The above course structure, number of classes and recommended books/references are suggestive. Faculty/academic bodies may incorporate revision as per need).

Physics-I– Practicals

(Recommended that physics practical to be carried out from mechanics and optics as per availability of facilities with minimum 3 experiments from each group)

Group-A: Mechanics

1. Determination of spring constant of a spring by (i) static, and (ii) dynamic methods.
2. Study of damped harmonic oscillator- Q factor.
3. Determination of temperature coefficient of resistance using platinum resistance thermometer.
4. Study of thermal couple calibration and inversion temperature.
5. LCR study of resonance Q-factor.
6. Kator's pendulum- Bar pendulum.

Group-B: Optics

7. Determination of wavelength of light by Fresnel's biprism.
8. Determination of wavelength of sodium light by Newton's arrangement.
9. Determination of refractive index of tint glass using a spectrometer.
10. Determination of dispersive power of a glass prism using Cauchy's constant. Also determine the resolving power of a prism.
11. Determination of wavelength of sodium light using a plane transmission grating and resolving power of a diffraction grating.
12. Determination of specific rotation of cane sugar solution using a polarimeter.

4. Mathematics-II

L	T	P	Cr
3	1	2	6

Differential equations: (8 classes of 60 minutes duration each)

Solving differential equations with separable variables, series solution, numerical solutions of differential equations those appear in Newtonian mechanism, harmonic oscillator, Linear differential equations with constant coefficients.

Partial differential equations: separation of variables. (10 classes of 60 minutes duration each)

Multiple integrals. Change variables. Vector derivative operators. Multiple integrals involving other coordinate systems (spherical polar). Maximum and minimum of functions of several variables. Stationary points, complex numbers, complex plane, Euler's formula and polar form of complex numbers, complex conjugates, modulus of a complex number.

Operators: (6 classes of 60 minutes duration each)

Operator algebra, linear and Hermitian operators, eigenfunctions and eigenvalues, commutators of operators.

Vectors and coordinate systems: (6 classes of 60 minutes duration each)

Unit vectors (application in solid state), addition and subtraction of vectors, multiplication of vectors. Vector calculus. Vectors and coordinate systems in three dimensions (Cartesian, spherical polar and their inter-conversion), Jacobian.

Determinants and Matrices: (10 classes of 60 minutes each)

Determinant, Matrix algebra, Simultaneous equations: method of substitution and elimination, consistency and independence. Homogeneous linear equations. Simultaneous equations with more than two unknowns, Cramer's rule, matrix inversion, orthogonal and unitary matrices, diagonalization of a matrix.

Recommended Books/references:

McQuarrie D. A. Mathematics for Physical Chemistry Opening Doors, University Science Books (2008).

(The above course structure/number of classes are suggestive. Faculty/academic bodies may incorporate revision/may incorporate text and reference books as per need).

(Suitable Laboratory Practicals may be designed by the faculty of Mathematics/Chemistry based on above course modules and available facilities)

5. Physics-II

L	T	P	Cr
3	1	2	6

Electrostatics and magnetism: (15 classes of 60 minutes duration each)

Electric field, potential due to a charge distribution and due to a dipole, electrical potential energy, flux, Gauss's law, electric field in a dielectric, polarization, energy stored in an electric field. Magnetic field due to a current-carrying conductor, Biot Savart law, magnetic force on a current, Lorentz force, electromagnetic induction, Lenz's law, magnetic properties of matter, para- dia- and ferromagnetism, spinning of a magnetic dipole in an external magnetic field. Modification of Ampere's law, equation of continuity and displacement current, Maxwell's equations, wave equation and its plane wave solution, nature of electromagnetic waves, transversality and polarization, propagation of electromagnetic plane waves in dielectric media.

Electronics: (15 classes of 60 minutes duration each)

Half-wave, full-wave and bridge rectifiers, ripple factor, rectification efficiency, filters (series in inductor, shunt capacitor, LC and π sections), voltage regulations, load regulation, Zener diode as voltage regulator. Characteristic curves of bipolar transistors, static and dynamic load line, biasing (fixed and self) of transistor circuit, thermal instability of bias, the black box idea of CE, CB and CC transistor circuits as two-port network, small signal active output, hybrid model of a CE transistor circuit, analysis of a small signal amplifier: its voltage and current gains, negative and positive feedback. Barkhausen's criterion for self-sustaining oscillations, LC and phase shift oscillators.

Digital electronics: (10 classes of 60 minutes duration each)

Number systems (binary, BCD, octal and hexadecimal), 1's and 2's complements. Logic gates, AND, OR, NAND, NOR, XOR and NXOR. Boolean algebra (Boolean laws and simple expressions), binary adders, half adder, half subtractor, full adder and full subtractor.

Recommended Text books/References:

1. Griffiths, D. J. *Introduction to Electromagnetism* 3rd Ed. Prentice-Hall (1999).
2. Malvino, A.P. & Leach, D. P. *Digital Principles and Applications*, Tata McGraw- Hill (2008).
3. Ryder, J. D. *Electronic Fundamentals and Applications: Integrated and Discrete Systems*. 5th Ed. Prentice-Hall, Inc. (2007).
4. Floyd, T. L. & Buchla, D. M. *Electronics Fundamentals: Circuits, Devices and Applications* (8th Ed.) Prentice-Hall (2009).

(The above course structure/number of classes are suggestive. Faculty/academic bodies may incorporate revision/may incorporate text and reference books as per need).

Physics Practical

1. Ballistic Galvanometer: resistance, current sensitivity, charge sensitivity, and critical damping resistance of the galvanometer.
2. Determination of high resistance by leakage method.
3. Determination of mutual inductance by Ballistic Galvanometer.
4. Operations and measurements by Cathode Ray Oscilloscope (CRO). Calibration of DC and AC voltages, frequency and phase measurements of a signal.
5. Study of transistor characteristics (CB, CE, CC configurations).
6. Study of power supply (rectification factor, voltage and load regulation for C, L, CL and π filters).
7. Study of basic RC coupled amplifier (frequency response and band width).
8. Self-inductance measurement by Owen's bridge.
9. Measurement of magnetic field by search coil.
10. To verify experimentally OR, NAD, NOT, NOR, NAND gates.

(The above list of experiments are suggestive. Faculty/academic bodies may incorporate revision in the list of experiments depending upon experimental facilities available/may incorporate text and reference books as per need).

ABILITY ENHANCEMENT COURSES

These courses have the following credit pattern. For theory papers:

L	T/P	Cr
3	1	4

1. English for communication

L	T	P	Cr
3	1	0	4

Communication: Language and communication, differences between speech and writing, distinct features of speech, distinct features of writing.

Writing Skills; Selection of topic, thesis statement, developing the thesis; introductory, developmental, transitional and concluding paragraphs, linguistic unity, coherence and cohesion, descriptive, narrative, expository and argumentative writing.

Technical Writing: Scientific and technical subjects; formal and informal writings; formal writings/reports, handbooks, manuals, letters, memorandum, notices, agenda, minutes; common errors to be avoided.

(The above course is suggestive. However, the course teacher/academic bodies may incorporate changes as per the need with incorporation of appropriate text books, reference materials).

2. Intellectual Property Rights

L	T	P	Cr
3	1	0	4

Learning outcomes

On completion of this course, the students will be able to:

- Understand the concept of IPR
- Differentiate between various agreements of IPR
- Compare copyrights, patents and Geographical Indicators
- Examine various legal issues related to IPR
- Relate to various cyber issues concerning IPR

Keywords:

Copyright act, IPR and WTO, Patents, Bioprospecting, Biopiracy, Database

Unit I: Introduction to Intellectual Property Right (IPR)

7 lectures

Copyright Act and IPR, Economic importance. IPR in India and world: Genesis and scope, some important examples. IPR and WTO (TRIPS, WIPO). Objectives, Rights, Patent Act 1970 and its amendments.

Unit II: Patents, Copyrights and Trademarks

7 lectures

Procedure of obtaining patents, working of patents. Infringement of patents, Copyrights: work protected under copyright laws, Rights, Transfer of Copyright, Infringement. Trademarks: Objectives of trademarks, Types, Rights, Protection of goodwill, Infringement, Passing off, Defenses, Domain name.

Unit III: Protection of Traditional Knowledge, Industrial Designs and Plant Varieties

7 lectures

Objective, Concept of Traditional Knowledge, Holders, Issues concerning, Bioprospecting and Bio-piracy, Alternative ways, Protectability, need for a Sui-Generis regime, Traditional Knowledge on the International Arena, at WTO, at National level, Plant varieties protection in India. Rights of farmers, National gene bank, Benefit sharing. Protection of Plant Varieties and Farmers' Rights Act, 2001.

Unit IV: Information Technology Related I P R

7 lectures

Computer Software and Intellectual Property, Database and Data Protection, Protection of Semiconductor chips, Domain Name Protection. Patenting Biotech Inventions: Objective, Applications, Concept of Novelty, Concept of inventive step, Microorganisms, and Moral Issues in Patenting Biotechnological inventions.

Practical:

There are no experimental lab based Practical. However, the students are expected to prepare some project report based on the Success stories of Traditional Patents secured by India. Likewise, prepare a database for Indian products wherein is issue is still under consideration of the competent authorities. Prepare the dos and don'ts on Patents for Botanists

Suggested Readings

1. N.S. Gopalakrishnan and T.G. Agitha, (2009) Principles of Intellectual Property Eastern Book Company, Lucknow.
2. David Kitchen QC , David Llewelyn , James Mellor , Richard Meade , Thomas Moody-Stuart, and D. Keeling, Robin Jacob (2005). Kerly's Law of Trade Marks and Trade Names (14th Edition) Thomson, Sweet & Maxwell.
3. Ajit Parulekar and Sarita D' Souza, (2006) Indian Patents Law – Legal & Business Implications; Macmillan India Ltd.
4. B.L.Wadehra (2000) Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications; Universal law Publishing Pvt. Ltd., India.
5. P. Narayanan (2010) Law of Copyright and Industrial Designs; Eastern law House, Delhi.

3. History of Indian Science

L	T	P	Cr
3	1	0	4

Learning outcomes

On completion of this course, the students will be able to:

- Develop understanding of various branches of science during different eras
- Analyze the role played by different Indian organizations in science
- Appraise the contribution of different Indian Scientists in science

Keywords:

Astronomy, Ancient India, Colonial India, Modern India, Agricultural techniques, Green revolution

Unit I: Science in Ancient and Medieval India

8 lectures

History of development in astronomy, mathematics, engineering and medicine subjects in Ancient India, Use of copper, bronze and iron in Ancient India, The geography in literature of Ancient India. Influence of the Islamic world and Europe on developments in the fields of mathematics, chemistry, astronomy and medicine, innovations in the field of agriculture-new crop introduced new techniques of irrigation.

Unit II: Indian Science in before and after Independence

7 lectures

Introduction of different surveyors, botanists and doctors as early scientist in Colonial India, Indian perception and adoption for new scientific knowledge in Modern India, Establishment of premier research organizations like CSIR, DRDO and ICAR and ICMR, Establishment of Atomic Energy Commission, Launching of the space satellites, Botanical survey of India.

Unit III: Prominent Indian scientists

8 lectures

Eminent scholars in mathematics and astronomy: Baudhayana, Aryabhatta, Brahmgupta, Bhaskaracharya, Varahamihira, and Nagarjuna, Medical science of Ancient India (Ayurveda and Yoga): Susruta, Charak. Scientists of Modern India: Srinivas Ramanujan, C.V. Raman, Jagdish Chandra Bose, Homi Jehangir Bhabha and Vikram Sarabhai.

Unit IV: Prominent research in Plant Sciences in Republic of India

7 lectures

History of plant tissue culture from India, Green revolution in India: causes, details, and outcomes. First gene cloning in plants, First genome sequencing from India. Premier Plant Research institutes and scientists in India, GM Mustard. Allelopathy Plant research in India

Practical:

There are no experimental lab based Practical. However, the students are expected to prepare some term paper reports on the Life and works of some noted Indian Scientists especially the Botanists. Likewise, students need to prepare and organize some discussion on the ancient and medieval science in India and trace the reasons of inadequate visibility in the world. Prepare term papers on GM Crops, the controversies and procedure for approval. Prepare term papers on the significance of Allelopathic research from India

Suggested Readings

1. Kuppuram G (1990) History of Science and Technology in India, South Asia Books.
2. Handa O. C. (2014) Reflections on the history of Indian Science and Technology, Pentagon Press.
3. Basu A (2006) Chemical Science in Colonial India: The Science in Social History, K.P. Bagchi & Co.
4. Habib I, (2016.)A people's history of India 20: Technology in Medieval India, 5th Edition, Tulika Books.
5. A. Rahman et al (1982) Science and Technology in Medieval India – A Bibliography of Source Materials in Sanskrit, Arabic and Persian, New Delhi: Indian National Science Academy.
6. B. V. Subbarayappa & K. V. Sarma (1985), Indian Astronomy — A Source Book, Bombay.
7. Srinivasan S, Ranganathan S (2013) Minerals and Metals heritage of India, National Institute of Advanced Studies.
8. Srinivasiengar C N, (1967) The History of Ancient Indian Mathematics, World Press Private Ltd. Calcutta.
9. Bhardwaj H C (2000) Metallurgy in Indian Archaeology. Tara Book Agency

4. Good Laboratory Practices (largely Practical based)

L	T/P	P	Cr
3	1	0	4

Learning outcomes

After completing this course, the learner will be able to:

- Apply practical skills in science courses with the understanding of general laboratory practices
- Use various micro techniques used in chemistry
- Apply various techniques to study chemical compounds, salts
- Explore various research issues and their solutions

Keywords:

Laboratory calculations, calibration procedures, use of glasswares, safety aspects in preparation

Unit I: General Laboratory Practices

Common calculations in chemistry laboratories. Understanding the details on the label of reagent bottles. Preparation of solutions. Molarity and normality of common acids and bases. Dilutions. Percentage solutions. Molar, molal and normal solutions. Technique of handling micropipettes; Knowledge about common toxic chemicals and safety measures in their handling.

Unit II: Instrument-Techniques and laboratory preparation procedure.

Use of micropipette, analytical balances, pH meter, conductivity meter, rotary evaporator, potentiometer. Use of purified water in lab experiments, Cleaning and drying of glasswares, Perpartion of crystals from given salt. Preparation of Dyes, Demonstraton of preparation of material using Sol-gel procedure.

Suggested Readings

1. Seiler, J.P. (2005). Good Laboratory Practices: the why and how. Springer-Verlag Berlin and Heidelberg GmbH & Co. K; 2nd ed.
2. Garner, W.Y., Barge M.S., Ussary. P.J. (1992). Good Laboratory Practice Standards: Application for field and Laboratory studies. Wiley VCH.

5. Introduction to Forensic Science and technology

L	T/P	P	Cr
3	1	0	4

Scope of forensic science, Evidences in criminal law (act, case studies), Physical evidences (identification, collection and preservation of sample, physical properties of sample material, use of physical evidences in criminal proceedings), biological evidences (drugs, effects, identification, serology of blood, semen, saliva, DNA evidence, use of biological evidence in criminal proceedings), trace evidences (finger print, blood stream, hair, firearms, fibers, paints, etc), basic techniques of chemical analysis (FTIR, Mass spectroscopy, HPLC and GC with example of analysis). Admissible and non-admissible scientific evidence in legal system, Principle and limitation of DNA finger printing.

Recommended Books/references:

- 1.B.B. Nanda and R.K. Tiwari, Forensic Science in India: A Vision for the Twenty First Century, Select Publishers, New Delhi (2001).
2. M.K. Bhasin and S. Nath, Role of Forensic Science in the New Millennium, University of Delhi, Delhi (2002).
3. S.H. James and J.J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton (2005)
- 4.W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013).

6. Renewable Energies (solar and biogas)

L	T/P	P	Cr
3	1	0	4

Introduction to renewable energy sources – solar, wind, small hydro, biomass, geothermal and ocean energy, energy flow in ecosystem Solar Energy Resources Solar radiation: Spectrum of EM radiation, sun structure and characteristics, extraterrestrial radiation, solar constant, air mass, beam, diffused and total solar radiation, spectral distribution

Measurement of solar radiation Instruments: sunshine recorder, Pyranometer, Pyrliometer, Albedometer. Radiation measurement stations in India (NIWE, IMD etc.), solar radiation data, graphs, Meteoronorm and NASA-SSE databases Hands-on measurement of beam, diffuse and total radiation

Solar mapping using satellite data, Typical Meteorological Year

Models and methods for estimating solar radiation, estimation of global radiation, estimation of diffused components

Basics Biomass resources: plant derived, residues, aquatic and marine biomass, various wastes, photosynthesis. Biomass resource assessment Estimation of woody biomass, non woody biomass and wastes, ASTM standards

Bulk chemical properties Moisture content, proximate and ultimate analyses, calorific value, waste water analysis for solids

Chemical composition of biomass Cellulose, hemicelluloses and lignin content in common agricultural residues and their estimation, protein content in biomass, extractable, COD.

Structural properties Physical structure, particle size and size distribution, permeability. Physical properties: Bulk density, angle of repose, thermal analysis (thermogravimetric, differential thermal and differential scanning calorimetry). Properties of microbial biomass: Protein estimation, flocculating ability, relative hydrophobicity of sludge, sludge volume index.

7. Chemoinformatics

L	T/P	P	Cr
3	1	0	4

Introduction to Chemoinformatics: History, Prospects of chemoinformatics, Molecular Modelling and Structure elucidation.

Representation of molecules and chemical reactions: Nomenclature, Different types of notations, SMILES coding, Matrix representations, Structure of Molfiles and Sdfiles, Libraries and toolkits, Different electronic effects, Reaction classification.

Searching chemical structures: Full structure search, sub-structure search, basic ideas, similarity search, three dimensional search methods, basics of computation of physical and chemical data and structure descriptors, data visualization.

Applications: Prediction of Properties of Compounds; Linear Free Energy Relations; Quantitative Structure-Property Relations; Descriptor Analysis; Model Building; Modeling.

Toxicity; Structure-Spectra correlations; Prediction of NMR, IR and Mass spectra; Computer Assisted Structure elucidations; Computer Assisted Synthesis Design, Introduction to drug design; Target Identification and Validation; Lead Finding and Optimization; Analysis of HTS data; Virtual Screening; Design of Combinatorial Libraries; Ligand and structure based drug design; Applications in Drug Design.

Recommended Books/references:

1. Andrew R. Leach and Valerie, J. Gillet (2007) *An introduction to Chemoinformatics*. Springer: The Netherlands.
2. Gasteiger, J. and Engel, T. (2003) *Chemoinformatics: A text-book*. Wiley-VCH.
3. Gupta, S. P. (2011) *QSAR & Molecular Modeling*. Anamaya Pub.: New Delhi.

8. Water remediation and conservation studies

L	T	P	Cr
3	1	0	4

Sources of water pollutants, pollutants, Industrial and human contribution, WHO recommendation about potable water, current scenario of drinking water quality, chemistry of toxicants like arsenic, fluoride, chromium, lead and mercury, cause and effects of water pollution, remediation, techniques involved such as adsorption, coagulation-filtration, Nalgonda techniques, reverse osmosis, activated charcoal detoxification, applications of non-toxic oxides and mixed oxides, regeneration and recycling, mechanisms of detoxification, bio-remediation, need of green chemistry, future scope.

Introduction to water conservation and erosion of soil, forms of water erosion, factors affecting water erosion, types of water erosion, mechanics of water erosion control, agronomical measures of water erosion control, Terraces for water erosion control:

Modeling of watershed processes, Case study of water-shed modeling for water conservation and water quality.

Recommended Books/references:

1. Citterden J. C. , Trussell J. R., Hand D. W., Howe K. J., Tchobanoglous G. , Water treatment: Principles and Design MWH publication.
2. De A. K. Environmental Chemistry, Wiley Eastern
3. Clarson D., Dara S. S. A text book of Environmental chemistry and pollution control, S Chand Co. Soil and water analytical method
4. Edzwald J., Water Quality & Treatment: A Handbook on Drinking Water (Water Resources and Environmental Engineering Series)

9. Research Methodology

L	T	P	Cr
2	0	2	4

Learning outcomes:

At the end of the course the students will be able to,

- Understand the concept of research and different types of research in the context of biology
- Develop laboratory experiment related skills.
- Develop competence on data collection and process of scientific documentation
- Analyze the ethical aspects of research
- Evaluate the different methods of scientific writing and reporting

Keywords:

Qualitative, Quantitative, Reproducibility, Scientific methodology, Plagiarism, Scientific misconduct, Ethics in Science

Unit I: Basic Concepts of Research

12 lectures

Research-definition and types of research (Descriptive vs analytical; applied vs fundamental; quantitative vs. qualitative; conceptual vs empirical). Research methods vs methodology. Literature-review and its consolidation; Library research; field research; laboratory research.

Unit II: Data Collection and Documentation of Observations

12 lectures

Maintaining a laboratory record; Tabulation and generation of graphs. Imaging of tissue specimens and application of scale bars. The art of field photography.

Unit III: Overview of Application to Chemistry related problems

10 lectures

Key chemistry research areas, chemoinformatics.

Unit IV: Ethics and Good Practical's and Art of Scientific Writing

11 lectures

Authors, acknowledgements, reproducibility, plagiarism, Numbers, units, abbreviations and nomenclature used in scientific writing. Writing references. Power-point presentation. Poster presentation. Scientific writing and ethics, Introduction to copyright-academic misconduct/plagiarism.

Practical

1. Experiments based on chemical calculations.
2. Lab computational experiments.
3. Poster presentation on defined topics.
4. Technical writing on topics assigned.
5. Identification of different type of research in day by day life
6. Curation of relevant scientific literature from Google Scholar
7. Demonstration for checking of plagiarism using recommended software
8. Technical writing on topics assigned.

(More Practical may be added depending on the available facilities)

Suggested Readings

1. Dawson, C. (2002). Practical research methods. UBS Publishers, New Delhi.

10. Chemistry in Everyday life

L	T	P	Cr
2	0	2	4

Respiration and energy production in human body

Respiration, Respiratory enzymes, brief outline of hemoglobin and myoglobin, oxygen transport mechanism in body, co-operativity, Respiration in lower animals, hemocyanine, hemerythrin. Energy production in body, ATP; enzyme responsible for food digestion, mechanism of food digestion, active site of cytochrome c-oxidase.

Chemical aspects of some common health hazards

Anemia, sickle cell anemia, leukemia, blood pressure irregularity, blood sugar, arthritis, carbon monoxide poisoning in mines, cyanide poisoning, fluorosis etc.

Vitamins and minerals:

Need for vitamin in body, types of vitamins, water soluble and fat soluble vitamins, Vitamin B-12, vitamin C (Cyanocobalamin), D, Vitamin K. Role of minerals in body, iodine deficiency and remedy.

Significance of Radical chemistry in living system

Radical production in environment, superoxide and peroxide, health impact, action of radicals, cell mutation, diseases caused by free radical, cancer, radical quencher, anti-oxidants, natural anti-oxidants like vegetables, beverages like tea and coffee, fruits.

Radical destroying enzymes: superoxide dismutase, catalase, peroxidase, mechanism of action.

Chemistry of Materials

Soaps and Detergents – their action, Biofuels – production of biofuels and its utility as alternative fuel source, Fibers: natural fibers, cotton, wool, silk, rayon, artificial fibers, polyamides, acrylic acid, PVC, PVA; Examples of natural biodegradable polymers, cellulose, cellulose acetate, cellophane, soy protein, corn, zein protein, wheat gluten protein, synthetic biodegradable polymers. Use of polymeric materials in daily life.

Recommended Books/references:

1. Kaim W, Bioinorganic Chemistry, Vol 4, Brigitte Scwederski, Wiley, 1994.
2. Crichton R. H. Biological Inorganic Chemistry – An Introduction, Elsevier, 2008.
3. Berg J. M., Tymoczko J. L., Stryer I. Biochemistry, W. H. Freeman, 2008.
4. Bertini, I., Gray, H. B., Lippard, S. J. and Valentine, J. S. (1994) *Bioinorganic Chemistry*. University Science Books (1994)
5. Lippard S., Berg J. M. Principles of Bioinorganic Chemistry; University Science Books 1994.
6. Polymer science, V. R. Gowariker, N. V.Viswanathan, J. Sreedhar, New Age International.

Suggested Laboratory experiments:

1. Analysis of soaps and detergents.
2. Analysis of Biofuels - flash point, pour point, cloud point
3. Preparation of Nylon6/6,6
4. Testing of adulterant in food, oil and vegetable
5. Vitamin-C preparation.

11. Chemistry of food, nutrition and preservation

L	T/P	P	Cr
3	1	0	4

Learning objective:

1. To know about the basic of human physiological system and food science
2. To learn about the nutrition and its importance
3. To learn about the food preservation and its utility.

Key words: Food, nutrition, preservation.

Unit-1:

(10 lecture class)

Basic of human physiological system and food science:

Digestive System: Structure and functions of G.I. tract, Process of digestion and absorption of food, Structure and functions of liver, gallbladder and pancreas. Basic concept on Food, Nutrition and Nutrients (Nutrition, Malnutrition and Health: Scope of Nutrition.), Classification of Food, Classification of Nutrients.

Unit-II

(10 lecture class)

Nutrition: Dietary fibers (composition, properties and Minerals and trace elements (biochemical and physiological role, bioavailability and requirement with examples), Vitamines (examples, biochemical and physiological requirements, deficiency and excesses), Water (requirement, water balance), basic idea about community nutrition (objective, importance of various programmes).

Unit-III

(10 lecture class)

Food preservation:

Food preservation: definition, objectives and principles of food preservation. Different methods of food preservation. Preserved Products: Jam, Jelly, Marmalade, Sauces, Pickles, Squashes, Syrups-types, composition and manufacture, selection, cost, storage, uses and nutritional aspects, Food Standards : ISI, Agmark, FPO, MPO, PFA, FSSAI.

Practical:

Identification of Mono, Di and polysaccharides, Identification of Proteins, Identification of glycerol., Determination of moisture content in food, ash content and determination of calcium, iron, vitamin-C.

Comparison with norms and interpretation of the nutritional assessment data and its significance. Weight for age, height for age, weight for height, body Mass Index (BMI) Waist - Hip Ratio (WHR). Skin fold thickness.

Quantitative estimation of Sugars (Glucose, lactose, starch), Estimation of acid value, iodine value, Saponification value of fats, Estimation of blood Glucose, Estimation of serum cholesterol

Reference/suggested books

1. SrilakshmiB(2017): Nutrition Science,6th Multicolour Ed. New Age International (P) Ltd.
2. RodayS(2012): Food Science and Nutrition, 2nd Ed. Oxford University Press.
3. Mann J and TruswellS(2017) : Essentials of Human Nutrition, 5th Ed. Oxford University Press.
4. Wilson K and Walker J(2000): Principles and Techniques of Practical Biochemistry, 5th Ed. Oxford University Press.
5. Sadasivan S and ManikamK(2007): Biochemical Methods, 3rd Ed. New Age International (P) Ltd.
6. Oser B L(1965). Hawk's Physiological Chemistry, 14th Ed. McGraw-Hill Book
7. GopalanC , Rama Sastri BV and Balasubramanian SC(2016): Nutritive value of Indian Foods, Indian Council of Medical Research.
8. Subalakshmi, G and Udipi, SA(2006):Food processing and preservation, 1st Ed. New Age International (P)Ltd.
- 9..SrilakshmiB(2018): Food Science, 7th Colour Ed. New Age International (P) Lt
10. Potter NN and Hotchkiss JH(1999): Food science,5th Ed , Springer.

SKILL ENHANCEMENT COURSES

A number of courses has been enlisted. These courses have the following credit pattern. For theory based papers:

L	T	P	Cr
2	0	0	2

For practical based papers:

L	T	P	Cr
0	0	2	2

1. Skill Enhancement Course: Personality Development

L	T	P	Cr
2	0	0	2

Learning outcomes:

After the completion of this course, the learner will be able to:

- Develop understanding of the concepts and principles of basic psychological skills
- Apply techniques and methods to enhance productivity and time management
- Develop critical thinking skills
- Organize human resources with improved leadership qualities

Keywords:

Mental heuristics, Mental priming, Checklists, Stress management, Cognitive biases, Leadership qualities

Unit I: Basic Psychology Skills

8 lectures

Mental Heuristics and Priming, Cialdini's six psychological principles, Charisma and charisma enhancements, facing interviews

Unit II: Productivity and Time Management**7 lectures**

Eisenhower Matrix, Pomodoro Technique, Dealing with Procrastination, Journaling methods, Checklists, to-do lists and scheduling the events

Unit III: Dealing Negativity**7 lectures** Work-life

balance, stress management, coping with failures and depression

Unit IV: Critical Thinking and Human resources**8 lectures**

Logical fallacies, Cognitive biases, Mental Models, Critical Thinking. Evaluation and improvement; Leadership qualities.

Suggested Readings

2. Bast, F. (2016). Crux of time management for students. Available at: <https://www.ias.ac.in/article/fulltext/reso/021/01/0071-0088>
3. Cialdini, R.B. (2001). Influence: The Psychology of Persuasion, Revised Edition. Harper Collius.
4. Green, C.J. (2015). Leadership and soft skills for students: Empowered to succeed in High School, College and beyond. Dog Ear Publishing.
5. Velayudhan, A. and Amudhadevi, N. V. (2012). Personality Development for College Students. LAP Lambert Academic Publishing.

2. Computer Applications in Chemistry

L	T	P	C
2	0	0	2

Learning outcomes:

After the completion of this course the learner will be able to:

- Apply the basic operations of spreadsheet applications
- Recognize advanced resources for accessing scholarly literature from internet
- Utilize bibliography management software while typing and downloading citations
- Operate various software resources with advanced functions and its open office substitutes

Keywords:

Spreadsheet, Google search, Subscription, Bibliography, MS office, Image processing

Unit I: Spreadsheet Applications

8 lectures

Introduction of spreadsheet (MS Excel), application, formulas and functions, performing basic statistics using spreadsheet applications, creating basic graphs using spreadsheet applications, logical (Boolean) operators.

Unit II: Internet Resources

7 lectures

Advanced Google search operators and Boolean functions, Introduction to Google Scholar and accessing scholarly literature from Internet, Fake News and spotting the fake news, multimedia resources and podcasts, RSS/XML Feeds and feed subscription using a feed reader.

Unit III: Bibliography management

8 lectures

Introducing a bibliography management software (for e.g. Endnote), Styles and Templates, Changing the bibliography style as per journal format, Citing while typing in the office application, downloading citations from Google Scholar.

Unit IV: Other software resources**7 lectures**

Introduction to advanced functions of MS Word and its Open Office substitutes including tracking changes, inserting page numbers and automatic table of contents, Google Docs and Forms, MS Power point, Microphotography and scale calibration with ImageJ, digital image processing (Paint.net or GIMP).

Suggested Readings

1. User manual and online user manual of respective soft wares for the most updated content
2. Published books are not recommended as versions keep on updating very frequently; therefore, it is not easy to follow.

3. Science Communication and Popularization

L	T	P	Cr
2	0	0	2

Learning outcomes:

After the completion of this course, the learner will be able to:

- Identify the need and role of science communication in human development
- utilize visual media science communication for creating scripts and documentaries
- Contribute in science popularization through internet communication and public sensitization

Keywords:

Print science, Visual media, Internet communication, Blogs, Outreach talks, Public sensitization

Unit I: Print Science Communication

9 lectures

Need for Science Journalism: Science has potential for breaking news, impact on Human life, impact on technology. Role of science and technology in human development. Framing policies at national and international levels. Writing and communicating popular articles effectively, case studies of celebrated works of science communicators including Cosmos by Carl Sagan, works of Bill Bryson, Richard Dawkins, Richard Feynman, Isaac Asimov, Carl Zimmer and Matt Riddle, importance for communication through regional languages.

Unit II: Visual Media Science Communication

7 lectures

Science outreach through visual media: Creating science documentaries, creating the outline and expanding, scripts, citing authentic sources, case study: Famous documentaries of Carl Sagan, David Attenborough and Prof. Yashpal

Unit III: Internet Science Communication**7 lectures**

Science outreach through internet: Social media, Websites, Blogs, Youtube, Podcast etc.

Unit IV: Science Outreach Talks and Public Sensitization**7 lectures**

Tactics for providing a charismatic and effective public talk, use of metaphors, speaking in context, Science outreach for biodiversity conservation sensitization of public

Suggested Readings

1. Selected works of Carl Sagan, works of Bill Bryson, Richard Dawkins, Richard Feynman, Isaac Asimov, Carl Zimmer and Matt Riddley.
2. Gigante, E. Marie (2018). *Introducing Science Through Images: Cases of Visual Popularization (Studies in Rhetoric/Communication)*, University of South Carolina Press.

4. Biofertilizers (Practical based course)

L	T	P	Cr
2	0	0	2

Learning outcomes:

On the completion of this course, the students will be able to;

- Develop their understanding on the concept of bio-fertilizer
- Identify the different forms of biofertilizers and their uses
- Compose the Green manuring and organic fertilizers
- Develop the integrated management for better crop production by using both nitrogenous and phosphate bio fertilizers

Keywords:

Useful microbes, Cyanobacteria, Mycorrhiza, Organic farming, Recycling, Vermicompost

Unit I

9 lectures

General account about the microbes used as biofertilizer – Rhizobium – isolation, identification, mass multiplication, carrier based inoculants, Actinorrhizal symbiosis. *Azospirillum*: isolation and mass multiplication – carrier based inoculant, associative effect of different microorganisms. *Azotobacter*: classification, characteristics – crop response to *Azotobacter* inoculum, maintenance and mass multiplication.

Unit II

7 lectures

Cyanobacteria (blue green algae), *Azolla* and *Anabaena azollae* association, nitrogen fixation, factors affecting growth, blue green algae and *Azolla* in rice cultivation.

Unit III

7 lectures

Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield – colonization of VAM – isolation and inoculum production of VAM, and its influence on growth and yield of crop plants.

Unit IV

7 lectures

Organic farming – Green manuring and organic fertilizers, Recycling of bio- degradable municipal, agricultural and Industrial wastes – biocompost making methods, types and method of vermicomposting – field Application.

Suggested Readings

1. Dubey, R.C. (2005). A Text book of Biotechnology S.Chand & Co, New Delhi.
2. John Jothi Prakash, E. (2004). Outlines of Plant Biotechnology. Emkay Publication, New Delhi.
3. Kumaresan, V.(2005). Biotechnology, Saras Publications, New Delhi.
4. NIIR Board. (2012). The complete Technology Book on Biofertilizer and organic farming. 2nd Edition. NIIR Project Consultancy Services.
5. Sathe, T.V. (2004) Vermiculture and Organic Farming. Daya publishers.
6. Subba Rao N.S. (2017). Biofertilizers in Agriculture and Forestry. Fourth Edition. Medtech.
7. Vayas,S.C, Vayas, S. and Modi, H.A. (1998). Bio-fertilizers and organic Farming Akta Prakashan, Nadiad.

5. Herbal Technology (Practical based)

L	T	P	Cr
2	0	0	2

Learning outcomes:

On completion of this course the students will be able to;

- Develop their understanding on Herbal Technology
- Define and describe the principle of cultivation of herbal products.
- List the major herbs, their botanical name and chemical constituents.
- Evaluate the drug adulteration through the biological testing
- Formulate the value added processing / storage / quality control for the better use of herbal medicine
- Develop the skills for cultivation of plants and their value added processing / storage / quality control

Keywords:

Herbal medicines, Plant products, Biopesticides, Pharmacognosy, Adulteration, Secondary metabolites

Unit I

7 lectures

Herbal Technology: Definition and scope; Herbal medicines: history and scope; Traditional systems of medicine, and overview of AYUSH (Traditional Indian Systems of Medicine); Cultivation - harvesting - processing - storage of herbs and herbal products.

Unit II

7 lectures

Value added plant products: Herbs and herbal products recognized in India; Major herbs used as herbal medicines, nutraceuticals, cosmetics and biopesticides, their Botanical names, plant parts used, major chemical constituents.

Unit III

8 lectures

Pharmacognosy - Systematic position, botany of the plant part used and active principles of the following herbs: Tulsi, Ginger, Curcuma, Fenugreek, Indian Gooseberry, *Catharanthus roseus*, *Withania somnifera*, *Centella asiatica*, *Achyranthes aspera*, Kalmegh, Giloe (*Tinospora*), Saravar. Herbal foods, future of pharmacognosy.

Unit IV

8 lectures

Analytical pharmacognosy: Morphological and microscopic examination of herbs, Evaluation of drug adulteration - types, methods of drug evaluation - Biological testing of herbal drugs - Phytochemical screening tests for secondary metabolites (alkaloids, flavonoids, steroids, triterpenoids, phenolic compounds). Plant gene banks, Cultivation of Plants and their value added processing / storage / quality control for use in herbal formulations, Introductory knowledge of Tissue culture and Micro propagation. of some medicinal plants (*Withania somnifera*, neem and tulsi),

Suggested Readings

1. Agarwal, P., Shashi, Alok., Fatima, A. and Verma, A. (2013). Current scenario of Herbal Technology worldwide: An overview. *Int J Pharm Sci Res*; 4(11): 4105-17.
2. Arber, Agnes. (1999). Herbal Plants and Drugs. Mangal Deep Publications, Jaipur.
3. Varzakas, T., Zakyntinos, G, and Francis Verpoort, F. (2016). Plant Food Residues as a Source of Nutraceuticals and Functional Foods. *Foods* 5 : 88.
4. Aburjai, T. and Natsheh, F.M. (2003). Plants Used in Cosmetics. *Phytotherapy Research* 17 :987-1000.
5. Patri, F. and Silano, V. (2002). Plants in cosmetics: Plants and plant preparations used as ingredients for cosmetic products - Volume 1. ISBN 978-92-871-8474-0, pp 218.
6. AYUSH (www.indianmedicine.nic.in). *About the systems—An overview of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy*. New Delhi: Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH), Ministry and Family Welfare, Government of India.

7. Evans, W.C. (2009): Trease and Evans PHARMACOGNOSY. 16th Edition, SAUNDERS / Elsevier.
8. Sivarajan, V.V. and India, B. (1994). Ayurvedic Drugs and Their Plant Sources.. *Oxford & IBH Publishing Company*, 1994 - Herbs - 570 pages.
9. Miller, L. and Miller, B. (2017). Ayurveda & Aromatherapy: The Earth Essential Guide to Ancient Wisdom and Modern Healing. *Motilal Banarsidass;; Fourth edition* .
10. Kokate, C.K. (2003). Practical Pharmacognosy. Vallabh Prakashan, Pune.

6. Fermentation Science and Technology

L	T	P	Cr
2	0	0	2

Learning outcomes:

After completing this course the learner will be able to;

- Employ the process for maintenance and preservation of microorganisms
- Analyze the various aspects of the fermentation technology and apply for Fermentative production
- Demonstrate proficiency in the experimental techniques for microbial production of enzymes: amylase and protease, bio product recover

Keywords:

Microbial culture, Fermentation, Metabolites, Fermented products, Enzyme production, Bioproduct recovery

Unit I

8 lectures

Preparation of microbial culture, Preparation and sterilization of fermentation media. Isolation and improvement of industrially important microorganisms.

Unit II

8 lectures

Maintenance and preservation of microorganisms, Metabolic regulations and overproduction of metabolites. Kinetics of microbial growth and product formation.

Unit III

8 lectures

Scope and opportunities of fermentation technology. Principles of fermentation: Submerged, solid state, batch, fed-batch and continuous culture. Fermentative production of vinegar, alcohol (ethanol, wine, beer), acids (citric acid and gluconic acid), amino acids (lysine and glutamic acid) and antibiotics (penicillin and streptomycin).

Unit IV

6 lectures

Microbial production of enzymes: Amylase and Protease. Bioproduct recovery.

Suggested readings

1. Waites M.J. (2008). Industrial Microbiology: An Introduction, 7th Edition, Blackwell Science, London, UK.
2. Prescott S.C., Dunn C.G., Reed G. (1982). Prescott & Dunn's Industrial Microbiology, 4th Edition, AVI Pub. Co., USA.
3. Reed G. (2004). Prescott & Dunn's industrial microbiology, 4th Edition, AVI Pub. Co., USA.
4. JR Casida L.E. (2015). Industrial Microbiology, 3rd Edition, New Age International (P) Limited Publishers, New Delhi, India.
5. Waites M.J., Morgan N.L., Rockey J.S. and Highton G. (2001) Industrial Microbiology: An Introduction. 1st Edition, Blackwell Science, London, UK.
6. Pelczar M.J., Chan E.C.S. and Krieg N.R. (2003) Microbiology. 5th Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.

7. Environmental impact analysis (Practical based)

L	T	P	Cr
2	0	0	2

Learning outcomes:

After completing this course the learner will be able to;

- Have critical understanding of environmental impact
- Learn important steps of EIA process
- Interpret the environmental appraisal and procedures in India.

Keywords:

Environmental management, Environmental impact assessment, Project proponent, Consultant, Environmental audit, Risk assessment, Legislation

Unit I: Origin and Development

8 lectures

Purpose and aim, core values and principles, History of EIA development, Environmental Management Plan, Environmental Impact Statement, Scope of EIA in Project planning and Implementation.

Unit II: EIA Process

8 lectures

Components of EIA, EIA Methodology- Screening, Scoping, Baseline data, Impact Identification, Prediction, Evaluation and Mitigation, Appendices and Forms of Application, Techniques of Assessment-Cost-benefit Analysis, Matrices, Checklist, Overlays, Impact on Environmental component: air, noise, water, land, biological, social and environmental factors. EIA Document.

Unit III: Main participants in EIA Process

7 lectures

Role of Project proponent, environmental consultant, PCBs, PCCs, public and IAA. Public participation.

Unit IV: Environmental Appraisal and Procedures in India and EIA

7 lectures

Methodology, indicators and mitigation, Environmental Audit of different environmental resources, Risk Analysis, Strategic environmental assessment, ecological impact assessment: legislation.

Practical

1. Prepare a Matrix of every environmental existing resource of your college or your hostel/mohalla or any defined area and evaluate each component using established methods and make audit analysis
2. Prepare a case report of Environmental impact of any area under development

Suggested readings:

1. Kulkarni V and Ramachandra TV, (2006). Environmental Management, Capital Pub. Co. New Delhi.
2. Petts, J. (2005) Handbook of Environmental Impact Assessment- Volume 1 and 2. Blackwell Publishers, UK.
3. Glasson, J. Therivel, R. and Chadwick, (2006) A. Introduction to Environmental Impact Assessment. Routledge, London..
4. Canter, W. L. (1995) Environmental Impact Assessment, McGraw-Hill Science/ Engineering/ Math, New York;
5. Morris, P. and Therivel, R. (1995) Methods of Environmental Impact Assessment, UCL Press, London;
6. Petts, J. (1999) (ed) Handbook of Environmental Impact Assessment, volume 1 and 2, Blackwell Science, Oxford;
7. Therivel, R. and Partidario, M. R. (1996) (eds) The Practice of Strategic Environmental Assessment, Earthscan, London;
8. Vanclay, F. and Bronstein, D. A. (1995) (eds) Environmental and Social Impact Assessment, Wiley & Sons, Chichester

8. Skill Enhancement Course: IT skills for chemists

L	T	P	Cr
2	0	0	2

1. IT Skills for Chemists

Fundamentals, mathematical functions, polynomial expressions, logarithms, the exponential function, units of a measurement, inter-conversion of units, constants and variables, equation of a straight line, plotting graphs.

Uncertainty in experimental techniques: Displaying uncertainties, measurements in chemistry, decimal places, significant figures, combining quantities. Uncertainty in measurement: types of uncertainties, combining uncertainties. Statistical treatment. Mean, standard deviation, relative error. Data reduction and the propagation of errors. Graphical and numerical data reduction. Numerical curve fitting: the method of least squares (regression). Algebraic operations on real scalar variables (e.g. manipulation of van der Waals equation in different forms). Roots of quadratic equations analytically and iteratively (e.g. pH of a weak acid). Numerical methods of finding roots (Newton-Raphson, binary –bisection, e.g. pH of a weak acid not ignoring the ionization of water, volume of a van der Waals gas, equilibrium constant expressions).

Differential calculus: The tangent line and the derivative of a function, numerical differentiation (e.g., change in pressure for small change in volume of a van der Waals gas, potentiometric titrations). Numerical integration (Trapezoidal and Simpson's rule, e.g. entropy/enthalpy change from heat capacity data).

Computer programming:

Constants, variables, bits, bytes, binary and ASCII formats, arithmetic expressions, hierarchy of operations, inbuilt functions. Elements of the BASIC language. BASIC keywords and commands. Logical and relative operators. Strings and graphics. Compiled versus interpreted languages. Debugging. Simple programs using these concepts. Matrix addition and multiplication. Statistical analysis.

BASIC/FORTRAN programs for curve fitting, numerical differentiation and integration (Trapezoidal rule, Simpson's rule), finding roots (quadratic formula, iterative, Newton-Raphson method).

Recommended books/References:

1. McQuarrie, D. A. Mathematics for Physical Chemistry University Science Books (2008).
2. Mortimer, R. Mathematics for Physical Chemistry. 3rd Ed. Elsevier (2005).
3. Steiner, E. The Chemical Maths Book Oxford University Press (1996).
4. Yates, P. Chemical calculations. 2nd Ed. CRC Press (2007).
5. Harris, D. C. Quantitative Chemical Analysis. 6th Ed., Freeman (2007) Chapters 3-5.
6. Levie, R. de, How to use Excel in analytical chemistry and in general scientific data analysis, Cambridge Univ. Press (2001) 487 pages.
7. Noggle, J. H. Physical chemistry on a Microcomputer. Little Brown & Co. (1985).
8. Venit, S.M. Programming in BASIC: Problem solving with structure and style. Jaico Publishing House: Delhi (1996).

9. Intellectual property right (IPR) and business skills for chemists

L	T	P	Cr
2	0	0	2

Introduction to Intellectual Property:

Historical Perspective, Different Types of IP, Importance of protecting IP.

Copyrights

Introduction, How to obtain, Differences from Patents.

Trade Marks

Introduction, How to obtain, Different types of marks – Collective marks, certification marks, service marks, Trade names, etc. Differences from Designs.

Patents Historical Perspective, Basic and associated right, WIPO, PCT system, Traditional Knowledge, Patents and Healthcare – balancing promoting innovation with public health, Software patents and their importance for India.

Geographical Indications

Definition, rules for registration, prevention of illegal exploitation, importance to India.

Industrial Designs

Definition, How to obtain, features, International design registration.

Layout design of integrated circuits

Circuit Boards, Integrated Chips, Importance for electronic industry.

Trade Secrets

Introduction, Historical Perspectives, Scope of Protection, Risks involved and legal aspects of Trade Secret Protection.

Different International agreements

(a) World Trade Organization (WTO):

(i) General Agreement on Tariffs & Trade (GATT), Trade Related Intellectual Property Rights (TRIPS) agreement (ii) General Agreement on Trade related Services (GATS) (iii) Madrid Protocol (iv) Berne Convention (v) Budapest Treaty

(b) Paris Convention

WIPO and TRIPS, IPR and Plant Breeders Rights, IPR and Biodiversity

IP Infringement issue and enforcement – Role of Judiciary, Role of law enforcement agencies – Police, Customs etc. Economic Value of Intellectual Property – Intangible assets and their valuation, Intellectual Property in the Indian Context – Various laws in India Licensing and technology transfer.

Business Basics

Key business concepts: Business plans, market need, project management and routes to market.

Chemistry in Industry

Current challenges and opportunities for the chemistry-using industries, role of chemistry in India and global economies.

Financial aspects

Financial aspects of business with case studies.

Recommended Books/References:

1. Acharya, N.K. Textbook on intellectual property rights, Asia Law House (2001).
2. Guru, M. & Rao, M.B. Understanding Trips: Managing Knowledge in Developing Countries, Sage Publications (2003).
3. Ganguli, P. Intellectual Property Rights: Unleashing the Knowledge Economy, Tata McGraw-Hill (2001).
4. Miller, A.R. & Davis, M.H. Intellectual Property: Patents, Trademarks and Copyright in a Nutshell, West Group Publishers (2000).
5. Watal, J. Intellectual property rights in the WTO and developing countries, Oxford University Press, New Delhi.

10. Analytical Clinical Biochemistry

L	T	P	Cr
2	0	0	2

Structure, properties and functions of carbohydrates, lipids and proteins:

Carbohydrates: Biological importance of carbohydrates, Metabolism, Cellular currency of energy (ATP), Glycolysis, Alcoholic and Lactic acid fermentations, Krebs cycle. Isolation and characterization of polysaccharides.

Proteins: Classification, biological importance; Primary and secondary and tertiary structures of proteins: α -helix and β -pleated sheets, Isolation, characterization, denaturation of proteins.

Enzymes: Nomenclature, Characteristics (mention of Ribozymes), Classification; Active site, Mechanism of enzyme action, Stereospecificity of enzymes, Coenzymes and cofactors, Enzyme inhibitors, Introduction to Biocatalysis: Importance in “Green Chemistry” and Chemical Industry.

Lipids: Classification. Biological importance of triglycerides and phosphoglycerides and cholesterol; Lipid membrane, Liposomes and their biological functions and underlying applications. Lipoproteins: Properties, functions and biochemical functions of steroid hormones.

Biochemistry of peptide hormones.

Structure of DNA (Watson-Crick model) and RNA, Genetic Code, Biological roles of DNA and RNA: Replication, Transcription and Translation, Introduction to Gene therapy. *Enzymes:* Nomenclature, classification, effect of pH, temperature on enzyme activity, enzyme inhibition.

A diagnostic approach to biochemistry:

Blood: Composition and functions of blood, blood coagulation. Blood collection and preservation of samples. Anaemia, Regulation, estimation and interpretation of data for blood sugar, urea, creatinine, cholesterol and bilirubin.

Urine: Collection and preservation of samples. 6. Formation of urine. Composition and estimation of constituents of normal and pathological urine.

Recommended books/references:

1. Cooper, T.G. *Tool of Biochemistry*. Wiley-Blackwell (1977).
2. Wilson, K. & Walker, J. *Practical Biochemistry*. Cambridge University Press (2009).
3. Varley, H., Gowenlock, A.H & Bell, M.: *Practical Clinical Biochemistry*, Heinemann, London (1980).
4. Devlin, T.M., *Textbook of Biochemistry with Clinical Correlations*, John Wiley & Sons, 2010.

5. Berg, J.M., Tymoczko, J.L. & Stryer, L. *Biochemistry*, W.H. Freeman, 2002.
6. Talwar, G.P. & Srivastava, M. *Textbook of Biochemistry and Human Biology*, 3rd Ed. PHI Learning.
7. Nelson, D.L. & Cox, M.M. *Lehninger Principles of Biochemistry*, W.H. Freeman, 2013.
8. O. Mikes, R.A. Chalmers: *Laboratory Handbook of Chromatographic Methods*, D. Van Nostrand & Co., 1961.

Analytical Clinical Biochemistry Practical

Identification and estimation of the following:

1. Carbohydrates – qualitative and quantitative.
2. Lipids – qualitative.
5. Determination of cholesterol using Liebermann- Burchard reaction.
6. Proteins – qualitative.
7. Isolation of protein.
8. Determination of protein by the Biuret reaction.
9. Determination of nucleic acids.

(visit to clinical laboratory/medical centre(s))

Recommended Books/References:

1. Cooper, T.G. *Tool of Biochemistry*. Wiley-Blackwell (1977).
2. Wilson, K. & Walker, J. *Practical Biochemistry*. Cambridge University Press (2009).
3. Varley, H., Gowenlock, A.H & Bell, M.: *Practical Clinical Biochemistry*, Heinemann, London (1980).
4. Devlin, T.M., *Textbook of Biochemistry with Clinical Correlations*, John Wiley & Sons, 2010.
5. Berg, J.M., Tymoczko, J.L. & Stryer, L. *Biochemistry*, W.H. Freeman, 2002.
6. Talwar, G.P. & Srivastava, M. *Textbook of Biochemistry and Human Biology*, 3rd Ed. PHI Learning.
7. Nelson, D.L. & Cox, M.M. *Lehninger Principles of Biochemistry*, W.H. Freeman, 2013.
8. O. Mikes, R.A. Chalmers: *Laboratory Handbook of Chromatographic Methods*, D. Van Nostrand & Co., 1961.

11. Mushroom Culture Technology

L	T	P	Cr
2	0	0	2

Learning outcomes:

On completion of this course, the students will be able to:

- Recall various types and categories of mushrooms.
- Demonstrate various types of mushroom cultivating technologies.
- Examine various types of food technologies associated with mushroom industry.
- Value the economic factors associated with mushroom cultivation
- Device new methods and strategies to contribute to mushroom production.

Keywords:

Edible mushrooms, Poisonous mushrooms, Cultivation technology, Mushroom bed, Mushroom unit, Storage and Nutrition

Unit I

7 lectures

Introduction, History. Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms. Types of edible mushrooms available in India - *Volvariella volvacea*, *Pleurotus citrinopileatus*, *Agaricus bisporus*.

Unit II

9 lectures

Cultivation Technology : Infrastructure: substrates (locally available) Polythene bag, vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Pure culture: Medium, sterilization, preparations of spawn, multiplication. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroom bed preparation- Low cost technology, Composting technology in mushroom production.

Unit III

7 lectures

Storage and nutrition: Short-term storage (Refrigeration – up to 24 hours) Long term Storage (canning, pickles, papads), drying, storage in salt solutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content - Vitamins.

Unit IV

7 lectures

Food Preparation: Types of foods prepared from mushroom. Research Centres - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.

Suggested Readings

1. Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R (1991) Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
2. Swaminathan, M. (1990) Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
3. Tewari, Pankaj and Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi.
4. Nita Bahl (1984-1988) Hand book of Mushrooms, II Edition, Vol. I & Vol. II.

(The above mentioned courses are indicative. Based on the facilities/expertise available, more similar courses can be introduced. The list of courses offered/recommended by UGC may also be considered/referred to while designing new courses/incorporating revision in the courses. References/Text books may be incorporated as per requirements/necessities of the subject concerned).

**Learning Outcomes based Curriculum Framework
(LOCF)
for
Computer Science
Undergraduate B.Sc./B.Sc.(Hons) Programmes
2020**



**UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002**

Table of Contents

Preamble	3-4
1. Introduction	5
2. Curriculum Planning- Learning Outcomes-based Approach	8
2.1 Nature and Extent of the B.Sc/B.Sc. (Hons.) Programme	8
2.2 Types of Courses	9
2.2.1 Core Course (CC)	9
2.2.2 Electives	10
2.2.3 Discipline Specific Elective (DSE)	10
2.2.4 Generic Elective (GE)	10
2.2.5 Dissertation/Project	11
2.2.6 Ability Enhancement Courses (AEC)	11
2.2.7 Practical/Tutorial	12
2.3 Aims of Bachelor of Science Programmes in Computer Science	12
3. Graduate Attributes	13
4. Qualification Descriptors	17
4.1. Qualification Descriptor for B.Sc. with CS	17
4.2. Qualification Descriptors for BSc(Hons) in Computer Science	18
5. Programme Learning Outcomes	19
5.1. Programme Learning Outcomes for BSc with CS	19
5.2. Additional PLOs for B.Sc. (Hons) in CS	19
6. Course Structures	21
6.1 Structure of B.Sc. with CS	21
6.2 Course Structure of B.Sc (Hons) in Computer Science	22
6.3 Course Learning Outcomes, Contents, References	28
7. Curriculum Alignment Matrix	80
8. Teaching-Learning Process	84
9. Assessment Methods	86
10. Keywords	89

Preamble

Education is the key to development of any society. Role of higher education is crucial for securing right kind of employment and also to pursue further studies in best available world class institutes elsewhere within and outside India. Quality education in general and higher education in particular deserves high priority to enable the young and future generation of students to acquire skill, training and knowledge in order to enhance their thinking, creativity, comprehension and application abilities and prepare them to compete, succeed and excel globally. Sustained initiatives are required to reform the present higher education system for improving and upgrading the academic resources and learning environments by raising the quality of teaching and standards of achievements in learning outcomes across all undergraduate programs in science, humanities, commerce and professional streams of higher education including computer science. One of the significant reforms in the undergraduate education is to introduce the Learning Outcomes-based Curriculum Framework (LOCF) which makes it student-centric, interactive and outcome-oriented with well-defined aims, objectives and goals to achieve. LOCF also aims at ensuring uniform education standard and content delivery across the country which will help the students to ensure similar quality of education irrespective of the institute and location. With initiatives of University Grants Commission (UGC) for nation-wide adoption and implementation of the LOCF for bachelor's programmes in colleges, universities and HEIs in general. A Core Expert Committee (CEC) was constituted to formulate the modalities for developing the LOCF in various subjects being taught in the undergraduate courses in sciences, humanities, commerce and professional courses. The CEC also constituted the Subject Expert Committees (SEC) in various subjects to prepare detailed guidelines for the LOCF in subjects concerned.

The Learning Outcomes (LO) specified by the CEC are the guidelines to determine the structure of the undergraduate programs to be offered by the Higher Educational Institutions (HEI) of our country. The key components of the planning and development of LOCF are given in terms of clear and unambiguous description of the Graduate Attributes (GA), Qualification Descriptors (QD), Program Learning Outcomes (PLO) and Course Learning Outcomes (CLO) to be achieved at the end of the successful completion of each undergraduate program to be offered by HEIs. In undergraduate education in Computer Science, there are two programmes of study leading to the degree of B.Sc. with Computer Science and B.Sc(Hons) in Computer Science. Several meetings were held by the SEC to formulate the framework for both undergraduate programmes. In the first meeting of the Committee, held in UGC on ..., the Chairman of SEC briefed the

members about the decisions taken in the meeting of chairpersons of all SECs with the members of CEC and officers of UGC. He appraised the members the task at hand and the modalities to prepare the report were elucidated. The topics were allocated to each member keeping in mind the members' expertise and interests. It was proposed that the prepared notes shall be circulated among all members for feedback in the first instance. The committee after getting first set of inputs met again at University of Hyderabad on October 8, 2018 where different course outcomes, course objectives, learning outcomes, core structures of the programme were discussed. Chairman also informed that UGC also wants detailed syllabus of each course. Accordingly, each member was advised to prepare the syllabus along with textbooks, reference books and circulate among the members for inputs. Subsequently, in another meeting again held at University of Hyderabad, the detailed syllabus was discussed and finalized incorporating the suggestions of members. The Qualification Descriptors (QD), Program Learning Outcomes (PLO) and the Course Learning Outcomes (CLO) were also finalized keeping the broad requirement of the programme in view. The LOCF also gives general guidelines for the Teaching Learning Process (TLP) corresponding to each component of theory, experiment, tutorials, projects and industrial / field visits to be followed in order to achieve the stated outcomes for each component. Finally, some suggestions for using various methods in the assessment and evaluation of learning levels of students are also made.

The main objective of this whole exercise is to prepare a comprehensive course structure with detailed syllabus along with quality reading material in order to have a uniform standard of education in undergraduate Computer Science programme in the country. This document shall serve as a model document across the higher education institutes (HEIs) in the country for teachers, students and academic administrators. It is a student centric framework where they are expected to learn fundamentals of computer science along with the latest trends and techniques like Artificial Intelligence, Internet of Things, Machine Intelligence alongwith advanced skillsets that include Mobile Application Development, Object Oriented Programming among many other courses.

We sincerely hope that our sincere effort in this endeavor will help the students to be equipped with fundamental as well as advanced and latest technologies in computer science after completion of the programme irrespective of the location and institute across the length and breadth of the country. This will also prepare to opt for higher education in top notch universities and institutes within and outside India. We thank UGC and other experts who contributed in our endeavor.

1. Introduction

Computer Science (CS) has been evolving as an important branch of science and engineering throughout the world in last couple of decades and it has carved out a space for itself like any other disciplines of basic science and engineering. Computer science is a discipline that spans theory and practice and it requires thinking both in abstract terms and in concrete terms. Nowadays, practically everyone is a computer user, and many people are even computer programmers. Computer Science can be seen on a higher level, as a science of problem solving and problem solving requires precision, creativity, and careful reasoning. The ever-evolving discipline of computer science also has strong connections to other disciplines. Many problems in science, engineering, health care, business, and other areas can be solved effectively with computers, but finding a solution requires both computer science expertise and knowledge of the particular application domain.

Computer science has a wide range of specialties. These include Computer Architecture, Software Systems, Graphics, Artificial Intelligence, Computational Science, and Software Engineering. Drawing from a common core of computer science knowledge, each specialty area focuses on specific challenges. Computer Science is practised by mathematicians, scientists and engineers. Mathematics, the origins of Computer Science, provides reason and logic. Science provides the methodology for learning and refinement. Engineering provides the techniques for building hardware and software.

Universities and other HEIs introduced programmes of studies in computer science as this discipline evolved itself to a multidisciplinary discipline. Information Technology is growing rapidly. Increasing applications of computers in almost all areas of human endeavour has led to vibrant industries with concurrent rapid change in technology. Unlike other basic disciplines, developing core competency in this discipline that can be reasonably stable becomes a challenge. In India, it was initially introduced at the Master (postgraduate) level as MCA and M.Tech. Later on, engineering programmes such as B.Tech and B.E in Computer Science & Engineering and in Information Technology were introduced in various engineering College/Institutions to cater to the growing demand for trained engineering manpower in IT industries. Parallely, BSc and MSc programmes with specialisation in Computer Science were introduced to train manpower in this

highly demanding area. B.Sc and B.Sc(Hons) in Computer Science are being planned and introduced in different colleges and institutions.

Computer Science education at undergraduate level (+3) will result in earning a Bachelor of Arts (BA) or Bachelor of Science (BS) degree in CS. The coursework required to earn a BSc is equally weighted in mathematics and science. B.Sc with CS and BSc(Hons) in CS are aimed at undergraduate level training facilitating multiple career paths. Students so graduated, can take up postgraduate programmes in CS leading to research as well as R&D, can be employable at IT industries, or can pursue a teachers' training programme such BEd in Computer Education, or can adopt a business management career. BSc with CS aims at laying a strong foundation of CS at an early stage of the career along with two other subjects such as Physics, Maths, Electronics, Statistics etc. There are several employment opportunities and after successful completion of an undergraduate programme in CS, graduating students can fetch employment directly in companies as Web Developer, Software Engineer, Network Administrator, Data Scientist, or AI/ML personnel.

The Learning Outcome-based Curriculum Framework in Computer Science is aimed at allowing flexibility and innovation in design and development of course content, in method of imparting training, in teaching learning process and in assessment procedures of the learning outcomes. The emphasis in computer science courses, in outcome-based curriculum framework, help students learn solving problems, accomplishing IT tasks, and expressing creativity, both individually and collaboratively. The proposed framework will help Students learn programming techniques and the syntax of one or more programming languages.

Many of the learning outcomes of Computer Science can be achieved only by programming a computer for several different meaningful purposes. All students must, therefore, have access to a computer with a modern programming language installed. The computer science framework does not prescribe a specific language. The teacher and students will decide which modern programming languages students will learn. More importantly, students will learn to adapt to changes in programming languages and learn new languages as they are developed.

The present Learning Outcome-based Curriculum Framework for bachelor's degrees in CS is intended to facilitate the students to achieve the following.

- To develop an understanding and knowledge of the basic theory of Computer Science and Information Technology with good foundation on theory, systems and applications such as algorithms, data structures, data handling, data communication and computation.
- To develop the ability to use this knowledge to analyse new situations
- To acquire necessary and state-of-the-art skills to take up industry challenges. The objectives and outcomes are carefully designed to suit to the above-mentioned purpose.
- The ability to synthesize the acquired knowledge, understanding and experience for a better and improved comprehension of the real-life problems
- To learn skills and tools like mathematics, statistics, physics and electronics to find the solution, interpret the results and make predictions for the future developments.

2. Curriculum Planning- Learning Outcomes-based Approach

2.1 Nature and Extent of the B.Sc/B.Sc. (Hons.) Programme

The undergraduate programs in Computer Science builds on science-based education at +2 level. The +2 senior secondary school education aims and achieves a sound grounding in understanding the basic scientific temper with introduction to process of computation by introducing some programming languages. This prepares a young mind to launch a rigorous investigation of exciting world of computer science.

Framing and implementation of curricula and syllabi is envisaged to provide an understanding of the basic connection between theory and experiment and its importance in understanding the foundation of computing. This is very critical in developing a scientific temperament and to venture a career which a wide spectrum of applications as well as theoretical investigations. The undergraduate curriculum provides students with theoretical foundations and practical experience in both hardware and software aspects of computers. The curriculum in computer science is integrated with courses in the sciences and the humanities to offer an education that is broad, yet of enough depth and relevance to enhance student employment opportunities upon graduation. As a Bachelor's degree program, the curriculum is based on the criterion that graduates are expected to function successfully in a professional employment environment immediately upon graduation.

The undergraduate program in Computer Science is presently being offered though the courses designed for granting the following degrees by various colleges and universities in India. All the courses are of 3-year duration spread over six semesters.

- i. B.Sc (Honours) Computer Science
- ii. B.Sc with Computer Science

B. Sc. with Computer Science

B.Sc. or Bachelor of Science with Computer Science is a general multidiscipline bachelor programme. The programme has a balanced emphasis on three science subjects, one of which is computer science. A student studying B.Sc. with Computer Science is required to choose two other subjects from a pool of subjects which include Physics,

Mathematics, Statistics, Electronics, Chemistry. Different institutions offer different choice of combinations of subjects. Most popular combinations are Physics and Mathematics, Physics and Electronics, Mathematics and Electronics, but there are also combinations like Statistics and Economics or Commerce and Economics alongwith Computer Science.

B.Sc.(Hons) in Computer Science

B.Sc. (Hons) in India is generally a three-year degree program which develops advanced theoretical and research skills in subject in which Honours is opted. It is a specialized programme offering specialization in one science subject and another auxiliary science subject. This programme helps in building an advanced professional or academic career. It is an appropriate course for students who wish to pursue a Master of Science (M.Sc) or Doctor of Philosophy (PhD) and a research or academic career. This program facilitates students who wish to pursue an independent research project in an area of interest under the supervision of an academic. B.Sc.(Hons) differs from BSc in the number of courses in the subject in which Honours is opted. Thus BSc(Hons) has more CS courses than that of BSc programme.

B.Sc. with CS and B.Sc. (Hons) in CS follow CBCS structure as mandated by UGC. In accordance with CBCS guidelines the courses are categorized into compulsory courses, elective courses, ability enhancement courses. These categories of courses are discussed below keeping the present context of undergraduate education in CS in mind.

2.2 Types of Courses

2.2.1 Core Course (CC)

A core course is a mandatory course required in degree. **Core course** of study refers to a series or selection of courses that all students are required to complete before they can move on to the next level in their education or earn a diploma. The general educational purpose of a core course of study is to ensure that all students take and complete courses that are academically and culturally essential. These are the courses that teach students the foundational knowledge and skills they will need in securing the specific degree or diploma. The core courses are designed with an aim to cover the basics that is expected of a student to imbibe in that particular

discipline. Thus, a course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. The present document specifies the core courses for B.Sc. The courses (papers, as referred popularly) under this category are going to be taught uniformly across all universities with 30% deviation proposed in the draft. The purpose of fixing core papers is to ensure that all the institutions follow a minimum common curriculum so that each institution/ university adheres to common minimum standard.

2.2.2 Electives

Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course. Different types of elective courses mandated in the present framework are the following.

- Domain Specific Elective (DSE)
- Generic Elective (GE)
- Ability Enhancement Elective (AEEC)

2.2.3 Discipline Specific Elective (DSE)

Elective courses offered under the main discipline/subject of study is referred to as Discipline Specific Elective. The list provided under this category are suggestive in nature and HEI has freedom to suggest its own papers under this category based on their expertise, specialization, requirements, scope and need. The University/Institute may also offer discipline related elective courses of interdisciplinary nature (to be offered by main discipline/subject of study).

2.2.4 Generic Elective (GE)

An elective course chosen from another discipline/subject, with an intention to seek exposure beyond discipline/s of choice is called a Generic Elective. The purpose of this category of papers is to offer the students the option to explore disciplines of interest beyond the choices they make in Core and Discipline Specific Elective papers. The list provided under this category are suggestive in nature and HEI can design its own papers under this category based on available expertise, specialization, and contextual requirements, scope and need.

P.S.: A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.

GE for B.Sc. Honours- ONE auxiliary discipline of interest other than major subject in which Honours is opted from a set of related science disciplines is chosen for the entire 3-year and Generic Elective (GE) are opted one paper for each semester in the chosen discipline only.

2.2.5 Dissertation/Project

An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his/her own with an advisory support by a teacher/faculty member is called dissertation/project.

2.2.6 Ability Enhancement Courses (AEC)

The Ability Enhancement Courses may be of two kinds:

A. Ability Enhancement Compulsory Courses (AECC): AECC are the courses based upon the content that leads to knowledge enhancement. These are mandatory for all disciplines. Ability Enhancement Compulsory Courses (AECC) are the following.

- AECC-I English
- AECC-II English/Hindi/ MIL Communications
- AECC-III Environment Science

B. Skill Enhancement Courses (SEC): SEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc. SEC are at least 2 courses for Honours courses and 4 courses for General bachelor programmes. These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge and should contain both theory and lab/hands-on/training/field work. The main purpose of these courses is to provide students life-skills in hands-on mode to increase their employability. The list provided under this category are suggestive in nature and each university has freedom to suggest their own papers under this category based on their expertise, specialization, requirements, scope and need.

2.2.7 Practical/Tutorial

For each core course and DSE course there will be one practical. The list of practical provided is suggestive in nature and each university has the freedom to add/subtract/edit practical from the list depending on their faculty and infrastructure available. Addition will however be of similar nature.

2.3 Aims of Bachelor of Science Programmes in Computer Science

The Bachelor of Science degree in Computer Science emphasizes problem solving in the context of algorithm development and software implementation and prepares students for effectively using modern computer systems in various applications. The curriculum provides required computer science courses such as programming languages, data structures, computer architecture and organization, algorithms, database systems, operating systems, and software engineering; as well as elective courses in artificial intelligence, computer-based communication networks, distributed computing, information security, graphics, human-computer interaction, multimedia, scientific computing, web technology, and other current topics in computer science. The main aim of this Bachelor's degree is to deliver a modern curriculum that will equip graduates with strong theoretical and practical backgrounds to enable them to excel in the workplace and to be lifelong learners. The purpose of the BS programs in computer science are twofold: (1) to prepare the student for a position involving the design, development and implementation of computer software/hardware, and (2) to prepare the student for entry into a program of postgraduate study in computer science/engineering and related fields.

The Bachelor of Science program with Computer Science as one subject (BSc with CS) and the Bachelor of Science Honours programme in Computer Science (BSc(Hons) in CS) focus on the concepts and techniques used in the design and development of software systems. Students in this program explore the conceptual underpinnings of Computer Science -- its fundamental algorithms, programming languages, operating systems, and software engineering techniques. In addition, students choose from a rich set of electives that includes data science, computer graphics, artificial intelligence, database systems, computer architecture, and computer networks, among other topics. A generous allotment of free electives allows students to combine study in computer science with study in auxiliary fields to formulate a program that combines experiences across disciplines.

3. Graduate Attributes

Graduate Attributes (GA) are the qualities, skills and understandings that students should develop during their time with the HEI. These are qualities that also prepare graduates as agents of social good in future. Graduate Attributes can be viewed as qualities in following subcategories.

- Knowledge of the discipline
- Creativity
- Intellectual Rigour
- Problem Solving and Design
- Ethical Practices
- Lifelong Learning
- Communication and Social Skills

Among these attributes, categories attributes under *Knowledge of the Discipline* are specific to a programme of study.

3.1.a. Knowledge of Discipline of CS

Knowledge of a discipline is defined as "command of a discipline to enable a smooth transition and contribution to professional and community settings. This Graduate Attribute describes the capability of demonstrating comprehensive and considered knowledge of a discipline. It enables students to evaluate and utilise information and apply their disciplinary knowledge and their professional skills in the workplace.

3.1.b. Creativity

Creativity is a skill that underpins most activities, although this may be less obvious in some disciplines. Students are required to apply imaginative and reflective thinking to their studies. Students are encouraged to look at the design or issue through differing and novel perspectives. Creativity allows the possibility of a powerful shift in outlook and enables students to be open to thinking about different concepts and ideas.

3.1.c. Intellectual Rigour

Intellectual Rigour is the commitment to excellence in all scholarly and intellectual activities, including critical judgement. The students are expected in having clarity in thinking. This capability involves engaging constructively and methodically when exploring ideas, theories and philosophies. It also relates to the ability to analyse and construct knowledge with depth, insight and intellectual maturity.

3.1.d. Problem Solving and Design

Problem solving skills empower students not only within the context of their programmes, but also in their personal and professional lives. Many employers cite good problem

solving skills as a desired attribute that they would like graduates to bring to the workplace. With an ability to seek out and identify problems, effective problem solvers are able to actively engage with a situation, think creatively, to consider different perspectives to address identified challenge, to try out possible solutions and subsequently evaluate results as a way to make decisions. Through this process they can consolidate new and emergent knowledge and develop a deeper understanding of their subject discipline.

3.1.e. Ethical Practices

Ethical practice is a key component of professionalism and needs to be instilled in curricula across courses. When operating ethically, graduates are aware that we live in a diverse society with many competing points of view. Ethical behaviour involves tolerance and responsibility. It includes being open-minded about cultural diversity, linguistic difference, and the complex nature of our world. It also means behaving appropriately towards colleagues and the community and being sensitive to local and global social justice issues.

3.1.f. Life-Long Learning

The skill of being a lifelong learner means a graduate is open, curious, willing to investigate, and consider new knowledge and ways of thinking. This flexibility of mind means they are always amenable to new ideas and actively seek out new ways of learning or understanding the world.

3.1.g. Communication and Social Skills

The ability to communicate clearly and to work well in a team setting is critical to sustained and successful employment. Good communication and social skills involve the ability to listen to, as well as clearly express, information back to others in a variety of ways - oral, written, and visual - using a range of technologies.

3.1.h. Self-Management

Graduates must have capabilities for self-organisation, self-review, personal development and life-long learning.

3.2 LIST OF GRADUATE ATTRIBUTES for B.Sc. and B.Sc.(Hons)

Afore-mentioned GAs can be summarized in the following manner.

GA 1. A commitment to excellence in all scholarly and intellectual activities, including critical judgement

GA 2. Ability to think carefully, deeply and with rigour when faced with new knowledge and arguments.

- GA 3. Ability to engage constructively and methodically when exploring ideas, theories and philosophies
- GA 4. Ability to consider other points of view and make a thoughtful argument
- GA 5. Ability to develop creative and effective responses to intellectual, professional and social challenges
- GA 6. Ability to apply imaginative and reflective thinking to their studies
- GA 7. Commitment to sustainability and high ethical standards in social and professional practices.
- GA 8. To be open-minded about cultural diversity, linguistic difference, and the complex nature of our world
- GA 9. Ability to be responsive to change, to be inquiring and reflective in practice, through information literacy and autonomous, self-managed learning.
- GA 10. Ability to communicate and collaborate with individuals, and within teams, in professional and community settings
- GA 11. Ability to communicates effectively, comprehending and writing effective reports and design documentation, summarizing information, making effective oral presentations and giving and receiving clear oral instructions
- GA 12. Ability to demonstrates competence in the practical art of computing in by showing in design an understanding of the practical methods, and using modern design tools competently for complex real-life IT problems
- GA 13. Ability to use a range of programming languages and tools to develop computer programs and systems that are effective solutions to problems.
- GA 14. Ability to understand, design, and analyse precise specifications of algorithms, procedures, and interaction behaviour.
- GA 15. Ability to apply mathematics, logic, and statistics to the design, development, and analysis of software systems
- GA 16. Ability to be equipped with a range of fundamental principles of Computer Science that will provide the basis for future learning and enable them to adapt to the constant rapid development of the field.
- GA 17. Ability of working in teams to build software systems.
- GA 18. Ability to identify and to apply relevant problem-solving methodologies

- GA 19. Ability to design components, systems and/or processes to meet required specifications
- GA 20. Ability to synthesise alternative/innovative solutions, concepts and procedures
- GA 21. Ability to apply decision making methodologies to evaluate solutions for efficiency, effectiveness and sustainability
- GA 22. A capacity for self-reflection and a willingness to engage in self-appraisal
- GA 23. Open to objective and constructive feedback from supervisors and peers
- GA 24. Able to negotiate difficult social situations, defuse conflict and engage positively in purposeful debate.

4. Qualification Descriptors

Qualification descriptors are generic statements of the outcomes of study. Qualification descriptors are in two parts. The first part is a statement of outcomes, achievement of which a student should be able to demonstrate for the award of the qualification. This part will be of interest to those designing, approving and reviewing academic programmes. They will need to be satisfied that, for any programme, the curriculum and assessments provide all students with the opportunity to achieve, and to demonstrate achievement of, the outcomes. The second part is a statement of the wider abilities that the typical student could be expected to have developed. It will be of assistance to employers and others with an interest in the general capabilities of holders of the qualification. The framework has the flexibility to accommodate diversity and innovation, and to accommodate new qualifications as the need for them arises. It should be regarded as a framework, not as a straitjacket.

4.1. Qualification Descriptor for B.Sc. with CS

On completion of B.Sc. with Computer Science, the expected learning outcomes that a student should be able to demonstrate are the following.

- QD-1.** Fundamental understanding of the principles of Computer Science and its connections with other disciplines
- QD-2.** Procedural knowledge that creates different types of professionals related to Computer Science, including research and development, teaching and industry, government and public service;
- QD-3.** Skills and tools in areas related to computer science and current developments in the academic field of study.
- QD-4.** Use knowledge, understanding and skills required for identifying problems and issues, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources, and their application, analysis and evaluation using methodologies as appropriate to Computer Science for formulating solutions
- QD-5.** Communicate the results of studies undertaken in Computer Science accurately in a range of different contexts using the main concepts, constructs and techniques
- QD-6.** Meet one's own learning needs, drawing on a range of current research and development work and professional materials
- QD-7.** Apply Computer Science knowledge and transferable skills to new/unfamiliar contexts,
- QD-8.** Demonstrate subject-related and transferable skills that are relevant to industry and employment opportunities.

4.2. Qualification Descriptors for BSc(Hons) in Computer Science

On completion of B.Sc (Hons) in Computer Science, the expected learning outcomes that a student should be able to demonstrate

- QD-Hons 1.** A systematic, extensive and coherent knowledge and understanding of the field of computer science as a whole and its applications, and links to related disciplinary areas; including a critical understanding of the established theories, principles and concepts, and of a number of advanced and emerging issues in the field of Computer Science
- QD-Hons 2.** Procedural knowledge that creates different types of professionals related to Computer Science, including research and development, teaching industry and government and public service;
- QD-Hons 3.** Skills in areas related to computer science and usage of tools and current developments, including a critical understanding of the latest developments in the area, and an ability to use established techniques of analysis and enquiry within the area of Computer Science.
- QD-Hons 4.** Demonstrate comprehensive knowledge, including current research, scholarly, and/or professional literature, relating to essential and advanced learning areas pertaining to the chosen disciplinary areas (s) and field of study, and techniques and skills required for identifying problems and issues relating to the disciplinary area and field of study.
- QD-Hons 5.** Demonstrate skills in identifying information needs, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources, effective analysis and interpretation of data
- QD-Hons 6.** Use knowledge, understanding and skills for critical assessment of a wide range of ideas and complex problems and issues relating to the chosen field of study.
- QD-Hons 7.** Communicate the results of studies accurately in a range of different contexts using the main concepts, constructs and techniques of the subject(s) of study;
- QD-Hons 8.** Address one's own learning needs relating to current and emerging areas of study, making use of research, development and professional materials as appropriate
- QD-Hons 9.** Apply one's disciplinary knowledge and transferable skills to new/unfamiliar contexts and to identify and analyse problems and issues and seek solutions to real-life problems.

QD-Hons 10. Demonstrate subject-related and transferable skills that are relevant to industry and employment opportunities.

5. Programme Learning Outcomes

These outcomes describe what students are expected to know and be able to do by the time of graduation. They relate to the skills, knowledge, and behaviours that students acquire in their graduation through the program

5.1. Programme Learning Outcomes for BSc with CS

The Bachelor of Science with Computer Science (BSc with CS) program enables students to attain, by the time of graduation:

- PLO-A. Demonstrate the aptitude of Computer Programming and Computer based problem solving skills.
- PLO-B. Display the knowledge of appropriate theory, practices and tools for the specification, design, implementation
- PLO-C. Ability to learn and acquire knowledge through online courses available at different MOOC Providers.
- PLO-D. Ability to link knowledge of Computer Science with other two chosen auxiliary disciplines of study.
- PLO-E. Display ethical code of conduct in usage of Internet and Cyber systems.
- PLO-F. Ability to pursue higher studies of specialization and to take up technical employment.
- PLO-G. Ability to formulate, to model, to design solutions, procedure and to use software tools to solve real world problems and evaluate .
- PLO-H. Ability to operate, manage, deploy, configure computer network, hardware, software operation of an organization.
- PLO-I. Ability to present result using different presentation tools.
- PLO-J. Ability to appreciate emerging technologies and tools.

5.2. Additional PLOs for B.Sc. (Hons) in CS

The Bachelor of Science Honours in Computer Science (B.Sc. (Hons) in CS) program enables students to attain following additional attributes besides the afore-mentioned attributes, by the time of graduation:

- PLO-K. Apply standard Software Engineering practices and strategies in real-time software project development

- PLO-L. Design and develop computer programs/computer -based systems in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics.
- PLO-M. Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems
- PLO-N. The ability to apply the knowledge and understanding noted above to the analysis of a given information handling problem.
- PLO-O. The ability to work independently on a substantial software project and as an effective team member.

6. Course Structures

6.1 Structure of B.Sc. with CS

The B.Sc. programme with CS as one of the subjects consists of 132 credits in accordance with the Choice Based Credit System (CBCS) approved by the UGC with 1 weekly-contact-hour for each credit for theory/tutorials and 2 weekly-contact-hours for each credit of laboratory work.

- 6.1.1. Credit-wise Distribution - Out of 132 credits, 108 credits are equally divided among CS (denoted as A in the following table) and two other auxiliary subjects, denoted as B and C, (36 credits each). 36 credits for each subject are further distributed as 24 credits for Core Compulsory Courses (CC) and 12 credits for Discipline Specific Electives (DSE). There are 8 credits for Ability Enhancement Compulsory Courses. SEC's will have 16 credits.
- 6.1.2. Course-wise Distribution - There are 4 CC courses for each subject (CS and two auxiliary subjects). Each CC course is of 6 credits (4 Theory + 2 Practicum). Similarly, there are 2 DSE papers, each of 6 credits. There are 4 Skill Enhancement Courses (SEC) each of 4 credits with a total of 16 credits. 16 credits of SEC are distributed as 8 credits (2 courses) for subject A (CS) and 4 credits for each of two auxiliary subjects, subjects B and C (one courses for each subject). There are two AECC namely, Environmental Sciences and Languages/ Communications with 4 credits.
- 6.1.3. Semester-wise Distribution – BSc with CS is a 3-Yr programme with 6 semesters. In each semester, there will be 22 credits. For each of first four semesters, there will be 3 CC, one each for subjects A, B and C accounting to 18 credits. Similarly, for semesters 5 and 6, there will be 3 DSE in each semester and one DSE for each of three subjects (a, B and C). Two AECC will be offered in first two semesters. SEC will be offered in semesters 3, 4, 5 and 6 and a student is required to take any one SEC from a pool of options. However, in semesters 3 and 4, SEC for the auxiliary subjects will be offered and in semesters 5 and 6, SEC for CS will be offered.

The scope of the present proposal is to design CS courses. There are 4 CC courses for CS, 2 DSE courses and 2 SEC (CS related elective). A student can take more than 132 credits in total (but not more than 148 credits) to qualify for the grant of the B.Sc. (CS) degree after completing them successfully as per rules and regulations of the HEI.

Table I presents the structure in a schematic form. Table II gives details of CS papers in each of different course-categories.

6.2 Course Structure of B.Sc (Hons) in Computer Science

The B.Sc. (Hons) in Computer Science programme consists of 148 credits in accordance with UGC's CBCS with 1 contact-hour per week for each credit for Theory/Tutorial and 2 contact-hour per week for each credit for practical.

6.2.1. Credit-wise Distribution – Out of 148 credits in BSc(Hons) in CS, 84 credits of CC papers in CS, 24 credits of GE papers are devoted to one auxiliary subject, DSE papers are of 24 credits, AECC papers are 8 credits, and SEC papers are of 8 credits.

6.2.2. Course-wise Distribution - In BSc(Hons) in CS, there are 14 core compulsory courses (CC) in CS subjects, each of 6 credits (4+2). There are 4 Discipline Specific Electives (DSE) papers each of 6 (4+2) credits. In addition, there are 2 AEC papers and 2 SEC papers. There are 4 GE papers each of 6 credits. One auxiliary discipline of interest from Mathematics Statistics, Operational Research , Physics, and Electronics for the entire 3-year and Generic Elective (GE) are opted one paper for each semester in the chosen discipline only.

6.2.3. Semester-wise Distribution- Unlike BSC programme, BSc (Hons) programme has uneven distribution of credits in 6 semesters. First two semesters have 22 credits each, third and fourth semesters have 28 credits each and each of fifth and sixth semester has 24 credits.

Table III presents the structure of BSc(Hons) in CS and Table IV lists the CS-specific courses for the programme

.

TABLE I: COURSE STRUCTURE FOR GENERAL B.Sc.

SEMESTER	Compulsory Core Courses (CC) each with 06 credit; 04 Core courses are compulsory for each subject A, B and C	Discipline Specific Elective (DSE) A- for CS; B and C are other subjects	Ability Enhancement Compulsory Courses (AECC)	Skill Enhancement Course (SEC) Select any one in each semester of Sem-III and Sem-IV	Total Credit
Sem- I	CC-1A CS		AECC-1		22
	CC- 1B <i>Auxiliary Sub</i>				
	CC- 1C <i>Auxiliary Sub</i>				
Sem-II	CC-2A CS		AECC-2		22
	CC-2B <i>Auxiliary Sub</i>				
	CC- 2C <i>Auxiliary Sub</i>				
Sem-III	CC-3A CS			Any one of the following SEC-1B <i>Auxiliary</i> SEC-1C <i>Auxiliary</i>	22
	CC- 3B: <i>Auxiliary Sub</i>				
	CC- 3C: <i>Auxiliary Sub</i>				
Sem-IV	CC-4A CS			Any one of the following SEC-2B <i>Auxiliary</i> SEC-2C <i>Auxiliary</i>	22
	CC- 4B <i>Auxiliary Sub</i>				
	CC- 4C <i>Auxiliary Sub</i>				
Sem-V		DSE-1A CS		Any one elective of SEC-3A CS	22
		DSE-1B <i>Auxiliary</i>			
		DSE-1C <i>Auxiliary</i>			
Sem- VI		DSE-2A CS		Any one elective of SEC-4A CS	22
		DSE-2B <i>Auxiliary</i>			
		DSE-2C <i>Auxiliary</i>			

TABLE II: CS COURSE DETAILS FOR GENERAL B.Sc. WITH CS

Course-Type	Course-code as referred above	Compulsory/Elective	List of compulsory courses and list of option of elective courses. (A suggestive list)
CC	CC-1A, CC-2A, CC-3A, CC-4A	Compulsory	Programming Methodologies, AND Data Structure, AND Operating Systems, AND DBMS
DSE	DSE 1A	Elective	Software Engineering, OR Computer Ethics OR Computer Organization & Architecture OR Computer Networks
	DSE 2A	Elective	Data Mining OR Internet of Things OR Artificial Intelligence OR Computer Graphics
SEC	SEC 3A	Elective	MATLAB Programming OR, Programming in Java OR Python Programming
	SEC 4A	Elective	Web Programming OR Mobile Application Development OR Cloud Computing
AEC	AECC1, AECC2	Compulsory	Communication in English, Environmental Science

TABLE III: COURSE STRUCTURE FOR B.Sc. (Hons)

SEM	Core Courses (CC) each with 06 credit. All 14 courses are compulsory	Ability Enhancement Compulsory Courses (AECC) Select any 2 (04 credits each)	Skill Enhancement Course (SEC) Select any 4 courses (04 credits each)	Discipline Specific Elective (DSE) Select any 4 courses (06 credits each)	Generic Elective, 4 courses (06 credits each) in 4 semesters on one auxiliary subject	Total Credit
I	CC-1	AEC-1			GEC-1	22
	CC-2					
II	CC-3	AEC-2			GEC-2	22
	CC-4					
III	CC-5		SEC-1		GEC-3	28
	CC-6					
	CC-7					
IV	CC-8		SEC-2		GEC-4	28
	CC-9					
	CC-10					
V	CC-11			DSE-1		24
	CC-12			DSE-2		
VI	CC-13			DSE-3		24
	CC-14			DSE-4		

TABLE IV: CS COURSE DETAILS FOR B.Sc.(HONS) in CS

SEM	Core Courses (CC) each with 06 credit. 14 compulsory courses	Discipline Specific Electives. 4 courses. One from set of courses in a box	Skill Enhancement Courses SEC 2 courses
I	Programming Methodology		
	Computer System Architecture		
II	Data Structure		
	Discrete Structures		
III	Operating System		Any one
	Algorithms		MATLAB Programming, Programming in Java, Python Programming
	Computer Networks		
IV	Software Engineering		Any one
	DBMS		Mobile Application Dev, Web Programming, GIMP(GNU Image Manipulation Program)
	Object Oriented Programming		
V	Internet Technologies	Any two of (suggestive list) Image Processing, Data Analytics, Computer Ethics, System Security, Human Computer Interface,	
	Artificial Intelligence		
VI	Computer Graphics	Any two of (suggestive list) Modelling and Simulation, Theory of Computation, Data Mining, Cloud Computing, Internet of Things , Institutions can add courses	
	Machine Learning		

CS as Generic Elective

For B.Sc. (Hons) programme with Honours in subjects such as Physics, Mathematics, Statistics, Electronics etc, CS can be one of the auxiliary subjects. The following table gives the details CS courses as Generic Elective for BSc(Hons) in other subjects.

TABLE V: CS COURSE DETAILS AS GEC FOR B.Sc.(HONS) in OTHER SUBJECT

SEM	Generic Elective Courses (GEC) each with 06 credit. 4 Courses	
I	GEC-I	Programming Methodology
II	GEC-II	Data Structure OR Discrete Structures
III	GEC-III	Operating System OR Algorithms OR Computer Networks
IV	GEC-IV	Software Engineering OR DBMS OR Object Oriented Programming

6.3 Course Learning Outcomes, Contents, References

PROGRAMMING METHODOLOGY

1. Learn to develop simple algorithms and flow charts to solve a problem.
2. Develop problem solving skills coupled with top down design principles.
3. Learn about the strategies of writing efficient and well-structured computer algorithms/programs.
4. Develop the skills for formulating iterative solutions to a problem.
5. Learn array processing algorithms coupled with iterative methods.
6. Learn text and string processing efficient algorithms.
7. Learn searching techniques and use of pointers.
8. Understand recursive techniques in programming.

SYLLABUS

A. Theory

4 credits

UNIT I. Introduction to Programming, Program Concept, Characteristics of Programming, Stages in Program Development, Algorithms, Notations, Design, Flowcharts, Types of Programming Methodologies, Introduction to C++ Programming - Basic Program Structure In C++, Variables and Assignments, Input and Output, Selection and Repetition Statements.

UNIT II. Top-Down Design, Predefined Functions, Programmer-defined Function, Local Variable, Function Overloading, Functions with Default Arguments, Call-By-Value and Call-By-Reference Parameters, Recursion.

UNIT III. Introduction to Arrays, Declaration and Referring Arrays, Arrays in Memory, Initializing Arrays. Arrays in Functions, Multi-Dimensional Arrays.

UNIT IV. Structures - Member Accessing, Pointers to Structures, Structures and Functions, Arrays of Structures, Unions.

UNIT V. Declaration and Initialization, Reading and Writing Strings, Arrays of Strings, String and Function, Strings and Structure, Standard String Library Functions.

UNIT VI. Searching Algorithms - Linear Search, Binary Search. Use of files for data input and output. merging and copy files.

TEXT AND REFERENCE BOOKS

- Problem Solving and Program Design in C, J. R. Hanly and E. B. Koffman, Pearson, 2015.
- Programming and problem solving with C++: brief edition, N. Dale and C. Weems, Jones & Bartlett Learning, 2010.

B. Practicum**2 Credits**

Given the problem statement, students are required to formulate problem, develop flowchart/algorithm, write code, execute and test it. Students should be given assignments on following :

- a. To learn elementary techniques involving arithmetic operators and mathematical expressions, appropriate use of selection (if, switch, conditional operators) and control structures
- b. Learn how to use functions and parameter passing in functions, writing recursive programs.
2. Write Programs to learn the use of strings and string handling operations.
 - a. Problems which can effectively demonstrate use of Arrays. Structures and Union.
 - b. Write programs using pointers.
 - c. Write programs to use files for data input and output.
 - d. Write programs to implement search algorithms.

COMPUTER SYSTEM ARCHITECTURE

1. To make students understand the basic structure, operation and characteristics of digital computer.
2. To familiarize the students with arithmetic and logic unit as well as the concept of the concept of pipelining.
3. To familiarize the students with hierarchical memory system including cache memories and virtual memory.
4. To make students know the different ways of communicating with I/O devices and standard I/O interfaces.

SYLLABUS

6 credits

UNIT I Fundamentals of Digital Electronics: Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Other Binary Codes, Error Detection Codes, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip-Flops, Sequential Circuits, Registers, Counters, Multiplexer, Demultiplexer, Decoder, Encoder.

UNIT II Register Transfer and Micro operations: Register Transfer Language, Register Transfer, Bus & Memory Transfer, Arithmetic Microoperations, Logic Microoperations, Shift Microoperation.

UNIT III Basic Computer Organization: Instruction codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycles, Memory Reference Instruction, Input - Output & Interrupts, Complete Computer Description & Design of Basic Computer.

UNIT IV Processor and Control Unit: Hardwired vs. Micro programmed Control Unit, General Register Organization, Stack Organization, Instruction Format, Data Transfer & Manipulation, Program Control, RISC, CISC, Pipelining – Pipelined datapath and control – Handling Data hazards & Control hazards.

UNIT V Memory and I/O Systems: Peripheral Devices, I/O Interface, Data Transfer Schemes, Program Control, Interrupt, DMA Transfer, I/O Processor. Memory Hierarchy, Processor vs. Memory Speed, High-Speed Memories, Cache Memory, Associative Memory, Interleave, Virtual Memory, Memory Management.

UNIT VI Parallelism: Instruction-level-parallelism – Parallel processing challenges – Flynn's classification – Hardware multithreading – Multicore processors

TEXT BOOKS

Computer System Architecture, M. Morris Mano, 3rd Edition, Prentice Hall.

Computer Organization and Design, David A. Patterson and John L. Hennessey, Fifth edition, Morgan Kaufman / Elsevier, 2014.

REFERENCE BOOKS

Computer Architecture: A Quantitative Approach, John L. Hennessy, David A. Patterson, 4th Edition.

Computer Organization and Architecture, William Stallings, Prentice Hall.

DATA STRUCTURES

1. To be familiar with fundamental data structures and with the manner in which these data structures can best be implemented; become accustomed to the description of algorithms in both functional and procedural styles
2. To have a knowledge of complexity of basic operations like insert, delete, search on these data structures.
3. Ability to choose a data structure to suitably model any data used in computer applications.
4. Design programs using various data structures including hash tables, Binary and general search trees, heaps, graphs etc.
5. Ability to assess efficiency tradeoffs among different data structure implementations.
6. Implement and know the applications of algorithms for sorting, pattern matching etc.

SYLLABUS

A. Theory

4 credits

UNIT I. Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance analysis, Linear and Non Linear data structures, Singly Linked Lists-Operations, Concatenating, circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations. Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

UNIT II. Stack- Operations, Array and Linked Implementations, Applications- Infix to Postfix Conversion, Postfix Expression Evaluation, Recursion Implementation, Queue- Definition and Operations, Array and Linked Implementations, Circular Queues - Insertion and Deletion Operations, Dequeue (Double Ended Queue).

UNIT III. Trees, Representation of Trees, Binary tree, Properties of Binary Trees, Binary Tree Representations- Array and Linked Representations, Binary Tree Traversals, Threaded Binary Trees, Priority Queue- Implementation, Heap- Definition, Insertion, Deletion.

UNIT IV. Graphs, Graph ADT, Graph Representations, Graph Traversals, Searching, Static Hashing- Introduction, Hash tables, Hash functions, Overflow Handling.

UNIT V. Sorting Methods, Comparison of Sorting Methods, Search Trees- Binary Search Trees, AVL Trees- Definition and Examples.

UNIT VI. Red-Black and Splay Trees, Comparison of Search Trees, Pattern Matching Algorithm- The Knuth-Morris-Pratt Algorithm, Tries (examples).

TEXTBOOKS

- Fundamentals of Data structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson-Freed, Universities Press.

- Data structures and Algorithm Analysis in C, 2nd edition, M. A. Weiss, Pearson.
- Lipschutz: Schaum's outline series Data structures Tata McGraw-Hill

B. Practicum

2 credits

Students are required to write and practically execute programs to solve problem using various data structures. The teacher can suitably device problems which help students experiment using the suitable datastructures and operations. Some of the problems are indicated below.

1. Write program that uses functions to perform the following:
 - a) Creation of list of elements where the size of the list, elements to be inserted and deleted are dynamically given as input.
 - b) Implement the operations, insertion, deletion at a given position in the list and search for an element in the list
 - c) To display the elements in forward / reverse order
2. Write a program that demonstrates the application of stack operations (Eg: infix expression to postfix conversion)
3. Write a program to implement queue data structure and basic operations on it (Insertion, deletion, find length) and code atleast one application using queues.
4. Write a program that uses well defined functions to Create a binary tree of elements and Traverse the a Binary tree in preorder, inorder and postorder,
5. Write program that implements linear and binary search methods of searching for an elements in a list
6. . Write and trace programs to understand the various phases of sorting elements using the methods
 - a) Insertion Sort
 - b) Quicksort
 - c) Bubble sort
7. Write and trace programs to Create a Binary search tree and insert and delete from the tree.
8. Represent suitably a graph data structure and demonstrate operations of travesrals on it.

DISCRETE STRUCTURES

1. Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.
2. Understand the basics of combinatorics, and be able to apply the methods from these subjects in problem solving.
3. Be able to use effectively algebraic techniques to analyse basic discrete structures and algorithms.
4. Understand asymptotic notation, its significance, and be able to use it to analyse asymptotic performance for some basic algorithmic examples.
5. Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.

SYLLABUS

6 credits

UNIT I. Sets: Finite and Infinite Sets, Uncountable Infinite Sets; Functions, Relations, Properties of Binary Relations, Closure, Partial Ordering Relations; Counting - Pigeonhole Principle, Permutation and Combination; Mathematical Induction, Principle of Inclusion and Exclusion.

UNIT II. Growth of Functions: Asymptotic Notations, Summation Formulas and Properties, Bounding Summations, Approximation by Integrals

UNIT III. Recurrences: Recurrence Relations, Generating Functions, Linear Recurrence Relations with Constant Coefficients and their Solution, Substitution Method, Recurrence Trees, Master Theorem

UNIT IV. Graph Theory: Basic Terminology, Models and Types, Multigraphs and Weighted Graphs, Graph Representation, Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph Coloring, Trees, Basic Terminology and Properties of Trees, Introduction to Spanning Trees

UNIT V. Propositional Logic: Logical Connectives, Well-formed Formulas, Tautologies, Equivalences, Inference Theory

REFERENCE BOOKS

- C.L. Liu & Mahopatra, Elements of Discrete mathematics, 2nd Sub Edition 1985, Tata McGraw Hill
- Rosen, Discrete Mathematics and Its Applications, Sixth Edition 2006
- T.H. Cormen, C.E. Leiserson, R. L. Rivest, Introduction to algorithms, Prentice Hall on India (3rd edition 2009)
- M. O. Albertson and J. P. Hutchinson, Discrete Mathematics with Algorithms 1988 John Wiley Publication

OPERATING SYSTEM

1. Describe the important computer system resources and the role of operating system in their management policies and algorithms.
2. To understand various functions, structures and history of operating systems and should be able to specify objectives of modern operating systems and describe how operating systems have evolved over time.
3. Understanding of design issues associated with operating systems.
4. Understand various process management concepts including scheduling, synchronization, and deadlocks.
5. To have a basic knowledge about multithreading.
6. To understand concepts of memory management including virtual memory.
7. To understand issues related to file system interface and implementation, disk management.
8. To understand and identify potential threats to operating systems and the security features design to guard against them.
9. To have sound knowledge of various types of operating systems including Unix and Android.
10. Describe the functions of a contemporary operating system with respect to convenience, efficiency, and the ability to evolve.

SYLLABUS

6 credits

UNIT I. (Introduction to Operating System) What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.

UNIT II. (Operating System Organization and Process Characterization) Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Pre-emptive and Pre-emptive Scheduling Algorithms.

UNIT III. Process Management (Deadlock) Deadlock, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery.

UNIT IV. (Inter Process Communication and Synchronization) Concurrent and Dependent Processes, Critical Section, Semaphores, Methods for Inter-process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer.

UNIT V. (Memory Management) Physical and Virtual Address Space; Memory Allocation Strategies– Fixed and -Variable Partitions, Paging, Segmentation, Virtual Memory.

UNIT VI. (File and I/O Management, OS security) Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Security Policy Mechanism, Protection, Authentication and Internal Access Authorization

UNIT VII. (Introduction to Android Operating System) Introduction to Android Operating System, Android Development Framework, Android Application Architecture, Android Process Management and File System, Small Application Development using Android Development Framework.

REFERENCE BOOKS

- A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
- A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
- G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
- W. Stallings, Operating Systems, Internals & Design Principles 2008 5th Edition, Prentice Hall of India.
- M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

ALGORITHMS

1. To learn good principles of algorithm design;
2. To learn how to analyse algorithms and estimate their worst-case and average-case behaviour (in easy cases);
3. To become familiar with fundamental data structures and with the manner in which these data structures can best be implemented; become accustomed to the description of algorithms in both functional and procedural styles;
4. To learn how to apply their theoretical knowledge in practice (via the practical component of the course).

SYLLABUS

A Theory

4 Credits

UNIT I. Introduction: Basic Design and Analysis Techniques of Algorithms, Correctness of Algorithm. Algorithm Design Techniques: Iterative Techniques, Divide and Conquer, Dynamic Programming, Greedy Algorithms.

UNIT II. Sorting and Searching Techniques: Elementary Sorting techniques– Bubble Sort, Insertion Sort, Merge Sort, Advanced Sorting techniques- Heap Sort, Quick Sort, Sorting in Linear Time - Bucket Sort, Radix Sort and Count Sort, Searching Techniques- Medians & Order Statistics, complexity analysis

UNIT III. Graphs Algorithms: Graph Algorithms– Breadth First Search, Depth First Search and its Applications, Minimum Spanning Trees. String Processing

UNIT IV. Lower Bounding Techniques: Decision Trees, Balanced Trees, Red-Black Trees

UNIT V. Advanced Analysis Technique: Randomized Algorithm, Distributed Algorithm, Heuristics

RECOMMENDED BOOKS

- T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein Introduction to Algorithms, PHI, 3rd Edition 2009
- Sara Basse & A.V. Gelder Computer Algorithm – Introduction to Design and Analysis, Publisher – Pearson 3rd Edition 1999

B. Practicum

2 Credits

The student shall develop programs in a chosen language to solve problems using algorithm design techniques such as Divide and Conquer, Greedy, Dynamic programming and Backtracking. Some of the problems to be solved are indicated below.

1. Write a test program to implement Divide and Conquer Strategy . Eg: Quick sort algorithm for sorting list of integers in ascending order
2. Write a program to implement Merge sort algorithm for sorting a list of integers in ascending order.
3. Write program to implement the DFS and BFS algorithm for a graph.
4. Write program to implement backtracking algorithm for solving problems like N-queens ..
5. Write a program to implement the backtracking algorithm for the sum of subsets problem
6. Write program to implement greedy algorithm for job sequencing with deadlines.
7. Write a program to implement Dijkstra's algorithm for the Single source shortest path problem.
8. Write a program that implements Prim's algorithm to generate minimum cost spanning tree.
9. Write a program that implements Kruskal's algorithm to generate minimum cost spanning tree
10. Write program to implement Dynamic Programming algorithm for the 0/1 Knapsack problem.
11. Write program to implement Dynamic Programming algorithm for the Optimal Binary Search Tree Problem.

COMPUTER NETWORKS

1. Understand the structure of Data Communications System and its components. Be familiarize with different network terminologies.
2. Familiarize with contemporary issues in network technologies.
3. Know the layered model approach explained in OSI and TCP/IP network models
4. Identify different types of network devices and their functions within a network.
5. Learn basic routing mechanisms, IP addressing scheme and internetworking concepts.
6. Familiarize with IP and TCP Internet protocols.
7. To understand major concepts involved in design of WAN, LAN and wireless networks.
8. Learn basics of network configuration and maintenance.
9. Know the fundamentals of network security issues.

SYLLABUS

6 credits

- UNIT I. Introduction to Computer Networks and Networking Elements: Network Definition, Network Topologies, Network Classifications, Network Protocol, Layered Network Architecture, Overview of OSI Reference Model, Overview of TCP/IP Protocol Suite, Hub, Switch (Managed and Unmanaged), Routers
- UNIT II. Data Communication Fundamentals and Techniques: Analog and Digital Signal, Data-Rate Limits, Digital to Digital Line Encoding Schemes, Pulse Code Modulation, Parallel and Serial Transmission, Digital to Analog Modulation - Multiplexing Techniques- FDM, TDM, Transmission Media.
- UNIT III. Networks Switching Techniques and Access Mechanisms: Circuit Switching, Packet Switching- Connectionless Datagram Switching, Connection-Oriented Virtual Circuit Switching; Dial-Up Modems, Digital Subscriber Line, Cable TV for Data Transfer.
- UNIT IV. Data Link Layer Functions and Protocol: Error Detection and Error Correction Techniques, Data-Link Control- Framing and Flow Control, Error Recovery Protocols-Stop and Wait ARQ, Go-Back-N ARQ, Point to Point Protocol on Internet.
- UNIT V. Multiple Access Protocol and Network Layer: CSMA/CD Protocols, Ethernet LANS; Connecting LAN and Back-Bone Networks- Repeaters, Hubs, Switches, Bridges, Router and Gateways, Networks Layer Functions and Protocols (6 Lectures) Routing, Routing Algorithms, Network Layer Protocol of Internet- IP Protocol, Internet Control Protocols.
- UNIT VI. Transport Layer and Application Layer Functions and Protocols: Transport Services- Error and Flow Control, Connection Establishment and Release- Three Way Handshake, Overview of Application Layer Protocol (5 Lectures) Overview of DNS Protocol; Overview of WWW & HTTP Protocol.

REFERENCE BOOKS

- B. A. Forouzan: Data Communications and Networking, Fourth edition, THM Publishing Company Ltd 2007.
- A. S. Tanenbaum: Computer Networks, Fourth edition, PHI Pvt. Ltd 2002

SOFTWARE ENGINEERING

1. Basic knowledge and understanding of the analysis and design of complex systems.
2. Ability to apply software engineering principles and techniques.
3. To produce efficient, reliable, robust and cost-effective software solutions.
4. Ability to work as an effective member or leader of software engineering teams.
5. To manage time, processes and resources effectively by prioritising competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain.

SYLLABUS

6 credits

UNIT I. Software Development Approaches: Introduction; Evolving Role of Software; Software Characteristics; Software Applications. Software Design Processes: Introduction; What is Meant by Software Engineering?, Definitions of Software Engineering; The Serial or Linear Sequential Development Model; Iterative Development Model; The incremental Development Model

UNIT II. Software Design Principles: Introduction, System Models: Data-flow Models, Semantic Data Models, Object Models, Inheritance Models, Object Aggregation, Service Usage Models, Data Dictionaries; Software Design: The Design Process, Design Methods, Design description, Design Strategies, Design Quality; Architectural Design: System Structuring, The Repository Model, The Client–Server Model, The Abstract Machine Model, Control Models, Modular Decomposition, Domain-Specific Architectures.

UNIT III. Object Oriented Design: Introduction; Object Oriented Design: Objects, Object Classes & Inheritance, Inheritance, Object Identification, An Object -Oriented Design Example, Object Aggregation; Service Usage; Object Interface Design: Design Evolution, Function Oriented Design, Data–Flow Design; Structural Decomposition: Detailed Design.

UNIT IV. An Assessment of Process Life-Cycle Models: Introduction; Overview of the Assessment of Process; The Dimension of Time; The Need for a Business Model in Software Engineering; Classic Invalid Assumptions: First Assumption: Internal or External Drivers, Second Assumption: Software or Business Processes, Third Assumption: Processes or Projects, Fourth Assumption: Process Centered or Architecture Centered; Implications of the New Business Model; Role of the Problem - Solving Process in this Approach: Data, Problem Definition, Tools and Capabilities; Redefining the Software Engineering Process: Round-Trip Problem-Solving Approach, Activities, Goals, Interdisciplinary Resources, Time.

UNIT V. Software Reliability: Introduction; Software Reliability Metrics; Programming for Reliability: Fault Avoidance, Fault Tolerance, Software Reuse.

UNIT VI. Software Testing Techniques: Introduction; Software Testing Fundamental; Testing Principles; White Box Testing; Control Structure Testing; Black Box Testing; Boundary Value Analysis; Testing GUIs; Testing Documentation and Help Facilities; Software Testing Strategies: Introduction; Organizing for Software

Testing; Software Testing Strategy, Unit Testing: Unit Test Considerations, Top-Down Integration, Bottom-Up Integration.

REFERENCE BOOKS

- R. G. Pressman – Software Engineering, TMH
- Sommerville, Ian, Software Engineering, Pearson Education
- Pankaj Jalote – An Integrated Approach to Software Engineering, Narosa Publications.
- Pfleeger, Shari Lawrence, Software Engineering Theory and Practice, second edition. Prentice- Hall 2001.
- Object Oriented & Classical Software Engineering (Fifth Edition), SCHACH, TMH

DATABASE MANAGEMENT SYSTEMS

1. Gain knowledge of database systems and database management systems software.
2. Ability to model data in applications using conceptual modelling tools such as ER Diagrams and design data base schemas based on the model.
3. Formulate, using SQL, solutions to a broad range of query and data update problems.
4. Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.
5. Be acquainted with the basics of transaction processing and concurrency control.
6. Familiarity with database storage structures and access techniques.
7. Compare, contrast and analyse the various emerging technologies for database systems such as NoSQL.
8. Analyse strengths and weaknesses of the applications of database technologies to various subject areas.

SYLLABUS

A Theory

4 Credits

UNIT I. Basic Database Concepts, Terminology, and Architecture; Types of Database Management Systems. Differences between Relational and other Database Models. Data Modelling: Relations, Schemas, Constraints, Queries, and Updates; Conceptual vs. Physical Modeling; Entity Types, attributes, ER Diagrams.

UNIT II. SQL Data Definition: Specifying Tables, Data Types, Constraints; Simple SELECT, INSERT, UPDATE, DELETE Statements; Complex SELECT Queries, including Joins and Nested Queries; Actions and Triggers; Views; Altering Schemas.

UNIT III. Relational Algebra: Definition of Algebra; Relations as Sets; Operations: SELECT, PROJECT, JOIN, etc. Normalization Theory and Functional Dependencies, 2NF, 3NF, BCNF, 4NF, 5NF;

UNIT IV. Indexing: Files, Blocks, and Records, Hashing; RAID; Replication; Single-Level and Multi-Level Indexes; B-Trees and B+-Trees. Query Processing Translation of SQL into Query Plans; Basics of Transactions, Concurrency and Recovery.

UNIT V. DATABASE PROGRAMMING: Embedded SQL; Dynamic SQL, JDBC; Avoiding Injection Attacks; Stored Procedures; Lightweight Data Access Layers for Python and JavaScript Applications; PHP and MySQL, Object Relational Modeling: Hibernate for Java, Active Record for Rails.

UNIT VI. BIG DATA: Motivations; OLAP vs. OLTP; Batch Processing; MapReduce and Hadoop; Spark; Other Systems: HBase. Working with POSTGRES, REDIS, MONGO, and NEO: Setting up the same Database on Four Platforms; Basic Queries and Reporting.

TEXTBOOKS

- Elmasri's and Navathe's *Fundamentals of Database Systems*. Addison-Wesley

REFERENCE BOOK

- Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw Hill Education
- Data base System Concepts, A. Silberschatz, Henry. F. Korth, S. Sudarshan, McGraw Hill Education

B. Practicum

2 credits

Students are required to practice the concepts learnt in the theory by designing and querying a database for a chosen organization (Like Library, Transport etc). The teacher may devise appropriate weekly lab assignments to help students practice the designing , querying a database in the context of example database. Some indicative list of experiments is given below.

Experiment 1: E-R Model

Analyze the organization and identify the entities , attributes and relationships in it. .

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Experiment 2: Concept design with E-R Model

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any).

Experiment 3: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion.

Experiment 4: Normalization

Apply the First, Second and Third Normalization levels on the database designed for the organization

Experiment 5: Installation of Mysql and practicing DDL commands

Installation of MySQL. Creating databases, How to create tables, altering the database, dropping tables and databases if not required. Try truncate, rename commands etc.

Experiment 6: Practicing DML commands on the Database created for the example organization

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

Experiment 7: Querying

practice queries (along with sub queries) involving ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

Experiment 8 and Experiment 9: Querying (continued...)

Practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN),

GROUP BY, HAVING and Creation and dropping of Views.

Experiment 10: Triggers

Work on Triggers. Creation of, insert trigger, delete trigger, update trigger. Practice triggers using the above database.

OBJECT ORIENTED PROGRAMMING

1. Learn the concepts of data, abstraction and encapsulation
2. Be able to write programs using classes and objects, packages.
3. Understand conceptually principles of Inheritance and Polymorphism and their use and program level implementation.
4. Learn exception and basic event handling mechanisms in a program
5. To learn typical object-oriented constructs of specific object oriented programming language

SYLLABUS

A. Theory

4 credits

UNIT I. Basics: Introduction to Object Oriented Programming and its Basic Features, Basic Components of C++, Characteristics of Object-Oriented Language, Structure of a C++ Program, Flow Control Statements in C++, Functions - Scope of Variables, Inline Functions, Recursive Functions, Pointers to Functions, C++ Pointers, Arrays, Dynamic Memory Allocation and De-Allocation

UNIT II. Differences Between Object Oriented and Procedure Oriented Programming, Abstraction, Overview of Object-Oriented Programming Principles, Encapsulation, C++ Classes, Objects, User Defined Types, Constructors and Destructors, this Pointer, Friend Functions, Data Abstraction, Operator Overloading, Type Conversion

UNIT III. Class Inheritance, Base and Derived Classes, Virtual Base Class, Virtual Functions, Polymorphism, Static and Dynamic Bindings, Base and Derived Class Virtual Functions, Dynamic Binding through Virtual Functions, Pure Virtual Functions, Abstract Classes, Virtual Destructors

UNIT IV. Stream Classes Hierarchy, Stream I/O, File Streams, Overloading the Extraction and Insertion Operators, Error Handling during File Operations, Formatted I/O.

UNIT V. Exception Handling- Benefits of Exception Handling, Throwing an Exception, the Try Block, Catching an Exception, Exception Objects, Exception Specifications, Rethrowing an Exception, Uncaught Exceptions

TEXT BOOKS

- Problem solving with C++: The Object of Programming, Walter Savitch, 4th Edition, Pearson Education.
- C++: The Complete Reference, Herbert Schildt, 4th Edition

REFERENCE BOOKS

- Object Oriented Programming with C++, Sourav Sahay, 2nd Edition, Oxford
- The C++ Programming Language, B. Stroutstrup, 3rd Edition, Pearson Education
- Programming in C++, Ashok N Kamthane. Pearson 2nd Edition

B. Practicum

2 credits

Students are required to understand the object-oriented concepts using C++. They are required to practice the concepts learnt in the theory . Some of the programs to be implemented are listed as follows:

Part A

1. Number of vowels and number of characters in a string.
2. Write a function called zeros maller () that is passed with two introduce arguments by reference and set the smaller of the number to zero. Write a man() program to access this function.
3. Demonstration of array of object.
4. Using this pointer to return a value (return by reference).
5. Demonstration of virtual function.
6. Demonstration of static function.
7. Accessing a particular record in a student's file.
8. Demonstration of operator overloading.

Part B

9. Write a program to create a database for students that contains Name, Enrolment no, Department, Programme using Constructors, destructors, input and output functions ; input and output for 10 people using different methods.
10. Create a class holding information of the salaries of all the family members (husband, wife, son, daughter). Using friend functions give the total salary of the family.

INTERNET TECHNOLOGIES

1. To understand the terms related to the Internet and how the Internet is changing the world.
2. To understand how computers are connected to the Internet and demonstrate the ability to use the World Wide Web.
3. Demonstrate an understanding of and the ability to use electronic mail and other internet based services
4. Understand the design principles of Web pages and how they are created
5. To develop an ability to create basic Web pages with HTML.

SYLLABUS

6 credits

UNIT I. Introduction: Overview, Network of Networks, Intranet, Extranet and Internet. World Wide Web, Domain and Sub domain, Address Resolution, DNS, Telnet, FTP, HTTP. Review of TCP/IP: Features, Segment, Three-Way Handshaking, Flow Control, Error Control, Congestion control,

UNIT II. IP Datagram, IPv4 and IPv6. IP Subnetting and addressing: Classful and Classless Addressing, Subnetting. NAT, IP masquerading, IP tables. Internet Routing Protocol: Routing -Intra and Inter Domain Routing, Unicast and Multicast Routing, Broadcast. Electronic Mail: POP3, SMTP.

UNIT III. HTML: Introduction, Editors, Elements, Attributes, Heading, Paragraph. Formatting, Link, Head, Table, List, Block, Layout, CSS. Form, Iframe, Colors, Colorname, Colorvalue. Image Maps: map, area, attributes of image area. Extensible Markup Language (XML): Introduction, Tree, Syntax, Elements, Attributes, Validation, Viewing. XHTML in brief. CGI Scripts: Introduction, Environment Variable, GET and POST Methods.

UNIT IV. PERL: Introduction, Variable, Condition, Loop, Array, Implementing data structure, Hash, String, Regular Expression, File handling, I/O handling. JavaScript: Basics, Statements, comments, variable, comparison, condition, switch, loop, break. Object - string, array, Boolean, reg-ex. Function, Errors, Validation. Cookies: Definition of cookies, Create and Store a cookie with example. Java Applets: Container Class, Components, Applet Life Cycle, Update method; Parameter passing applet, Applications.

UNIT V. Client-Server programming In Java: Java Socket, Java RMI. Threats: Malicious code-viruses, Trojan horses, worms; eavesdropping, spoofing, modification, denial of service attacks. Network security techniques: Password and Authentication; VPN, IP Security, security in electronic transaction, Secure Socket Layer (SSL), Secure Shell (SSH). Firewall: Introduction, Packet filtering, Stateful, Application layer, Proxy.

UNIT VI. Internet Telephony: Introduction, VoIP. Multimedia Applications: Multimedia over IP: RSVP, RTP, RTCP and RTSP. Streaming media, Codec and Plugins, IPTV. mywbut.com Search Engine and Web Crawler: Definition, Meta data, Web Crawler, Indexing, Page rank, overview of SEO.

REFERENCE BOOKS

- Web Technology: A Developer's Perspective, N.P. Gopalan and J. Akilandeswari, PHI, Learning, Delhi, 2013.
- Internetworking Technologies, An Engineering Perspective, Rahul Banerjee, PHI Learning, Delhi, 2011.

ARTIFICIAL INTELLIGENCE

1. Explain what constitutes "Artificial" Intelligence and how to identify systems with Artificial Intelligence.
2. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
3. Formalise a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, etc).
4. Implement basic AI algorithms (e.g., standard search or constraint propagation algorithms).
5. Design and perform an empirical evaluation of different algorithms on a problem formalisation, and state the conclusions that the evaluation supports.
6. Explain the limitations of current Artificial Intelligence techniques.

SYLLABUS

A. Theory

4 credits

UNIT I. Introduction to Artificial Intelligence: Definition of AI; Turing Test; Brief History of AI. Problem Solving and Search: Problem Formulation; Search Space; States vs. Nodes; Tree Search: Breadth-First, Uniform Cost, Depth-First, Depth-Limited, Iterative Deepening; Graph Search.

UNIT II. Informed Search: Greedy Search; A* Search; Heuristic Function; Admissibility and Consistency; Deriving Heuristics via Problem Relaxation. Local Search: Hill-Climbing; Simulated Annealing; Genetic Algorithms; Local Search in Continuous Spaces.

UNIT III. Playing Games: Game Tree; Utility Function; Optimal Strategies; Minimax Algorithm; Alpha-Beta Pruning; Games with an Element of Chance. Beyond Classical Search: Searching with Nondeterministic Actions; Searching with Partial Observations; Online Search Agents; Dealing with Unknown Environments.

UNIT IV. Knowledge Representation and Reasoning: Ontologies, Foundations of Knowledge Representation and Reasoning, Representing and Reasoning about Objects, Relations, Events, Actions, Time, and Space; Predicate Logic, Situation Calculus, Description Logics, Reasoning with Defaults, Reasoning about Knowledge, Sample Applications.

UNIT V. Representing and Reasoning with Uncertain Knowledge: Probability, Connection to Logic, Independence, Bayes Rule, Bayesian Networks, Probabilistic Inference, and Sample Applications.

UNIT VI. Planning: The STRIPS Language; Forward Planning; Backward Planning; Planning Heuristics; Partial-Order Planning; Planning using Propositional Logic; Planning vs. Scheduling.

UNIT VII. Constraint Satisfaction Problems (CSPs): Basic Definitions; Finite vs. Infinite vs. Continuous Domains; Constraint Graphs; Relationship With Propositional Satisfiability, Conjunctive Queries, Linear Integer Programming, and Diophantine Equations; NP-

Completeness of CSP; Extension to Quantified Constraint Satisfaction (QCSP). Constraint Satisfaction as a Search Problem; Backtracking Search; Variable and Value Ordering Heuristic; Degree Heuristic; Least-Constraining Value Heuristic; Forward Checking; Constraint Propagation; Dependency-Directed Backtracking;

TEXT BOOKS

Elaine Rich, Kevin Knight, Shivashankar B Nair, Artificial Intelligence, Third Edition, McGraw Hill Edition.

REFERENCE BOOKS

- Russell Stuart Jonathan and Norvig Peter, Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall, 2010

B. Practicum

2 credits

The students are expected to explore the foundational skills on AI techniques acquired in theory in solving problems and using sample data sets and various tools prepare themselves for careers in AI industry. The following is an indicative list of assignments for the semester. However students should be encouraged to take-up mini-project using the techniques and tools explored in the lab to understand the true potential

1. Using simple Hill-climbing compute an approximate solution to the travelling salesperson problem.
2. Using Naïve bayes method learn a text classifier using training data and using test set evaluate the quality of the classifier.
3. Implement gradient descent and backpropagation in Python.
4. Using Scikit learn for Logistic regression, Support Vector Machines, Building Neural Networks.
5. Using inbuilt TensorFlow functionality to build a Neural Network and train on MNIST Dataset for classification.
6. Installation of Prolog and practicing queries using Prolog.

COMPUTER GRAPHICS

1. Acquire familiarity with the concepts and relevant mathematics of computer graphics.
2. Ability to implement various algorithms to scan, convert the basic geometrical primitives, transformations, area filling, clipping.
3. Describe the importance of viewing and projections.
4. Ability to design basic graphics application programs.
5. Familiarize with fundamentals of animation and Virtual reality technologies
6. Be able to design applications that display graphic images to given specifications.
7. To understand a typical graphics pipeline.

SYLLABUS

A. Theory

4 credits

UNIT I. Application Areas of Computer Graphics, Overview of Graphics Systems and Devices. Points and Lines, Line Drawing Algorithms, Mid-Point Circle and Ellipse Algorithms. Filled Area Primitives, Polygon Filling Algorithms. Curve Generation: Bezier and B-Spline Curves.

UNIT II. 2-D Geometrical Transforms: Translation, Scaling, Rotation, Reflection and Shear Transformations Composite Transforms, Transformations between Coordinate Systems. 2-D Viewing: The Viewing Pipeline, Viewing Coordinate Reference Frame, Window to Viewport Coordinate Transformation, Viewing Functions.

UNIT III. Line Clipping Algorithms- Cohen-Sutherland and Cyrus Beck Line Clipping Algorithms, Sutherland-Hodgeman Polygon Clipping Algorithm. 3-D Object Representation: Polygon Surfaces, Quadric Surfaces, Spline Representation

UNIT IV. 3-D Geometric Transformations: Translation, Rotation, Scaling, Reflection and Shear Transformations, Composite Transformations, 3-D Viewing: Viewing Pipeline, Viewing Coordinates, View Volume, General Projection Transforms and Clipping.

UNIT V. Visible Surface Detection Methods: Classification, Back-Face Detection, Depth-Buffer, Scanline, Depth Sorting, BSP-Tree Methods, Area Sub-Division and Octree Methods Illumination Models and Surface Rendering Methods: Basic Illumination Models, Polygon Rendering Methods Computer Animation: Design of Animation Sequence, General Computer Animation Functions Key Frame Animation, Animation Sequence, Motion Control Methods, Morphing, Warping (Only Mesh Warping)

UNIT VI. Virtual Reality : Basic Concepts, Classical Components of VR System, Types of VR Systems, Three Dimensional Position Trackers, Navigation and Manipulation Interfaces, Gesture Interfaces. Input Devices, Graphical Rendering Pipeline, Haptic Rendering Pipeline, Open GL Rendering Pipeline. Applications of Virtual Reality.

TEXTBOOKS

- Donald Hearn and M. Pauline Baker, “Computer Graphics with Open GL”, Prentice Hall.
- R. K Maurya, “Computer Graphics with Virtual Reality”, Wiley

REFERENCE BOOKS

- “Computer Graphics Principles & practice”, Foley, Van Dam, Feiner and Hughes, Pearson Education.

B. Practicum

2 credits

The students are required to create interactive graphics applications in C using graphics application programming interfaces and demonstrate geometrical transformations. The lab material includes implementation of line drawings, circle drawing, ellipse drawing as well as different geometrical transformations.

Experiment 1: Line Drawing Using DDA and Bresenham

Experiment 2: Circle Drawing Using Midpoint Algorithm .

Experiment 3: Ellipse Drawing Using Mipoint Algorithm.

Experiment 4: Performing the basic 2D transformations such as translation, Scaling, Rotation, shearing and reflection for a given 2D object.

MACHINE LEARNING

1. Differentiate between supervised, unsupervised machine learning approaches
2. Ability to choose appropriate machine learning algorithm for solving a problem
3. Design and adapt existing machine learning algorithms to suit applications
4. Understand the underlying mathematical relationships across various machine learning algorithms
5. Design and implement machine learning algorithms to real world applications

SYLLABUS

6 credits

UNIT I. Introduction: Concept of Machine Learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised vs. Unsupervised Learning, Statistical Learning: Bayesian Method, The Naive Bayes Classifier

UNIT II. Software's for Machine Learning and Linear Algebra Overview: Plotting of Data, Vectorization, Matrices and Vectors: Addition, Multiplication, Transpose and Inverse using Available Tool such as MATLAB.

UNIT III. Linear Regression: Prediction using Linear Regression, Gradient Descent, Linear Regression with one Variable, Linear Regression with Multiple Variables, Polynomial Regression, Feature Scaling/Selection.

UNIT IV. Logistic Regression: Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one Variable and with Multiple Variables.

UNIT V. Regularization: Regularization and its Utility: The problem of Overfitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Variance.

UNIT VI. Neural Networks: Introduction, Model Representation, Gradient Descent vs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Back Propagation Algorithm.

TEXT BOOKS

- Ethem Alpaydin, "Introduction to Machine Learning" 2nd Edition, The MIT Press, 2009.
- Tom M. Mitchell, "Machine Learning", First Edition by Tata McGraw-Hill Education, 2013.
- Christopher M. Bishop, "Pattern Recognition and Machine Learning" by Springer, 2007.
- Mevin P. Murphy, "Machine Learning: A Probabilistic Perspective" by The MIT Press, 2012.

IMAGE PROCESSING

1. To familiarize the students with the image fundamentals and mathematical transforms necessary for image processing.
2. To make the students understand the image enhancement techniques
3. To make the students understand the image restoration and reconstruction procedures.
4. To familiarize the students with the image segmentation procedures.

SYLLABUS

6 credits

UNIT I Digital Image Fundamentals: Elements of Visual Perception, Light, Brightness Adaption and Discrimination, Image Sensing and Acquisition, Image Sampling and Quantization, Pixels, Some Basic Relationships between Pixels, Coordinate Conventions, Imaging Geometry, Perspective Projection, Linear and Nonlinear Operations

UNIT II Image Enhancement in the Spatial Domain: Intensity transformations, Contrast Stretching, Histogram Equalization, Correlation and Convolution, Basics of Spatial Filtering, Smoothing Filters, Sharpening Filters, Gradient and Laplacian.

UNIT III Filtering in the Frequency domain: Hotelling Transform, Fourier Transforms and properties, FFT (Decimation in Frequency and Decimation in Time Techniques), Convolution, Correlation, 2-D sampling, Discrete Cosine Transform, Frequency domain filtering.

UNIT IV Image Restoration and Reconstruction: Basic Framework, Interactive Restoration, Image deformation and geometric transformations, image morphing, Restoration techniques, Noise characterization, Noise restoration filters, Adaptive filters, Linear, Position invariant degradations, Estimation of Degradation functions, Restoration from projections.

UNIT V Color Image Processing, Color Fundamentals, Color Models, Pseudocolor Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Color Segmentation. Morphological Image Processing, Dilation and Erosion, Opening and Closing., Extensions to Gray -Scale Images.

UNIT VI Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, Segmentation by Morphological Watersheds.

TEXT BOOKS

Digital Image Processing, Rafael C. Gonzalez and Richard E. Woods, 4th Edition, Prentice Hall.

REFERENCE BOOKS

Anil K. Jain, Fundamentals of Digital Image Processing, Prentice Hall.
Stan Birchfield, Image Processing and Analysis, Cengage Learning.

DATA ANALYTICS

1. This course prepares students to gather, describe, and analyze data, and use advanced statistical tools to support decision making.
2. To gather sufficient relevant data, conduct data analytics using scientific methods, and understand appropriate connections between quantitative analysis and real-world problems.
3. Understand the exact scopes and possible limitations of each method to provide constructive guidance in decision making.
4. To Use advanced techniques to conduct thorough and insightful analysis, and interpret the results correctly with detailed and useful information.
5. To make better decisions by using advanced techniques in data analytics.

SYLLABUS

6 credits

UNIT I. Data Definitions and Analysis Techniques: Elements, Variables, and Data Categorization, Levels of Measurement, Data Management and Indexing

UNIT II. Descriptive Statistics: Measures of Central Tendency, Measures of Location of Dispersions, Error Estimation and Presentation (Standard Deviation, Variance), Introduction to Probability

UNIT III. Basic Analysis Techniques: Statistical Hypothesis Generation and Testing, Chi-Square Test, T-Test, Analysis of Variance, Correlation Analysis, Maximum Likelihood Test

UNIT IV. Data Analysis Techniques-I: Regression Analysis, Classification Techniques, Clustering Techniques (K-Means, K-Nearest Neighborhood) UNIT

V. Data Analysis Techniques-II: Association Rules Analysis, Decision Tree

UNIT VI. Introduction to R Programming: Introduction to R Software Tool, Statistical Computations using R (Mean, Standard Deviation, Variance, Regression, Correlation etc.)

UNIT VII. Practice and Analysis with R and Python Programming, Sensitivity Analysis

REFERENCE BOOKS

- Probability and statistics for Engineers and Scientists (9 Edn.), Ronald E Walppole, Raymond H Myres, Sharon L. Myres and Lying Ye, Prentice Hall Inc
- The Elements of Statistical Learning, Data Mining, Inference, and Prediction (2nd Edn.) Trevor Hastie Robert Tibshirani Jerome Friedman, Springer, 2014

- Software for Data Analysis: Programming with R (Statistics and Computing), John M. Chambers, Springer

COMPUTER ETHICS

1. The student will be able to describe and distinguish between the various ethical theories which can be used to form the basis of solutions to moral dilemmas in computing.
2. Identify traditional and current Issues related to Computers, Information Systems, Ethics, Society and Human Values;
3. The student will be able to identify and define the components of a structured plan for solving ethical problems and, in the process, will be able to understand the basis for her/his own ethical system.
4. Given several examples of professional codes of ethics related to computing, the student will be able to compare and contrast these examples, discussing their commonalities, differences, and implications.
5. Develop skills of critical analysis and applying ethical principles to situations and dialectical thinking

SYLLABUS

6 credits

UNIT I.	The Need for Computer Ethics Training and Historical Milestones
UNIT II.	Defining the Field of Computer Ethics, Computer ethics codes, Sample Topics in Computer Ethics <ol style="list-style-type: none">i. Computer crime and computer securityii. Software theft and intellectual property rightsiii. Computer hacking and the creation of virusesiv. Computer and information system failurev. Invasion of privacy. Privacy in the Workplace and on the Internetvi. Social implications of artificial intelligence and expert systemsvii. The information technology salesman issues
UNIT III.	Transparency and Virtual Ethics, Free Speech, Democracy, Information Access
UNIT IV.	Developing the Ethical Analysis Skills and Professional Values, Privacy, Accountability, Government Surveillance
UNIT V.	Boundaries of Trust, Trust Management, Wikipedia, Virtual Trust, Plagiarism in Online Environment, Intellectual Property, Net neutrality

REFERENCE BOOKS

- Deborah, J, Nissenbaun, H, Computing, Ethics & Social Values, Englewood Cliffs, New Jersey, Prentice Hall, 1995.
- Spinello, R, Tavani, H, T, Readings in Cyberethics, Sudbury, MA, Jones and Bartlett Publishers, 2001.
- Bynum, T, W; Rogerson, S, Computer Ethics and Professional Responsibility, Blackwell, 2004

SYSTEM SECURITY

1. Develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.
2. Gain familiarity with prevalent network and distributed system attacks, defenses against them, and forensics to investigate the aftermath.
3. Develop a basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.
4. Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges.

SYLLABUS

6 Credits

- UNIT 1. Cryptographic Tools- Confidentiality with Symmetric Encryption, Message Authentication and Hash Functions, Public-Key Encryption, Digital Signatures and Key Management, Random and Pseudorandom Numbers, Practical Application: Encryption of Stored Data
- UNIT 2. User Authentication- Means of Authentication, Password-Based Authentication, Token-Based Authentication, Biometric Authentication, Remote User Authentication, Security Issues for User Authentication, Practical Application: An Iris Biometric System, Case Study: Security Problems for ATM Systems
- UNIT 3. Access Control- Access Control Principles, Subjects, Objects, and Access Rights, Discretionary Access Control, Example: UNIX File Access Control, Role-Based Access Control, Case Study: RBAC System for a Bank
- UNIT 4. Database Security-The Need for Database Security, Database Management Systems, Relational Databases, Database Access Control, Inference, Statistical Databases, Database Encryption, Cloud Security
- UNIT 5. Malicious Software-Types of Malicious Software (Malware), Propagation–Infected Content–Viruses, Propagation–Vulnerability Exploit–Worms, Propagation–Social Engineering–SPAM E-mail, Trojans, Payload–System Corruption, Payload–Attack Agent–Zombie, Bots, Payload–Information Theft–Keyloggers, Phishing, Spyware, Payload–Stealth–Backdoors, Rootkits,, Countermeasures
- UNIT 6. Denial-of-Service Attacks- Denial-of-Service Attacks, Flooding Attacks, Distributed Denial-of-Service Attacks, Application-Based Bandwidth Attacks, Reflector and Amplifier Attacks, Defenses Against Denial-of-Service Attacks, Responding to a Denial-of-Service Attack.

TEXT BOOKS

- M. Stamp, “Information Security: Principles and Practice,” 2 st Edition, Wiley, ISBN: 0470626399, 2011.
- M. E. Whitman and H. J. Mattord, “Principles of Information Security,” 4 st Edition, Course Technology, ISBN: 1111138214, 2011.
- M. Bishop, “Computer Security: Art and Science,” Addison Wesley, ISBN: 0-201-44099-7, 2002.
- G. McGraw, “Software Security: Building Security In,” Addison Wesley, ISBN: 0321356705, 2006.

HUMAN COMPUTER INTERFACE

1. Provide an overview of the concepts relating to the design of human-computer interfaces in ways making computer-based systems comprehensive, friendly and usable.
2. Understand the theoretical dimensions of human factors involved in the acceptance of computer interfaces.
3. Understand the important aspects of implementation of human-computer interfaces.
4. Identify the various tools and techniques for interface analysis, design, and evaluation.
5. Identify the impact of usable interfaces in the acceptance and performance utilization of information systems.

SYLLABUS

6 credits

UNIT I. Introduction: Historical Evolution of HCI, Interactive System Design: Concept of Usability- Definition and Elaboration, HCI and Software Engineering, GUI Design and Aesthetics, Prototyping Techniques

UNIT II. Model-Based Design and Evaluation: Basic Idea, Introduction to Different Types of Models, GOMS Family of Models (KLM And CMN-GOMS), Fitts' Law and Hickhyman's Law,

UNIT III. General Development Guidelines and Principles: Shneiderman's Eight Golden Rules, Norman's Seven Principles, Norman's Model of Interaction, Nielsen's Ten Heuristics with Example of its use, Contextual Inquiry

UNIT IV. Dialog Design: Introduction to Formalism in Dialog Design, Design using FSM (Finite State Machines), State Charts and (Classical) Petri Nets in Dialog Design

UNIT V. Task Modeling and Analysis: Hierarchical Task Analysis (HTA), Engineering Task Models and Concur Task Tree (CTT)

UNIT VI. Object Oriented Modelling: Object Oriented Principles, Definition of Class and Object and their Interactions, Object Oriented Modelling for User Interface Design, Case Study Related to Mobile Application Development

REFERENCE BOOKS

- Dix A., Finlay J., Abowd G. D. and Beale R. Human Computer Interaction, 3rd edition, Pearson Education, 2005.
- Preece J., Rogers Y., Sharp H., Baniyon D., Holland S. and Carey T. Human Computer Interaction, Addison-Wesley, 1994.
- B. Shneiderman; Designing the User Interface, Addison Wesley 2000 (Indian Reprint).

MODELLING AND SIMULATIONS

1. Characterise systems in terms of their essential elements, purpose, parameters, constraints, performance requirements, sub-systems, interconnections and environmental context.
2. Understand the technical underpinning of modern computer simulation software.
3. System problem modelling and solving through the relationship between theoretical, mathematical, and computational modelling for predicting and optimizing performance and objective.
4. Mathematical modelling real world situations related to information systems development, prediction and evaluation of outcomes against design criteria.
5. Develop solutions and extract results from the information generated in the context of the information systems
6. Interpret the model and apply the results to resolve critical issues in a real world environment.
7. Develop different models to suit special characteristics of the system being modelled.

SYLLABUS

6 credits

- UNIT 1. Systems and environment:** Concept of model and model building, model classification and representation, Use of simulation as a tool, steps in simulation study.
- UNIT 2. Continuous-time and Discrete-time systems:** Laplace transform, transfer functions, statespace models, order of systems, z-transform, feedback systems, stability, observability, controllability. Statistical Models in Simulation: Common discrete and continuous distributions, Poisson process, empirical distributions
- UNIT 3. Random Numbers:** Properties of random numbers, generation of pseudo random numbers, techniques of random number generation, tests for randomness, random variate generation using inverse transformation, direct transformation, convolution method, acceptance-rejection
- UNIT 4. Design and Analysis of simulation experiments:** Data collection, identifying distributions with data, parameter estimation, goodness of fit tests, selecting input models without data, multivariate an time series input models, verification and validation of models, static and dynamic simulation output analysis, steady-state simulation, terminating simulation, confidence interval estimation, Output analysis for steady state simulation, variance reduction techniques
- UNIT 5. Queuing Models:** Characteristics of queuing systems, notation, transient and steady state behavior, performance, network of queues
- UNIT 6. Large Scale systems:** Model reduction, hierarchical control, decentralized control, structural properties of large-scale systems

REFERENCE BOOKS

Shailendra Jain, Modeling and Simulation using MATLAB - Simulink, 2ed, Kindle edition

THEORY OF COMPUTATION

1. To provide a formal connection between algorithmic problem solving and the theory of languages and automata and develop them into a mathematical (abstract) view towards algorithmic design and in general computation itself.
2. The course should in addition clarify the practical view towards the applications of these ideas in the engineering part as well.
3. Become proficient in key topics of theory of computation, and to have the opportunity to explore the current topics in this area

PREREQUISITE

Students should have a background in discrete mathematics, data structures, and programming languages.

SYLLABUS

A THEORY

4 Credits

UNIT I. Automata: Introduction to Formal Proof, Additional Forms of Proof, Inductive Proofs, Finite Automata (FA), Deterministic Finite Automata (DFA), Non-Deterministic Finite Automata (NFA), Finite Automata with Epsilon Transitions

UNIT II. Regular Expressions and Languages: Regular Expression, FA and Regular Expressions, Proving Languages not to be Regular, Closure Properties of Regular Languages, Equivalence and Minimization of Automata

UNIT III. Context Free Grammars and Languages: Context Free Grammar (CFG), Parse Trees, Ambiguity in Grammars and Languages, Definition of The Pushdown Automata, Languages of a Pushdown Automata, Equivalence of Pushdown Automata and CFG Deterministic Pushdown Automata.

UNIT IV. Properties of Context Free Languages: Normal Forms for CFG, Pumping Lemma for CFL, Closure Properties of CFL, Turing Machines, Programming Techniques for TM, Variations of TM, Non Universal TM, Universal TM.

UNIT V. Undecidability: A Language that is not Recursively Enumerable (RE), an Undecidable Problem that is RE, Undecidable Problems about Turing Machine, Post's Correspondence Problem, The Classes P and NP.

REFERENCE BOOKS

- J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education, 2007.
- H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education, 2003.

- Thomas A. Sudkamp,” An Introduction to the Theory of Computer Science, Languages and Machines”, Third Edition, Pearson Education., 2007.
- J. Martin, “Introduction to Languages and the Theory of computation, Third Edition, Tata Mc Graw Hill, 2007.

B. Practicum

2 credits

The students are expected to understand the Hierarchy of formal languages with reference to their varying degrees of complexity in recognising them. Programs can be designed after designing suitable automata to recognize the following formal languages. Given an input the recognizer shall output a Yes/No answer depending on whether the string is part of the language or not.

1. Language of Binary strings which ends with the pattern 101.
2. Language of Binary strings such that the third symbol from the end is a Zero
3. Language of parenthesised expressions with matching left and right parenthesis
4. Language of Binary strings with equal number of Zeros and Ones
5. Language generated by the grammar $\{a^n b^n c^n \mid n \geq 1\}$
6. Language $\{a^p \mid p \text{ is prime}\}$

DATA MINING

1. Demonstrate advanced knowledge of data mining concepts and techniques.
2. Apply the techniques of clustering, classification, association finding, feature selection and visualisation on real world data
3. Determine whether a real world problem has a data mining solution
4. Apply data mining software and toolkits in a range of applications
5. Set up a data mining process for an application, including data preparation, modelling and evaluation
6. Demonstrate knowledge of the ethical considerations involved in data mining.

SYLLABUS

6 credits

UNIT I. Introduction to Data Mining, Understanding Data, Relations to Database, Statistics, Machine Learning

UNIT II. Association Rule Mining, Level-wise Method, FP-Tree Method, Other Variants

UNIT III. Classification, Decision Tree Algorithm, CART, PUBLIC, Pruning Classification Tree

UNIT IV. Clustering Techniques, Clustering of Numeric Data, of Ordinal Data, Efficiency of Clustering, Consensus Clustering, Spectral Clustering

UNIT V. Rough Set Theory and its Application to Data Mining

UNIT VI. ROC Analysis

UNIT VII. Data Mining Trends, Big Data, Data Analytics

TEXT BOOKS

- Data Mining Techniques (4e) Universities Press Arun K Pujari

CLOUD COMPUTING

1. Analyze the trade-offs between deploying applications in the cloud and over the local infrastructure.
2. Compare the advantages and disadvantages of various cloud computing platforms.
3. Deploy applications over commercial cloud computing infrastructures such as Amazon Web Services, Windows Azure, and Google AppEngine.
4. Program data intensive parallel applications in the cloud.
5. Analyze the performance, scalability, and availability of the underlying cloud technologies and software.
6. Identify security and privacy issues in cloud computing.
7. Explain recent research results in cloud computing and identify their pros and cons.
8. Solve a real-world problem using cloud computing through group collaboration.

SYLLABUS

A. Theory

4 Credits

Unit I. Introduction to cloud computing

Definition, characteristics, components, Cloud service provider, the role of networks in Cloud computing, Cloud deployment models- private, public & hybrid, Cloud service models, multitenancy, Cloud economics and benefits, Cloud computing platforms - IaaS: Amazon EC2, PaaS: Google App Engine, Microsoft Azure, SaaS.

Unit II. Virtualization

Virtualization concepts , Server virtualization, Storage virtualization, Storage services, Network virtualization, Service virtualization, Virtualization management, Virtualization technologies and architectures, virtual machine, Measurement and profiling of virtualized applications. Hypervisors: KVM, Xen, VMware hypervisors and their features.

Unit III. Data in cloud computing

Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. MapReduce and extensions: Parallel computing, the map-Reduce model, Parallel efficiency of MapReduce, Relational operations using Map-Reduce, Enterprise batch processing using MapReduce.

Unit IV. Cloud security

Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud. Cloud computing security architecture: General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro - architectures; Identity Management and Access control, Autonomic security, Security challenges : Virtualization security management - virtual threats, VM Security Recommendations, VM - Specific Security techniques, Secure Execution Environments and Communications in cloud.

Unit V. Issues in cloud computing

Implementing real time application over cloud platform, Issues in Inter-cloud environments, QoS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud computing environment. Cloud Middleware. Mobile Cloud Computing. Inter Cloud issues. A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamic reconfiguration, Monitoring in Cloud

TEXT BOOK:

1. Enterprise Cloud Computing by Gautam Shroff, Cambridge publication

REFERENCE BOOK:

1. Cloud Security by Ronald Krutz and Russell Dean Vines, Wiley-India
- 2.. Dr. Kumar Saurabh, "Cloud Computing", Wiley Publication

B. Practicum

2 Credits

The students shall explore development of web applications in cloud. Practically Design and develop processes involved in creating a cloud based application and programming using Hadoop

Indicative List of Experiments

1. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS with virtualization support
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
3. Install Google App Engine. Create hello world app and other simple web applications using python/java.
4. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
5. Experiment a procedure to transfer the files from one virtual machine to another virtual machine.
6. Experiment a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
7. Install Hadoop single node cluster and run simple applications like word count.

INTERNET OF THINGS

1. To learn the concepts of Sensors, Wireless Network and Internet
2. To learn and implement use of Devices in IoT technology.
3. To learn the different IoT Technologies like Micro-controller, Wireless communication like Blue Tooth, GPRS, Wi-Fi and Storage and embedded systems
4. To understand how to program on embedded and mobile platforms including different Microcontrollers like ESP8266, Raspberry Pi, Arduino and Android programming
5. To understand how to make sensor data available on the Internet (data acquisition) and understand how to analyze and visualize sensor data
6. To understand, analysis and evaluate different protocols used in IoT.
7. To learn basic python programming for IoT applications
8. To learn and design different applications in IoT.
9. To design, develop and test different prototypes in IoT.

SYLLABUS

6 credits

UNIT I. (Introduction to IoT, Sensors and Actuators) Introduction to IoT: Definition, Characteristics, Applications, Evolution, Enablers, Connectivity Layers, Addressing, Networking and Connectivity Issues, Network Configurations, Multi-Homing, Sensing: Sensors and Transducers, Classification, Different Types of Sensors, Errors, Actuation: Basics, Actuator Types- Electrical, Mechanical Soft Actuators

UNIT II. (Introduction to Networking, Communication Protocols and Machine-to-Machine Communication) Basics of Networking, Communication Protocols, Sensor Network, Machine to Machine Communication (IoT Components, Inter-Dependencies, SoA, Gateways, Comparison Between IoT & Web, Difference Protocols, Complexity of Networks, Wireless Networks, Scalability, Protocol Classification, MQTT & SMQTT, IEEE 802.15.4, Zigbee)

UNIT III. (Arduino Programming) Interoperability in IoT, Introduction To Arduino Programming, Integration Of Sensors And Actuators With Arduino

UNIT IV. (Python Programming and Raspberry Pi) Introduction to Python Programming, Introduction to Raspberry Pi, Implementation of IoT with Raspberry Pi, Implementation of IoT with Raspberry Pi

UNIT V. (Data Analytics and Cloud Computing) Data Handling and Analytics, Cloud Computing Fundamentals, Cloud Computing Service Model, Cloud Computing Service Management and Security, Sensor-Cloud Architecture, View and Dataflow

UNIT VI. (FOG Computing and Case Studies) FOG Computing: Introduction, Architecture, Need, Applications and Challenges

UNIT VII. Industrial IoT, Case Studies: Agriculture, Healthcare, Activity Monitoring

REFERENCE BOOKS

- "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press).
- "Internet of Things: A Hands-on Approach", by A Bahga and Vijay Madisetti (Universities Press)

MATLAB PROGRAMMING

1. Understand the fundamentals of procedural and functional programming;
2. Understand Matlab data types and structures;
3. Be able to set up simple real-life numerical problems such that they can be solved and visualized using basic codes in Matlab;
4. Be ready to use advanced coding in Matlab in their subsequent studies

SYLLABUS

4 Credits

- UNIT 1. Introduction to MATLAB Programming- Basics of MATLAB programming, Array operations in MATLAB, Loops and execution control, Working with files: Scripts and Functions, Plotting and program output
- UNIT 2. Approximations and Errors- Defining errors and precision in numerical methods, Truncation and round-off errors, Error propagation, Global and local truncation errors
- UNIT 3. Linear Equations- Linear algebra in MATLAB, Gauss Elimination, LU decomposition and partial pivoting, Iterative methods: Gauss Siedel Method
- UNIT 4. Regression and Interpolation- Introduction, Linear least squares regression(including *lsqcurvefit* function), Functional and nonlinear regression (including *lsqnonlin* function), Interpolation in MATLAB using spline and *pchip*
- UNIT 5. Nonlinear Equations- Nonlinear equations in single variable, MATLAB function *fzero* in single variable, Fixed-point iteration in single variable, Newton-Raphson in single variable, MATLAB function *fsolve* in single and multiple variables, Newton-Raphson in multiple variables

TEXT BOOKS

1. Fausett L.V.(2007) Applied Numerical Analysis Using MATLAB, 2nd Ed., Pearson Education
2. Essential MATLAB for Engineers and Scientists, 6th Edition, Brian Hahn; Daniel T. Valentine, Academic Press, Web ISBN-13: 978-0-12-805271-6,

PROGRAMMING IN JAVA

1. Knowledge of the structure and model of the Java programming language,
2. Use the Java programming language for various programming technologies
3. Develop software in the Java programming language,
4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements

SYLLABUS

4 credits

A. Theory

UNIT I. Introduction: Java Essentials, Its characteristics, Execution and Compilation, Data types, Variables, Control Statements, Standard Input/ Output.

UNIT II. Constructors, Object Oriented Concepts: Encapsulation, Abstraction, Inheritance, Polymorphisms, JAVA Packages.

UNIT III. Exception Handling, Wrapper Classes, Autoboxing, Multi-thread Programming.

UNIT IV. Applets, Event Handling, AWT, Database Handling using JDBC.

TEXT BOOKS

E Balaguruswamy, Programming with JAVA, A Primer (5e), Kindle Edition

REFERENCE BOOKS

- Bruce Eckel, Thinking in Java (4e)
- Herbert Schildt, Java: The Complete Reference (9e)
- Y. Daniel Liang, Introduction to Java Programming (10e)
- Paul Deitel, Harvey Deitel, Java: How To Program (10e)
- Cay S. Horstmann, Core Java Volume I –Fundamentals (10e)

B. Practicum

Students are required to implement object-oriented paradigm using JAVA. Below are the list of some of the experiments.

Part A

1. Program on strings: Check the equality of two strings, Reverse a string.
2. Program using loops: to find the sum of digits of a given number, display a multiplication table, display all prime numbers between 1 to 1000.
3. Program to demonstrate all math class functions.

Part B

4. Program on files : to copy a file to another file using Java to package classes.
5. Program to demonstrate method over-riding and overloading
6. Programs on inheritances.
7. Multi-threaded programming.

PYTHON PROGRAMMING

1. Develop and Execute simple Python programs.
2. Structure a Python program into functions.
3. Using Python lists, tuples to represent compound data
4. Develop Python Programs for file processing

SYLLABUS

A Theory

4 Credits

UNIT I. Introduction to Python, Python, Features of Python, Execution of a Python, Program, Writing Our First Python Program, Data types in Python. Python Interpreter and Interactive Mode; Values and Types: int, float, boolean, string, and list; Variables, Expressions, Statements, Tuple Assignment, Precedence of Operators, Comments; Modules and Functions, Function Definition and use, Flow of Execution, Parameters and Arguments

UNIT II. Operators in Python, Input and Output, Control Statements. Boolean Values and operators, Conditional (if), Alternative (if-else), Chained Conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful Functions: Return Values, Parameters, Local and Global Scope, Function Composition, Recursion

UNIT III. Arrays in Python, Strings and Characters. Strings: String Slices, Immutability, String Functions and Methods, String Module; Lists as Arrays. Illustrative Programs: Square Root, gcd, Exponentiation, Sum an Array of Numbers, Linear Search, Binary Search.

UNIT IV. Functions, Lists and Tuples. List Operations, List Slices, List Methods, List Loop, Mutability, Aliasing, Cloning Lists, List Parameters; Tuples: Tuple Assignment, Tuple as Return Value; Dictionaries: Operations and Methods; Advanced List Processing - List Comprehension; Illustrative Programs: Selection Sort, Insertion Sort, Merge sort, Histogram.

UNIT V. Files and Exception: Text Files, Reading and Writing Files, Format Operator; Command Line Arguments, Errors and Exceptions, Handling Exceptions, Modules, Packages; Illustrative Programs: Word Count, Copy File.

TEXT BOOKS

- Mark Lutz, Learning Python
- Tony Gaddis, Starting Out With Python
- Kenneth A. Lambert, Fundamentals of Python
- James Payne, Beginning Python using Python 2.6 and Python 3

B. Practicum

2 Credits

The students are required to verify their ability to use core programming basics and program design with functions using Python programming language. The teacher shall programs to strengthen the practical expertise of the students. The following is an indicative list of programs that can be practised

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format “Fri Oct 11 02:26:23 IST 2019”
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to construct the following pattern, using a nested for loop

```
*  
  
* *  
  
* * *  
  
* * * *  
  
* * * * *  
  
* * * * *  
  
* * *  
  
* *  
  
*
```

10. Write a Python script that prints prime numbers less than 20.
11. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.

12. Write a python program to define a module and import a specific function in that module to another program.
13. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
14. Write a Python class to convert an integer to a roman numeral.
15. Write a Python class to reverse a string word by word.

MOBILE APPLICATION DEVELOPMENT

1. To understand Android platform and its architecture.
2. To learn about mobile devices types and different modern mobile operating systems.
3. To learn activity creation and Android User Interface designing.
4. To learn basics of Intent, Broadcast and Internet services.
5. To learn about different wireless mobile data transmission standards.
6. To understand and learn how to integrate basic phone features, multimedia, camera and Location based services in Android Application.
7. To learn about different systems for mobile application development, deployment and distribution in Mobile market place (Android, iOS).
8. To understand and carry out functional test strategies for mobile applications.

SYLLABUS

4 credits

UNIT I. (Introduction) What is Android, Android Versions and its Feature Set, Various Android Devices on the Market, Android Market Application Store, Android Development Environment System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs)

UNIT II. (Android Architecture Overview and Application) Android Software Stack, The Linux Kernel, Android Runtime - Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework, Creating a New Android Project ,Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files,

UNIT III. (Android Software Development Platform and Framework) Understanding Java SE and the Dalvik Virtual Machine, The Directory Structure of an Android Project, Common Default Resources Folders, The Values Folder, Leveraging Android XML, Screen Sizes , Launching Mobile Application: The AndroidManifest.xml File, Android Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications Content Providers: Data Management, Android Intent Objects: Messaging for Components, Android Manifest XML: Declaring Your Components

UNIT IV. (Understanding Android User Interfaces, Views and Layouts) Designing for Different Android Devices, Views and View Groups, Android Layout Managers, The View Hierarchy, Designing an Android User Interface using the Graphical Layout Tool Displaying Text with TextView, Retrieving Data from Users, Using Buttons, Check Boxes and Radio Groups, Getting Dates and Times from Users, Using Indicators to Display Data to Users, Adjusting Progress with Seek Bar, Working with Menus using views, Gallery, Image Switcher, Grid View, and Image View views to display images, Creating Animation

UNIT V. (Databases, Intents, Location-based Services) Saving and Loading Files, SQLite Databases, Android Database Design, Exposing Access to a Data Source through a Content

Provider, Content Provider Registration, Native Content Providers Intents and Intent Filters: Intent Overview, Implicit Intents, Creating the Implicit Intent Example Project, Explicit Intents, Creating the Explicit Intent Example Application, Intents with Activities, Intents with Broadcast Receivers

UNIT VI. Sending SMS Messages Programmatically, Getting Feedback after Sending the Message Sending SMS Messages Using Intent Receiving, sending email, Introduction to location-based service, configuring the Android Emulator for Location-Based Services, Geocoding and Map-Based Activities Multimedia: Audio, Video, Camera: Playing Audio and Video, Recording Audio and Video, Using the Camera to Take and Process Pictures

REFERENCE BOOKS

- Android Programming Unleashed (1st Edition) by Harwani.
- Beginning Mobile Application Development in the Cloud (2011), Richard Rodger.

WEB PROGRAMMING

1. To understand basics of the Internet and World Wide Web
2. To acquire knowledge and skills for creation of web site considering both client and server-side programming
3. To learn basic skill to develop responsive web applications
4. To understand different web extensions and web services standards
5. To understand basic concepts of Search Engine Basics.
6. To learn Web Service Essentials.
7. To learn Rich Internet Application Technologies.
8. To understand and get acquainted with Web Analytics 2.0

SYLLABUS

4 credits

UNIT I. (Introduction to World Wide Web) -Internet Standards, Introduction to WWW and WWW Architecture, Internet Protocols, Overview of HTTP, HTTP request – response, Generations of dynamic web pages

UNIT II. (User Interface Design) Introduction to HTML and HTML5, TML Tags, Formatting and Fonts, Commenting Code, Anchors, Backgrounds, Images, Hyperlinks, Lists, Tables, Frames, HTML Forms. The need for CSS, Introduction to CSS, Basic syntax and structure, Inline Styles, Embedding Style Sheets, Linking External Style, Backgrounds, Manipulating Text, Margins and Padding, Positioning using CSS.

UNIT III. (Java Programming) Java Script, Introduction, Core features, Data types and Variables, Operators, Expressions, Functions, Objects, Array, Date and Math related Objects. JAVA Networking classes, TCP/IP Protocol Suite, File Transfer Protocol (FTP), Java Environment |Setup for Web Applications, JavaBean, Application Builder Tool, Bean Developer Kit (BDK), The Java Beans API, Introduction to EJB

UNIT IV. (Database) Database basics, SQL, MySQL, PostgreSQL, JDBC API, Driver Types, Two-tier and Three-tier Models, Connection Overview, Transactions, Driver Manager Overview, Statement Overview, Result Set Overview, Types of Result Sets, Concurrency Types, Prepared Statement Overview

UNIT V. (Java Applet and JSP) Java Web Programs and Applets, Web Application, Servlet, Servlet Life Cycle, Servlet Programming, Introduction to JSP, Life Cycle of a JSP Page, Translation and Compilation, Creating Static Content, Response and Page Encoding, Creating Dynamic Content, Using Objects within JSP Pages, JSP Programming

UNIT VI. (Dot Net Framework) Introduction to Dot Net, Dot Net framework and its architecture, CLR, Assembly, Components of Assembly, DLL hell and Assembly Versioning, Overview to C#, Introduction to ASP.net, Asp.net Programming

REFERENCE BOOKS

- J2EE: The complete Reference by James Keogh.
- Java EE and HTML5 Enterprise Application Development (Oracle Press) by John Brock, Arun Gupta, Geertjan Wielenga
- Struts: The Complete Reference, 2nd Edition by James Holmes

- ASP.NET Unleashed by Stephen Walther, Kevin Scott Hoffman, Nate Dudek
- Microsoft Visual C# 2013 Step by Step by John Sharp

GNU IMAGE MANIPULATION PROGRAMME

1. To familiarize the students with the underlying concepts of digital images.
2. To make the students know how to enhance images and prepare them for printing and publishing.

SYLLABUS

4 credits

A. Theory

UNIT I Imaging Concepts and Graphic Formats: Pixel, Resolution, File Size, Image Compression, Raster & Vector Images, Color Model.

UNIT II Capturing and Creating Images: Saving Images, Scanning Images, Familiarization with GIMP Interface.

UNIT III Settings: Foreground and Background Colors, Grid Properties.

UNIT IV Image Manipulations: Resizing images, Cropping images, Moving and Copying images, Rotating and flipping images.

UNIT V Working with Text: Creating and editing text, Formatting Text, Applying text wraps.

UNIT VI Tools: Drawing tools, Painting tools.

REFERENCE BOOKS

Kay Richter, GIMP 2.8- Buch (e-book)

Olivier Lecarme and Karine Delvare, The Book of GIMP, A complete Guide to Nearly Everything, Kindle Edition

B. Practicum

Students are required to implement a project based on learned concepts.

7. Curriculum Alignment Matrix

Curriculum Alignment Matrix lists the learning objectives against the courses in the program and it becomes clear where assessment of student learning should occur. The curriculum alignment matrix becomes the basis of the assessment plan. With this, faculty and/or assessment coordinator can determine what student artifact or work sample (signature assignment or other assignment(s)) can be used to measure progress towards the learning objectives and/or when the assessment will take place. In addition, the matrix will help point out any gaps in the curriculum. The exercise of building and reviewing a curriculum alignment matrix encourages reflection on the curriculum and can lead to better integration among courses.

Curriculum Alignment Matrix is a table with one row for each learning outcome and one column for each course or required event/experience. Faculty identify where key learning outcomes are *introduced* (I), *reinforced* with the opportunity to practice (R or P), and where *mastery* (M) is achieved at the senior or exit level. When the matrix is complete, the program can identify where assessment evidence (A) should be gathered. In addition to courses, faculty should include any other required events/experiences (e.g., internships, department symposium, national licensure exams).

TABLE VI: Curriculum Alignment Matrix for BSc with Computer Science

Course Type	Course Name	PLO-									
		A	B	C	D	E	F	G	H	I	J
CC-1A	Programming Methodology	I	I	-	I	-	-	I	-	I	-
CC-2A	Data Structures	R	-	-	R	-	I	I	-	-	-
CC-3A	Operating System	R	I	-	-	I	-	I	I	-	-
CC-4A	Database Management System	-	R	-	M	-	I	R	I	I	I
DSE-1A Any One	Software Engineering	M	R	-		I	I	R	I	I	-
	Computer Ethics	-	-	-	-	I	I	-	-	I	-
	Computer Organization & Architecture	I	I	-	-	-	I	-	I	-	-
	Computer Networks	-	M	I	-	R	R	I	R	-	I
DSE-2A Any One	Data Mining	M	-	-	M	-	R	M	-	-	R
	Internet of Thing	-	I	-	M	R	M	R	R	-	R
	Artificial Intelligence	M	-	I	-	-	M	R	-		R
	Computer Graphics	M	M	-	-	-	I	-	-	-	R
SEC-3A Any one	MATLAB Programming	R	M	-	R	-	R	I			
	Programming in Java	R	M	-	R	-	R	I	-	-	-
	Python Programming	R	M	-	R	-	R	I			
SEC-4A Any one	Web Programming	-	R	I	-	-	M	R	-	R	I
	Mobile Application Development	-	I	I	M	R	M	M	-	-	I
	Cloud Computing	-	R	I	M	R	M	M	-	-	I

TABLE VII: Curriculum Alignment Matrix for BSc (Hons) in Computer Science

	Course Name	PLO-														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
CC	Prog Methodology	I	I	-	I	-	-	I	-	I	-	I	I	-	-	-
	Comp System Arch	I	I	I	-	I	-	I	I	I	-	-	-	-	-	-
	Data Structures	R	-	-	R	-	I	I	-	-	-	I	-	-	-	-
	Discrete Structure											-	-	-	-	-
	Operating System	R	I	-	-	I	-	I	I	-	-	I	I	-	-	-
	Algorithm	M	M	I	M	-	R	-	-	-	-	R	I	-	-	-
	Computer Graphics	M	M	-	-	-	I	-	-	-	R	-	I	-	-	-
	Computer Networks	-	M	I	-	R	R	I	R	-	I	R	I	-	-	-
	Software Engineering	-	R	-	M	-	I	R	I	I	I	I	I	-	-	-
	DBMS	-	R	-	M	-	I	R	I	I	I	R	I	-	-	-
	Object-Oriented Prog	R	M	-	R	-	R	I	-	-	-	I	I	-	M	M
	Internet Technologies	M	-	I	-	-	M	R	-	-	R	R	R	I	M	M
	Artificial Intelligence	M	-	I	-	-	M	R	-	-	R	M	M	R	M	M
	Computer Graphics	M	-	I	-	-	M	R	-	R	R	M	R	-		
	Machine Learning	M	-	M	-	-	M	M	-	-	R	M	M	M	M	M
SE C	MATLAB Programming	R	M	-	R	-	R	I		I		-	I	I	I	I
	Programming in Java	R	M	-	R	-	R	I	-	-	-	I	I	I	I	I
	Python Programming	R	M	-	R	-	R	I		-		-	I	I	I	I
	Web Programming	-	R	I	-	-	M	R	-	R	I	-	I	I	I	I

	Mobile Application Development	-	I	I	M	R	M	M	-	-	I	-	I	I	I	I
DS E	Cloud Computing	-	R	I	M	R	M	M	-	-	I	R	M	R	R	R
	Image Processing	M	-	R	-	-	M	R	-	-	R	M	M	R	M	M
	Data Mining	M	-	R	-	-	M	R	-	-	R	M	R	R	M	M
	Data Analytics	M	-	R	-	-	M	R	-	-	R	M	R	R	R	M
	Internet of Things	M	-	R	-	-	M	R	-	-	R	R	R	R	M	M

8. Teaching-Learning Process

The teaching-learning process should be in-line with the course objective and outcomes. Teaching has to ensure that the suggested outcomes are ensured for each course and overall programme. Teaching-aids should be used wherever required to facilitate proper and impactful learning. Blended learning is recommended with the use of MOOC platforms and classroom teaching.

To meet the set objectives of the course and enable students achieve the expected outcomes of the course the teaching-learning process should be appropriately chosen. Though the teachers are best positioned to create innovative models suitable for teaching the course, certain well accepted and widely tested processes are suggested to achieve the desired outcomes

CLASSROOM TEACHING - Regular classroom and face to face teaching and tutorials can be primarily used for imparting theoretical foundations of Computer Science. Applications of the same may be explained from time to time so that the student can appreciate the theory.

LABORATORY - Lab exercises in programming and usage of package / software tools should be made mandatory and integral part. Open source software/Packages should be preferred over proprietary tools wherever available.

SEMINARS - Guest lectures and seminars involving industry experts and eminent teachers should be arranged to help the students understand the practices in the industry and developments in the field.

MOOCS - Teacher should choose appropriate lecture materials and videos on similar courses available online through Massive Open Courses Online in the world wide web (such as NPTEL) to provide good perspective of the course and usecases and promote blended learning.

PROJECT - Wherever possible the laboratory assignments can be designed in the form of a mini project. For example, the database course lab assignments can be designed to build a complete system for library management. Similarly, summer/ Semester breaks can be utilized for guiding students to develop live projects with industry orientation/ industry problem. Teamwork work should be encouraged,

- (1) **ASSIGNMENTS** - Home assignments should be designed to make student collect information from various sources and solve unfamiliar problems and make comparisons of solutions
- (2) **MAJOR PROJECT** - The major project should be defined based on the student proposals keeping in mind that opportunity to demonstrate the knowledge and skills gained during the course. One-One mentoring support should be provided.
- (3) **Simulation** - Packages to provide simulated environments to teach various components of networking and hardware working should be used wherever feasible.

9. Assessment Methods

The committee recommends that assessment should be viewed not only merely as a testing by the institution to evaluate the students' progress, but also as a valuable tool for a student to learn what is expected of him/her, where their level of knowledge and skill is lacking, and perhaps most importantly, what he/she could do to improve these levels with the valuable inputs of the lecturers. Assessment methods are the strategies, techniques, tools and instruments for collecting information to determine the extent to which students demonstrate desired learning outcomes. In the Bachelor's programmes leading to degrees such as BSc with Computer Science and BSc(Hons) in Computer Science, the assessment and evaluation methods focus on testing the conceptual understanding of the basic ideas of computer hardware and software, development of programming skills and experimental techniques, retention and ability to apply the knowledge acquired to real-life applications, and to solve new problems and communicate the results and findings effectively. Based on the Learning Objectives defined for each course as proposed in detail, assessment methods can be designed to monitor the progress in achieving the Learning Objectives during the course and test the level of achievement at the end of the course. Several methods can be used to assess student learning outcomes. Relying on only one method to provide information about the program will only reflect a part of students' achievement.

Modular Assessment

As the courses are broken up into a smaller more cohesive learning outcomes a module will consist of a number of these smaller, finer grained assessments of which the majority can be considered to be formative assessments that aid the learning process rather than assessments aimed at solely being used to evaluate the student.

Continuous Assessment

The continuous assessment occurs on a regular and continuous basis, it is an ongoing formative and summative process, involves the monitoring of students, is integrated with teaching, involves a systematic collection of marks or grades into a final score, may be used to determine the students' final grades.

Direct methods of assessment ask students to demonstrate their learning while indirect methods ask students to reflect on their learning. Tests, essays, presentations, etc. are generally direct

methods of assessment, and indirect methods include surveys and interviews. For each Learning Objective, a combination of direct and indirect assessment methods should be used.

Formative Assessment

While *formative assessment* is to gather feedback from formal or informal processes that can be used by the instructor and the students to gather evidence for the purpose of improving learning, *summative assessment* measures the level of success or proficiency that has been obtained at the end of an instructional unit, by comparing it against some standard or benchmark. Nevertheless, the outcome of a *summative assessment* can be used formatively when students or faculty use the results to guide their efforts and activities in subsequent courses. Daily programming assignments or home-assignments is a good way of implementing *formative assessment* and gives an idea of how well the students understood and could apply each programming concept. Another way of *formative assessment* can be that at the end of each class period, a student response system can be used to ask students one or more questions about the topic taught on that day. Regular tutorial Assignment, Term-paper, Seminar Presentation, Surprise Quizzes, Open-book Quizzes should be adopted for formative assessments. It is suggested that 25-30% weightage be given *Formative Assessments* in case of theory components while 30-40% weightage be given to the Programming/Laboratory/Projects/Dissertation components of the various courses.

During the semester, at least three smaller formative assessments shall be given for each course. To pass a course a student had to achieve marks between 70% in two of the assessment opportunities. The philosophy is that the student could fail one opportunity and take the experience gained from that opportunity to pass subsequent assessments.

Summative Assessment

For the traditional summative assessment, it is the semester tests based. The students need to attend two semester tests which consist of half of the content they learned for each test. Students are admitted to an examination for individual courses if they attain the minimum semester mark of 40%. Summative Assessment for the theory papers, can be a combination of Mid -Semester Test, Individual /Team Project report, Oral Presentations of Seminar/Projects, Viva -Voce Examination for dissertation and End Semester closed book examination. Summative Assessment methods shall be different for theory courses and Practical Courses.

It is suggested that the examination questions should be asked keeping the learning outcomes in mind and also covering all the Units. Term papers, problem solving assignments, Lab

projects, Internship experience, group projects are recommended for achieving the expected outcomes. Wherever possible, students need to do minor projects in practical classes to learn the technology and also to apply the technology for problem solving. As this is a technology oriented programme and new technologies are introduced quite often, care should be taken to familiarize the students with the recent advances through seminars or term papers and case studies. This should be given due weightage during continuous evaluation process. To achieve this objective, the following are suggested

- (i) The end examination papers should be covering all units of the syllabus. Questions should be balanced and evaluate the comprehension, analytical and problem-solving skills.
- (ii) The students should be evaluated on teamwork in addition to the technical skills through projects.
- (iii) Ability to self-learning and solving new problems should be assessed through assignments, Seminars and project work.
- (iv) It is recommended that 25-30% weightage of marks shall be devoted for formative assessment.
- (v) It is recommended that 40% weightage be given for practical and laboratory work.
- (vi) Peer evaluation component is recommended for project evaluation and seminar.
- (vii) Online course certification should be encouraged and equivalent grade for the same need to be worked to achieve the outcome of self-learning.

10. Keywords

Learning Outcome, Graduate Aptitude, Qualification Descriptor, Generic Elective, Skill Enhancement, Core Compulsory Courses, Discipline Specific Elective, Summative Assessment, Formative Assessment, Curriculum Alignment Matrix.

दिल्ली विश्वविद्यालय UNIVERSITY OF DELHI

**Computer Science Courses
for
Physical Science/ Mathematical Science**
(Effective from Academic Year 2019-20)



Revised Syllabus as approved by

Academic Council

Date:

No:

Executive Council

Date:

No:

**Applicable for students registered with Regular Colleges, Non Collegiate
Women's Education Board and School of Open Learning**

List of Contents	Page No.
Preamble	2
1. Introduction to Computer Science Courses for BSc Physical Science/Mathematical Science	3
2. Aims of Computer Science Courses for BSc Physical Science/Mathematical Science	3
3. Structure of Computer Science Courses for BSc Physical Science/Mathematical Science	4
3.1. Credit Distribution	4
3.2. Semester-wise Placement of Courses.	5
4. Detailed Syllabi of Computer Science Courses for BSc Physical Science/Mathematical Science	7
Acknowledgement	59

Preamble

The objective of any programme at Higher Education Institute is to prepare their students for the society at large. The University of Delhi envisions all its programmes in the best interest of their students and in this endeavour it offers a new vision to all its Under-Graduate courses. It imbibes a Learning Outcome-based Curriculum Framework (LOCF) for all its Under Graduate programmes.

The LOCF approach is envisioned to provide a focused, outcome-based syllabus at the undergraduate level with an agenda to structure the teaching-learning experiences in a more student-centric manner. The LOCF approach has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice. The Under-Graduate Programmes will prepare the students for both, academia and employability.

Each programme vividly elaborates its nature and promises the outcomes that are to be accomplished by studying the courses. The programmes also state the attributes that it offers to inculcate at the graduation level. The graduate attributes encompass values related to well-being, emotional stability, critical thinking, social justice and also skills for employability. In short, each programme prepares students for sustainability and life-long learning.

The new curriculum of Computer Science Courses for BSc Physical Science/Mathematical Science is designed to develop computational thinking, analytical, and problem solving skills. It covers core computer science topics and offers electives so that students can apply these skills while studying subjects like Maths, Physics, Chemistry etc. The programme also lays down the foundation for higher studies in the field of Computer Science/Applications.

The University of Delhi hopes the LOCF approach of the Computer Science Courses for BSc Physical Science/Mathematical Science will help students in making an informed decision regarding the goals that they wish to pursue in further education and life, at large.

1. Introduction to Computer Science Courses for BSc Physical Science/Mathematical Science

BSc Physical Science/Mathematical Science programme with Computer Science is offered in several prestigious colleges of the University of Delhi. This programme aims to introduce the discipline of Computer Science to the students who wish to either pursue higher studies in computer science or wish to use computational skill in study of physical and mathematical sciences. The courses are designed to promote logical thinking, analytical skills, develop programming skills and application of knowledge of computing to solve problems in other disciplines.

The curriculum for computer science courses in BSc Physical Science/Mathematical Science programme was developed by the Department of Computer Science by following the due diligent process. Close consultations were held with the college teachers involved in teaching of the courses. Inputs were collected from the college teachers in general body meetings and the courses were decided. Subsequently, committees were formed for designing syllabi for each course. Draft syllabus of each course was thoroughly discussed and debated among the peers in DU colleges. After multiple iterations, the final syllabus of the programme was approved in the Committee of Courses for Undergraduate Studies. The draft was then published in public domain for review by all stakeholders, and additionally sent for peer review outside University of Delhi. The review comments were thoroughly discussed in the Committee of Courses for Undergraduate Studies, and the appropriate changes were incorporated. Finally, the syllabus was placed in the Faculty of Mathematical Sciences and approved.

2. Aims of Computer Science Courses for BSc Physical Science/Mathematical Science

The objective of BSc Physical Science/Mathematical Science Programme with Computer Science is to introduce the discipline to students who want to pursue either higher studies in science or branch off to other disciplines for higher studies, or those who want to be educators. Specifically, the program aims the following achievements for students.

1. To attain understanding of computer systems, their applications and fundamentals.
2. To develop ability to apply knowledge of computing to solve computational problems.
3. To analyze a problem, and identify the computing requirements appropriate to its solution.

4. To design, implement, and evaluate a computer-based system, process or program to meet the desired needs.
5. To communicate effectively with a range of audiences

3.1 Course Structure for Under -Graduate (Non-Hons.) Programme

Course	Credits	
	Theory+ Practical	Theory+ Tutorial
=====		
<u>I. Core Course</u>	12X4=48	12X5=60
(12 Papers)		
Core Course Practical / Tutorial*		
Two papers – English		
Two papers – MIL		
Four papers – Discipline 1.		
Four papers – Discipline 2.		
Core Course Practical / Tutorial	12X2=24	12X1=12
(12 Practicals)		
<u>II. Elective Course</u>	6X4=24	6X5=30
(6 Papers)		
Two papers- Discipline 1 specific		
Two papers- Discipline 2 specific		
Two papers- Inter disciplinary		
Two papers from each discipline of choice		
and two papers of interdisciplinary nature.		
Elective Course Practical / Tutorials	6X2=12	6X1=6
(6 Practical/ Tutorials)		
Two papers- Discipline 1 specific		
Two papers- Discipline 2 specific		
Two papers- Generic (Inter disciplinary)		
Two papers from each discipline of choice		
including papers of interdisciplinary nature.		
• Optional Dissertation or project work in place of one elective paper (6 credits) in 6th Semester		
<u>III. Ability Enhancement Courses</u>		
Ability Enhancement Compulsory Courses (AECC)	2X4=8	2X4=8
(2 Papers of 4 credits each)		
Environmental Science		
English Communication/MIL		
Skill Enhancement Courses (SEC)	4X4=16	4X4=16
(4 Papers of 4 credits each)		
Total credits	132	132

3.2 Semester Wise Placement of Computer Science Courses

Sem- ester	Discipline Specific Core Course (DSC) (4)	Ability Enhanceme nt Compulsor y Course (AEC) (2)	Skill Enhanceme nt Course (SEC) (4)	Elective Discipline Specific (DSE) (2)
I	BSCS01	AECC 1		
II	BSCS02	AECC 2		
III	BSCS03		BSCS07A BSCS07B	
IV	BSCS04		BSCS08A BSCS08B	
V			BSCS09A BSCS09B	BSCS05A BSCS05B
VI			BSCS10A BSCS10B	BSCS06A BSCS06B BSCS06C

Discipline Specific Core Papers (DSC) for Computer Science (Credit: 06 each)

1. BSCS01: Problem Solving using Computers
2. BSCS02: Database Management Systems
3. BSCS03: Operating System
4. BSCS04: Computer System Architecture

Discipline Specific Elective Papers: (Credit: 06 each) (DSE-1, DSE -2)

Choose One from each group.

Options for DSE1:

1. BSCS05A: Data Structures
2. BSCS05B: Digital Image Processing

Options for DSE2:

1. BSCS06A: Computer Networks
2. BSCS06B: Analysis of Algorithms
3. BSCS06C: Project Work / Dissertation

Skill Enhancement Elective Courses

(SEC1, SEC2, SEC3, SEC4)

Choose one from each group.

Options for SEC1:

1. BSCS07A: Data Analysis using Python Programming
2. BSCS07B: Introduction to R Programming

Options for SEC2:

1. BSCS08A : Programming in C++
2. BSCS08B: Programming in Java

Options for SEC3:

1. BSCS09A: Advanced Programming in Java
2. BSCS09B: Web Design using HTML5

Options for SEC4:

1. BSCS10A: Android Programming
2. BSCS10B: PHP Programming

Note:

1. There will be one batch of 10-15 students for practical classes. The size of tutorial group for papers without practical is recommended to be 8-10 students.
2. Each practical will carry 50 marks including 25 marks for continuous evaluation and 5 marks for the oral viva.
3. Colleges are advised and encouraged to conduct the practical using Free and Open Source Software (FOSS)
4. At least two questions have to be compulsorily attempted in the final practical examination.
5. Softcopy of all the practical must be maintained by each student for each practical paper.
6. Discipline specific core and elective courses (DSC and DSE) are to be taught as 4 Hrs theory and 4 Hrs practical per week. In case the course has tutorials, it is to be taught as 5 Hrs theory and 1 Hr tutorial per week
7. Skill enhancement courses (SEC) are to be taught as 2 Hrs theory and 4 Hrs practical per week.
8. Practical given for the courses are only indicative, and by no means exhaustive. Instructor may add more complex problems in laboratory depending on the ability of the students.

4. Detailed Syllabi of Computer Science Courses for BSc Physical Science/Mathematical Science

Problem Solving using Computers (BSCS01)

Core Course - (CC) Credit:6

Course Objective

This course is designed as the first course in programming to develop problem solving skills. The course focuses on modularity, reusability, code documentation, and debugging skills. It also introduces the concept of object-oriented programming.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. describe the components of a computer and the notion of an algorithm.
2. apply suitable programming constructs and data structures to solve a problem.
3. develop, document, and debug modular python programs.
4. use classes and objects in application programs.
5. use files for I/O operations.

Unit 1

Computer Fundamentals and Problem Solving: Basic Computer Organization: CPU, memory, I/O Units. Problem solving using computer, notion of an algorithm.

Unit 2

Introduction to Python Programming: Python interpreter, using python as calculator, python shell, indentation, identifiers and keywords, literals, strings, arithmetic, relational and logical operators.

Unit 3

Creating Python Programs: Input and output statements, defining functions, control statements default arguments, errors and exceptions.

Unit 4

Inbuilt Data Structures: strings, lists, sets, tuples, nested lists, built-in functions, dictionary and associated operation.

Unit 5

Object Oriented Programming: Introduction to Classes, Objects and Methods, Standard Libraries, File handling through libraries.

Unit 6

Sorting and Searching: Iterative and Recursive methods for searching and sorting

Practical

1. Execution of expressions involving arithmetic, relational, logical, and bitwise operators

in the shell window of Python IDLE.

2. Write a Python function to produce the following outputs.

(a) *

 **

(b) \$ \$ \$ \$ \$

 \$ \$

 \$ \$

 \$ \$

 \$ \$ \$ \$ \$

3. Write a Python program to illustrate the functions of math module specified by the instructor in laboratory.
4. Write a Python program to produce a table of sins, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x).
5. Write a menu driven program to calculate the area of Square, rectangle, circle and triangle. Use suitable assertions.
6. Write a Python function that takes a number as an input from the user and computes its factorial. Then find the sum of the n terms of the following series:

$$1 + 1/1! + 1/2! + 1/3! + \dots + 1/n$$

7. Write a Python function to return n th terms of Fibonacci sequence
8. Write a function that takes a number as an input and finds its reverse and computes the sum of its digits.
9. Write a function that takes two numbers as input parameters and returns their least common multiple.
10. Write a function that takes a number as an input and determine whether it is prime or not.
11. Write a Python function that takes a string as an input from the user and displays its reverse.

More exercises using sets, lists and dictionary, as announced by instructor in the laboratory.

References

1. Downey, A.B. (2008). *Think Python–How to think like a Computer Scientist*. Needham, Massachusetts : Green Tea Press.
2. Urban, M. & Murach, J. (2018). *Python Programming*. Shroff.

Additional Resources

1. Guttag, J. V. (2013). *Introduction to computation and programming using Python*. MIT Press.
2. Liang, Y. D. (2013). *Introduction to Programming using Python*. Pearson.
3. Taneja, S. & Kumar, N. (2018). *Python Programming - A modular Approach*. Pearson.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 2	Unit 1-Computer Fundamentals and Problem Solving: Basic Computer Organization: CPU, memory, I/O Units. Problem solving using computer, notion of an algorithm.
Week 3 - 4	Unit 2-Introduction to Python Programming: Python interpreter, using python as calculator, python shell, indentation. identifiers and keywords, literals, strings, arithmetic, relational and logical operators.
Week 5 - 7	Unit 3- Creating Python Programs: input and output statements, defining functions, control statements, default arguments, errors and exceptions.
Week 7 - 9	Unit 4 - Inbuilt Data Structures: Strings, lists, sets, tuples, nested lists, built-in functions, dictionary and associated operation.
Week 10 - 11	Unit 5 - Object Oriented Programming: Introduction to Classes, Objects and Methods, Standard Libraries, File handling through libraries.

Week 12 - 15	Unit 6 - Sorting and Searching: Iterative and Recursive methods for searching and sorting
---------------------	--

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Problem Solving, Control structure, Functions, Strings, Lists, Object Oriented Programming

Database Management Systems (BSCS02) Core Course –(CC) Credit:6

Course Objective

The course introduces the students to the fundamentals of database management systems and methods to store and retrieve data. The course would give students hands-on practice of structured query language in a relational database management system.

Course Learning Outcomes

Upon successful completion of the course, students will be able to:

1. use database management system to manage data.
2. create entity relationship diagrams for modeling real-life situations and design the database schema.
3. use the concept of functional dependencies to remove data anomalies and arrive at normalized database design.
4. write queries using relational algebra and SQL.

Unit 1

Introduction to DBMS: Introduction to Database Management Systems, characteristics of database approach, data models, DBMS architecture and data independence.

Unit 2

Conceptual Modelling using ERD and EERD: Entity Relationship (ER) and Enhanced ER (EER) modeling, entity types, relationships, relationship constraints, and object modeling.

Unit 3

Relational Data Model and Relational Algebra: Relational data model concepts, relational constraints, queries in relational algebra.

Unit 4

Introduction to SQL: Data definition and data manipulation queries in SQL.

Unit 5

Database Design: Mapping of ER and EER diagrams to relational database, functional dependencies, Normalization and normal forms up to third normal form.

Practical

Note: MyAccess/MySQL may be used.

The following concepts must be introduced to the students:

Practicals based on DDL Commands

Create table, alter table, drop table

Practicals based on DML Commands

- a) Select, update, delete, insert statements
- b) Condition specification using Boolean and comparison operators (and, or, not, =, <>, >, <, >=, <=)
- c) Arithmetic operators and aggregate functions (Count, sum, avg, Min, Max)
- d) Multiple table queries (join on different and same tables)
- e) Nested select statements
- f) Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- g) Categorization using group by.....having
- h) Arranging using order by

Queries for the given schema

- a) Create tables with relevant foreign key constraints
- b) Populate the tables with data
- c) Display all the details of all records in table.
- d) Display some fields of the records in table.
- e) Conditionally display some fields of the records in table.
- f) Retrieve all distinct values of an attribute
- g) Retrieve records from table for numeric attribute in range
- h) Retrieve records that satisfy complex condition.

Queries for typical (Employee, Project, Department) database

- a) Retrieve the names of all employees who do not have supervisors
- b) Retrieve SSN and department name for all employees

- c) Retrieve the name and address of all employees who work for the 'Research' department

More exercises as announced by instructor in the laboratory.

References

1. Elmasri, R., Shamkan, & Navathe, B. (2017). *Fundamentals of Database Systems (7th Edition)*. Pearson Education.

Additional Resources

1. Ramakrishanan, R., & Gehrke, J. (2002). *Database Management Systems (3rd Edition)*. McGraw-Hill.

2. Silberschatz, A., Korth, H.F., & Sudarshan, S. (2011). *Database System Concepts (6th Edition)*. McGraw Hill.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 3	Unit 1 - Introduction to DBMS: Introduction to Database Management Systems, characteristics of database approach, data models, DBMS architecture and data independence.
Week 4 - 6	Unit 2- Conceptual Modelling using ERD and EERD: Entity Relationship (ER) and Enhanced ER (EER) modeling, entity types, relationships, relationship constraints, and object modeling
Week 7 - 9	Unit 3 - Relational Data Model and Relational Algebra: Relational data model concepts, relational constraints, queries in

	relational algebra
Week 10 - 11	Unit 4 - Introduction to SQL: Data manipulation and data definition queries in SQL
Week 12 -15	Unit 5- Database Design: Mapping of ER and EER diagrams to relational database, functional dependencies, Normalization and normal forms up to third normal form

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

DBMS architecture, Data Independence, Entity modeling, Relational Data Model, SQL, Normalization

Operating Systems (BSCS03) Core Course - (CC) Credit:6

Course Objective

This course introduces Operating System concepts and its importance in computer system. It focuses on the basic facilities provided in modern operating systems.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. understand the rationale behind the current design and implementation decisions in modern Operating Systems by considering the historic evolution.
2. identify modules of the operating systems and learn about important functions performed by operating system as resource manager.
3. use the OS in a more efficient manner.

Unit 1

Introduction: Operating systems, System software, Operating system resources, Operating System as resource manager.

Unit 2

Types of Operating Systems and Organization: Multiprogramming, batch, time sharing operating systems, personal computers & workstations. Basic OS functions, mechanisms of requesting operating system services – system calls and system programs.

Unit 3

Processor Management: Distinction between program and process, process address space, process states, process scheduling algorithms, process schedulers.

Unit 4

Memory Management: Mapping logical address space to physical address space, fixed partition, variable partition, paging, segmentation, virtual memory.

Unit 5

File and Input/Output Device Management: Classifications of I/O devices, I/O handling, file systems services, directory structure, disk storage.

Unit 6

Shell scripting: Shell variables, parameter passing, conditional statements, iterative statements, writing and executing shell scripts, utility programs (cut, paste, grep, echo, pipe, filter, etc.)

Practical

1. Usage of following commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands: cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify “cal” command to display calendars of the specified months.
6. Write a shell script to modify “cal” command to display calendars of the specified range

- of months.
7. Write a shell script to accept a login name. If not a valid login name display message – “Entered login name is invalid”.
 8. Write a shell script to display date in the mm/dd/yy format.
 9. Write a shell script to display on the screen sorted output of “who” command along with the total number of users .
 10. Write a shell script to display the multiplication table of any number.
 11. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
 12. Write a shell script to find the sum of digits of a given number.
 13. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
 14. Write a shell script to find the LCD(least common divisor) of two numbers.
 15. Write a shell script to perform the tasks of basic calculator.
 16. Write a shell script to find the power of a given number.
 17. Write a shell script to find the factorial of a given number.
 18. Write a shell script to check whether the number is Armstrong or not.
 19. Write a shell script to check whether the file have all the permissions or not.
 20. Program to show the pyramid of special character “*”.

References

1. Silberschatz, A., Galvin, P.B., & Gagne, G. (2008). *Operating Systems Concepts (8th Edition)*. John Wiley Publications.

Additional Resources

1. Milenkovic, M. (1992). *Operating Systems - Concepts and design*. Tata McGraw Hill.
2. Nutt, G. (1997). *Operating Systems: A Modern Perspective (2nd Edition)*. Pearson Education.
3. Stallings, W. (2008). *Operating Systems, Internals & Design Principles (5th Edition)*. Prentice Hall of India.
4. Tanenbaum, A.S. (2007). *Modern Operating Systems (3rd Edition)*. New Delhi: Pearson Education.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 2	Unit 1 - Introduction : System software, resource abstraction, Operating System
-------------------	---

	strategies, Operating System as resource manager
Week 3 - 5	Unit 2 - Types of operating Systems and organizations Multiprogramming, batch, time sharing, personal computers & workstations, Basic OS functions, process modes, methods of requesting system services – system calls and system programs.
Week 6 - 7	Unit 3- Processor Management: Distinction between program and process, process address space, process states, process scheduling algorithms, process schedulers.
Week 8 - 10	Unit 4 - Memory Management: Mapping logical address space to physical address space, fixed partition, variable partition, paging, segmentation, virtual memory.
Week 11 - 13	Unit 5 - File and Input/Output Device Management: Classifications of I/O devices, I/O handling, file systems services, directory structure, disk storage.
Week 14 - 15	Unit 6 - Shell scripting: Shell variables, parameter passing, conditional statements, iterative statements, writing and executing shell scripts, utility programs (cut, paste, grep, echo, pipe, filter, etc.)

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Memory Management, Process Management, File Management, Virtual memory

Computer System Architecture (BSCS04) Core Course - (CC) Credit:6

Course Objective

The course will introduce students to the fundamental concepts of digital computer organization, design and architecture. It aims to develop a basic understanding of the design of a computer system.

Course Learning Outcomes

On successful completion of the course, students will be able to :

1. design combinational circuits using basic building blocks. Simplify these circuits using Boolean Algebra and Karnaugh maps.
2. differentiate between combinational circuits and sequential circuits
3. represent data in binary form, convert numeric data between different number systems and perform arithmetic operations in binary.
4. determine various stages of instruction cycle, various instruction formats and instruction set.
5. describe interrupts and their handling.
6. explain how CPU communicates with memory and I/O devices.

Unit 1

Digital Logic Gates, Flipflops and their characteristic table, Logic circuit simplification using Boolean Algebra and Karnaugh Map, Don't Care conditions.
Combinational Circuits, Sequential Circuits.

Unit 2

Digital Components: Decoders, Encoders, Multiplexers, Binary Adder, Binary Adder-Subtractor, Binary Incrementer, Registers and Memory Units

Unit 3

Data Representation: Binary representation of both numeric and alphanumeric data, representation of numeric data in different number systems (Binary, Octal, Decimal and Hexadecimal), conversion from one number system to another, complements, representation of decimal numbers, representation of signed and unsigned numbers, addition and subtraction of signed and unsigned numbers and overflow detection.

Unit 4

Operations and Control: Arithmetic and logical micro-operations, instruction format, micro programmed control vs hardwired control, instruction set completeness, Timing and control,

instruction cycle, memory reference instructions and their implementation using arithmetic, logical, program control, transfer and input output micro operations, interrupt cycle.

Unit 5

Instructions: Instruction format illustration using single accumulator organization, general register organization and stack organization, zero-address instructions, one-address instructions, two-address instructions and three-address instructions, Addressing Modes

Unit 6

Peripheral Devices: I/O interface, I/O vs. Memory Bus, Isolated I/O, Memory Mapped I/O, Direct Memory Access

Practical

1. Write a program to convert a number in Radix 'R' to radix 10 and vice versa. Test the same by
 - a. Converting an unsigned number from binary, octal, hex to decimal.
 - b. Converting an unsigned number from decimal to binary, octal, hex.
2. Write a program that will prompt for the input of two integer values. Then using the bitwise shift operators show the result of
 - a. Left shifting the first number by the second
 - b. Right shifting the first number by the second
 - c. Exclusive OR of the first number by the second bitwise
 - d. OR of the first number by the second bitwise
 - e. AND of the first number by the second bitwise
3. Write a program that will prompt for the input of a binary value and print:
 - a. One's complement
 - b. Two's complement
4. Write a program to print the values of a 5 bit binary up-down counter. User should be able to specify the up or down nature of the counter.
5. Write a program to implement the following binary operations:
 - a. Addition
 - b. Subtraction using 2's complement.
6. Program related to concepts taught in theory

References

1. Mano, M. (1992). *Computer System Architecture (3rd Edition)*. Pearson Education.

Additional Resources

1. Mano, M. (2013). *Digital Design*. New Jersey: Pearson Education Asia.
2. Null, L., & Lobur, J. (2014). *The essentials of computer organization and architecture*. Jones & Bartlett Publishers.
3. Stallings, W. (2003). *Computer organization and architecture: designing for performance*.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 4	Unit 1 - Introduction: Digital Logic Gates, Flipflops and their characteristic table, Logic circuit simplification using Boolean Algebra and Karnaugh Map, Don't Care conditions. Combinational Circuits, Sequential Circuits.
Week 5 - 6	Unit 2 - Digital Components: Decoders, Encoders, Multiplexers, Binary Adder, Binary Adder-Subtractor, Binary Incrementer, Registers and Memory Units
Week 7 - 9	Unit 3 - Data Representation: Binary representation of both numeric and alphanumeric data, representation of numeric data in different number systems (Binary, Octal, Decimal and Hexadecimal), conversion from one number system to another, complements, representation of decimal numbers, representation of signed and unsigned numbers, addition and subtraction of signed and unsigned numbers and overflow detection.
Week 10 - 11	Unit 4 - Operations and Control: Arithmetic and logical micro-operations, instruction format, micro programmed control vs hardwired control, instruction set completeness, Timing and control, instruction cycle, memory reference instructions and their implementation using arithmetic, logical, program control, transfer and input output micro operations, interrupt cycle.
Week 12 - 13	Unit 5 - Instructions: Instruction format illustration using single accumulator organization, general register organization and stack organization, zero-address instructions, one-address instructions, two-address

	instructions and three-address instructions, Addressing Modes
Week 14 -15	Unit 6 - Peripheral Devices: I/O interface, I/O vs. Memory Bus, Isolated I/O, Memory Mapped I/O, Direct Memory Access

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Combinational circuits, Data representation, Interrupts, I/O interface

Data Structures (BSCS05A)

Discipline Specific Elective - (DSE) Credit:6

Course Objective

The course introduces the students to the fundamentals of data structures. Students will learn about arrays, stacks, queues, linked lists, recursion and trees.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. demonstrate a thorough understanding of the behaviour of basic data structures.
2. implement data structures efficiently in programming language C++.
3. demonstrate an understanding of recursion by applying recursive techniques to solve problems.

Unit 1

Arrays and Sorting: Single and multi-dimensional arrays, sparse matrices, different sorting methods including bubble, selection, insertion, merge, quick sort, linear and binary searching.

Unit 2

Stacks: Implementing stack using array, prefix, infix and postfix expressions, application of

stacks for conversion of infix to prefix and postfix expressions, evaluation of postfix expressions.

Unit 3

Queue: Implementing simple queue, circular queues and priority queues using array.

Unit 4

Linked Lists: Single, double and circular lists, implementing stack and queue using linked lists.

Unit 5

Recursion: Recursive solutions to simple problems and their implementation, advantages and limitations of recursion.

Unit 6

Trees: Introduction to tree as a data structure, binary trees, binary search tree- creation and traversal techniques.

Practical

- a. Implement sorting algorithms using arrays.
- b. Implement searching algorithms using arrays and lists.
- c. Implement stack data structure and its operations.
- d. Convert Prefix expression to Infix and Postfix expressions, and evaluate.
- e. Implementing queue using array, circular queues, priority queues.
- f. Implementing stack and queue using arrays and linked lists.
- g. Implementing recursive solutions to simple problems.
- h. Creating and traversing Binary Trees and Binary Search Tree.

References

1. Drozdek, A. (2012). *Data Structures and algorithm in C++ (3rd Edition)*. Cengage Learning.

Additional Resources

1. Sahni, S. (2011). *Data Structures, Algorithms and applications in C++ (2nd Edition)*. Universities Press.
2. Tenenbaum, A. M., Augenstein, M. J., & Langsam, Y. (2009). *Data Structures Using C and C++ (2nd edition)*. PHI.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.

- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 – 4	Unit 1 - Arrays and Sorting: Single and multi-dimensional arrays, sparse matrices, different sorting methods including bubble, selection, insertion, merge, quick sort, linear and binary searching
Week 5 – 6	Unit 2 - Stacks: Implementing stack using array, prefix, infix and postfix expressions, application of stacks for conversion of infix to prefix and postfix expressions, evaluation of postfix expressions
Week 7 – 8	Unit 3 - Queue: Implementing simple queue, circular queues and priority queues using array
Week 9 - 11	Unit 4 - Linked Lists: Single, double and circular lists, implementing stack and queue using linked lists
Week 12 – 13	Unit 5 - Recursion: Recursive solutions to simple problems and their implementation, advantages and limitations of recursion
Week 14 – 15	Unit 6 - Trees: Introduction to tree as a data structure, binary trees, binary search tree- creation and traversal techniques

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Arrays, linked lists, stacks, queues, tree, recursion

Digital Image Processing (BSCS05B) Discipline Specific Elective - (DSE) Credit:6

Course Objective

The course introduces the basic concepts and methodologies of digital image processing. The topics covered include image enhancement, spatial and frequency domain, image filtering, morphological image processing and image segmentation.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. describe general terminology of Digital Image Processing and the roles of image processing systems in a variety of applications.
2. describe the basic issues and the scope (or principal applications) of image processing.
3. explain representation and manipulation of digital images, image acquisition, reading, writing, enhancement, displaying and segmentation and image Fourier transform.
4. examine various types of images, intensity transformations and spatial filtering.

Unit 1

Introduction: Fundamental steps in digital image processing (DIP), applications of DIP, components of image processing system, image types (binary, grayscale, color, truecolor, cartoon).

Unit 2

Digital Image Fundamentals : Elements of visual perception (Human eye, electromagnetic spectrum), Image acquisition, sampling and quantization, basic relationships between pixels.

Unit 3

Image Enhancement in spatial domain : Basic gray level transformations, histogram processing, smoothing and sharpening filters.

Unit 4

Image enhancement in frequency domain : DCT transform, enhancement filters in frequency domain, JPEG Image Compression.

Unit 5

Morphological Image processing: Erosion, dilation, opening , closing, Hit-or-miss transform, some basic morphological algorithms including boundary extraction, convex hull, thinning and thickening.

Unit 6

Image Segmentation : Detection of discontinuities, edge linking and basic thresholding.

Practical

- 1) Implementing Image acquisition, sampling and quantization
- 2) Programs for image enhancement in spatial domain
- 3) Programs for image enhancement in frequency domain
- 4) Implementing Morphological Image processing

References

1. Gonzalez, R. C., & Woods, R. E. (2008).*Digital Image Processing. 3rd Edition.* Pearson Education.

Additional Resources

1. Castleman, K. R. (1996). *Digital Image Processing.* Pearson Education
2. Gonzalez, R. C., Woods, R. E., & Eddins, S. (2004). *Digital Image Processing using MATLAB.* Pearson Education, Inc.
3. Jain, A. K. (1994). Fundamentals of Digital Image Processing. Prentice Hall of India
4. Schalkoff, R.J. (1989). *Digital Image Processing and Computer Vision.* New York: John Wiley and Sons.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 2	Unit 1 - Introduction: Fundamental steps in digital image processing (DIP), applications of DIP, components of image processing system, image types (binary, grayscale, color, truecolor, cartoon).
Week 3 - 5	Unit 2 - Digital Image Fundamentals : Elements of visual perception (Human eye, electromagnetic spectrum), Image acquisition, sampling and quantization, basic relationships between pixels.
Week 6 - 9	UNIT III - Image Enhancement in spatial domain : Basic gray level transformations, histogram processing, smoothing and sharpening filters.
Week 9 - 10	Unit 4-Image enhancement in frequency domain: DCT transform, enhancement filters in frequency domain, JPEG Image Compression.
Week 11 - 13	Unit 5 Morphological Image processing: Erosion, dilation, opening , closing, Hit-or-miss transform, some basic morphological algorithms including boundary extraction, convex hull, thinning and thickening.
Week 14 -15	Unit 6 - Image Segmentation : Detection of discontinuities, edge linking and basic thresholding.

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz,as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Visual perception, Image Segmentation, Fourier transform, DCT transform

Computer Networks (BSCS06A) Discipline Specific Elective - (DSE) Credit:06

Course Objective

This course provides an overview of the concepts of data communication and computer networks. Network topologies and their characteristics, different type of networks, transmission media along with their limitations and use, different protocols used in application layer are covered.

Course Learning Outcomes

Upon successful completion of the course, students will be able to:

1. understand the basics of data communication.
2. differentiate between various types of computer networks and their topologies.
3. understand the difference between the OSI and TCP/IP protocol suit.
4. explain merits and demerits of different types of communication media.
5. distinguish between different types of network devices and their functions.
6. use IP addressing and understand the need of various application layer protocols.

Unit 1

Introduction: Introduction to data communications and networking, use of Computer Networks, classification of networks, OSI model, function of the layers, TCP/IP Protocol suite.

Unit 2

Network Topologies: Bus, star, ring, mesh, tree, hybrid topologies with their features, advantages and disadvantages of each type. Transmission Modes: simplex, half duplex and full duplex.

Unit 3

Transmission Media: Guided Media (Wired) (Twisted pair, Coaxial Cable, Fiber Optics. Unguided Media (Radio Waves, Infrared, Micro-wave, Satellite).

Unit 4

Data Communication and Switching Techniques: Framing, flow control, error control, circuit switching, message switching, packet switching, routing.

Unit 5

Switching Devices: Repeaters, hubs, switches, bridges, routers, gateways. Multiplexing: (FDM,

WDM, TDM)

Unit 6

Internet: Internet Service Providers (ISP), internet addressing system: IP address with their classification and notation, application layer protocols: (DNS, URL, WWW, FTP, SMTP, HTTP, TELNET), web pages, introduction to HTML.

Practical

1. Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
2. Simulate and implement stop and wait protocol for noisy channel.
3. Simulate and implement go back n sliding window protocol.
4. Simulate and implement selective repeat sliding window protocol.

More exercises as announced by instructor in the laboratory.

References

1. Comer, D. E. (2015). *Computer Networks and Internet (6th edition)*. Pearson Publication.

Additional Resources

1. Forouzan, B. A. (2017). *Data Communications and Networking (5th edition)*. McGraw Hill.
2. Tannenbaum, A. S., & Wetherall, D. J. (2011). *Computer Networks (5th edition)*. Pearson Publication.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 2	Unit 1 - Introduction: Introduction to data communications and networking, use of Computer Networks, classification of networks, OSI model, function of the layers, TCP/IP Protocol suite.
-------------------	--

Week 3 - 4	Unit 2 - Network Topologies: Bus, star, ring, mesh, tree, hybrid topologies with their features, advantages and disadvantages of each type. Transmission Modes: simplex, half duplex and full duplex.
Week 5 - 6	Unit 3 - Transmission Media: Guided Media (Wired) (Twisted pair, Coaxial Cable, Fiber Optics). Unguided Media (Radio Waves, Infrared, Micro-wave, Satellite).
Week 7 - 8	Unit 4 - Data Communication and Switching Techniques: Framing, flow control, error control, circuit switching, message switching, packet switching, routing.
Week 9 - 11	Unit 5 - Switching Devices: Repeaters, hubs, switches, bridges, routers, gateways. Multiplexing: (FDM, WDM, TDM)
Week 12 - 15	Unit 6 - Internet: Internet Service Providers (ISP), internet addressing system: IP address with their classification and notation, application layer protocols: (DNS, URL, WWW, FTP, SMTP, HTTP, TELNET), web pages, introduction to HTML.

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Data communication, Computer Networks, Switching, Internet Protocol, IP address

Analysis of Algorithms (BSCS06B)

Discipline Specific Elective - (DSE) Credit:6

Course Objective

The course provides techniques for design and analysis of algorithms. Topics include sorting, searching, heaps, divide and conquer, greedy and dynamic programming, and graph algorithms.

Course Learning Outcomes

On successful completion of this course, the student will be able to:

1. understand the idea of algorithm analysis.
 2. understand characteristics of searching and sorting algorithms and compare efficiency of different solutions for an application at hand.
- model simple problems as **graphs** and solve those using graph algorithms.

Unit 1

Mathematical Preliminaries: Growth of functions, Asymptotic notation, standard notations and common functions. Recurrences: The substitution method for solving recurrences, recursion-tree method for solving recurrences, the master method for solving recurrences.

Unit 2

Divide and Conquer Algorithms: General method, binary search, merge sort, quicksort algorithms, space and running time analysis of the algorithms.

Unit 3

Sorting Algorithms: Insertion sort, Heapsort, Sorting in linear time.

Unit 4

Graph Algorithms: Representations of graphs, Breadth-first search, Depth-first search, topological sort.

Unit 5

Greedy Algorithms and dynamic programming: Minimum spanning tree, shortest path in a graph, 0/1 knapsack problem and fractional knapsack problem.

Practical

1. Implement Insertion Sort and report the number of comparisons.
2. Implement Merge Sort and report the number of comparisons.
3. Implement Heap Sort and report the number of comparisons .
4. Implement Randomized Quick sort and report the number of comparisons.
5. Implement Radix Sort.

6. Implement Searching Techniques.
7. Implementation of Recursive function.
8. Array and Linked list implementation of Stack and Queue.
9. Implementation of Single, Double and circular Linked List.
10. Creation and traversal of Binary Search Tree.

References

1. Cormen, T. H., Leiserson, C. E., Rivest, R. L., & Stein, C. (2015). *Introduction to Algorithms (3rd Edition)*. PHI.

Additional Resources

1. Basse, S., & Gledet, A.V. (1999). *Computer Algorithm – Introduction to Design and Analysis (3rd edition)*. Pearson.
2. Kleinberg, J., & Tardos, E. (2013). *Algorithm Design*. Pearson.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 4	Unit 1- Mathematical Preliminaries: Growth of functions, Asymptotic notation, standard notations and common functions. Recurrences: The substitution method for solving recurrences, recursion-tree method for solving recurrences, the master method for solving recurrences.
Week 5 - 7	Unit 2 - Divide and Conquer Algorithms: General method, binary search, merge sort, Quick sort algorithms, space and running time analysis of the algorithms
Week 8 - 10	Unit 3 - Sorting Algorithms: Insertion sort, Heapsort, sorting in linear time
Week 11 - 12	Unit 4 - Graph Algorithms: Representations of graphs, Breadth-first search, Depth-first search, topological sort

Week 13 - 15	Unit 5 - Greedy Algorithms and dynamic programming Minimum spanning tree, shortest path in a graph, 0/1 knapsack problem and fractional knapsack problem
---------------------	--

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Asymptotic Notation, Divide and Conquer Algorithms, Sorting Algorithms, Graph Algorithms, Greedy Algorithms, Dynamic Programming

Project Work / Dissertation (BSCS06C)

Discipline Specific Elective - (DSE) Credit:6

Course Objective

The students will undergo one semester of project work based on the concepts studied in a subject of their choice. The objective is to train the students for the industry by exposing them to prototype development of real life software.

Course Learning Outcomes

On successful completion of this course, a student will be able to:

1. develop a project plan based on informal description of the project.
2. implement the project as a team.
3. write a report on the project work carried out by the team and defend the work done by the team collectively.
4. present the work done by the team to the evaluation committee.

Unit 1

The students will work on any project based on the concepts studied in core/elective/ skill based elective courses. Specifically, the project could be a research study, or a software development project.

Unit 2

Project Group Organization/Plan

- Students will initially prepare a synopsis (500 words) and submit it to their respective department.
- For a given project, the group size could be a maximum of four (04) students.
- Each group will be assigned a teacher as a supervisor who will be responsible for their lab classes.
- A maximum of four (04) projects would be assigned to one teacher.

Unit 3

Project Evaluation

- 100 marks for end semester examination comprising Viva/presentation (50 marks) and project report evaluation (50 marks): to be awarded jointly by the examiner and supervisor / mentor.
- 50 marks for continuous evaluation (to be awarded by the supervisor/mentor). Work carried out in each lab session will be assessed out of five marks (zero for being absent). Finally, the marks obtained will be scaled out of a maximum of 50 marks. For example, if 30 lab sessions are held in a semester, and a student has obtained an aggregate of 110 marks, then he/she will be assigned round $(110/(30*5))$ i.e. 37 marks.
- The students will submit only the soft copies of the report.
- The reports may be retained by the examiners.

Practical

Practical/discussion sessions based on the area of the project.

Teaching Learning Process

- Group Discussions
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 2	Unit 1 The students will work on any project based on the concepts studied in core/elective/ skill based elective courses.
-------------------	--

	Specifically, the project could be a research study, or a software development project
Week 3 - 12	Unit 2 -Project Group Organization/Plan
Week 13-15	Unit 3 - Project Evaluation Continue the project and start report writing.

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- Internal assessment
- End semester exam

Keywords

Software Development, Project planning.

Data Analysis using Python Programming (BSCS07A)

Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective

The course enables students to analyse data using python. They will learn how to prepare data for analysis and create meaningful data visualisations. They will learn to use Pandas, Numpy and Scipy libraries to work with different data sets.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. develop a python script for data analysis and execute it.
2. install, load and deploy the required packages.
3. clean and prepare the data for accurate analysis.
4. analyse the data stored in files in different formats.
5. experiment with data visualization methods.

Unit 1

Introduction to Pandas, NumPy, SciPy: Introduction to Pandas DataFrames, Numpy multi-dimensional arrays, and SciPy libraries to work with different datasets.

Unit 2

Import and Export of Data: Installing, loading and using packages for importing and exporting data in Python.

Unit 3

Data Preprocessing and Transformation: Handling of missing data, Data cleaning and transformation.

Unit 4

Data Exploration: Exploring data using statistical methods: mean, median, mode, quantiles. Building contingency table. Basics of grouping data and Correlation.

Unit 5

Data Visualization: Scatter Plot, line graph, histogram, boxplot, line plots regression, word clouds, exporting plots as images.

Practical

Use data set of your choice from Open Data Portal (<https://data.gov.in/>) for the following exercises.

1. Make visual representations of data using library Matplotlib and apply basic principles of data graphics to create rich analytic graphs for available datasets.
2. For the given data,
 - i. Generate box whisker plot
 - ii. Identify outliers, if any
 - iii. Display 5 point summary of data distribution
3. Create a CSV file having employee data records. Each employee record has three features viz. age, home city and salary. Import employee file and :
 - i. Draw scatter plot for age vs salary
 - ii. Plot histogram for features age and salary
 - iii. Plot Pie chart for the qualitative attribute city
4. Import iris data using sklearn library to:
 - i. Compute mean, mode, median, standard deviation, confidence interval and standard error for each feature
 - ii. Compute correlation between length and width of sepal feature
 - iii. Find covariance between length of sepal and petal
 - iv. Build contingency table for class feature

5. Download datasets Hepatitis and automobile from UCI repository
 - i. Find the number of records which are noise free
 - ii. Clean data after removing noise
 - iii. Normalize quantitative features in range of [0,1]
6. Practical based on data analysis functions from Pandas, NumPy, SciPy
7. Practical based on visualizing data as Scatter Plot, line graph, histogram, boxplot, line plots regression, word clouds, and exporting plots as images

Projects and Case Studies to be done as decided by the department in the beginning of the semester.

References

1. McKinney, W. (2017). *Python for Data Analysis. Second edition*, O'reilly (SPD).

Additional Resources

1. Grus, J. (2016). *Data Science from scratch. First edition*, O'reilly (SPD).
2. VanderPlas, J. (2016). *Python Data Science Handbook: Essential Tools for Working with Data. Second edition*, O'reilly (SPD).

Web Resources

<https://docs.python.org/3/tutorial/>
<https://www.python.org/>

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Unit-wise assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 – 4	Unit 1 - Introduction to Pandas, NumPy, SciPy: Introduction to Pandas DataFrames, Numpy multi-dimensional arrays, and SciPy libraries to work with different datasets
Week 5 – 7	Unit 2 - Import and Export of Data: Installing, loading and using packages for importing and exporting data in Python
Week 8 – 10	Unit 3- Data Preprocessing and Transformation:

	Handling of missing data, Data cleaning and transformation
Week 11 – 13	Unit 4 - Data Exploration: Exploring data using statistical methods: mean, median, mode, quantiles. Building contingency table. Basics of grouping data and Correlation.
Week 14 - 15	Unit 5 - Data Visualization: Scatter Plot, line graph, histogram, boxplot, line plots regression, word clouds, exporting plots as images.

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Data import and export, Cleaning, Transformation, Data Exploration, Data Visualization

Introduction to R Programming (BSCS07B)

Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective

This course introduces statistical programming language R for data analysis. The objective is to expose the students to the strengths and capabilities of R for data analysis. It also encourages students to use open source softwares.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. develop an R script for data analysis and execute it.
2. install, load and deploy the required packages.
3. analyse the data stored in files in different formats.
4. identify suitable data visualization and exploration methods to answer a business question.
5. interpret the results of analysis.

Unit 1

Introduction to Programming Structures: R interpreter, Introduction to major R data structures like vectors, matrices, arrays, list and data frames, Flow control and loops, looping over list and array, user-defined functions.

Unit 2

File Handling: Installing, loading and using packages for reading data from files

Unit 3

Data Preprocessing and Transformation: Handling of missing data, Data cleaning and transformation

Unit 4

Data Exploration: Exploring data using statistical methods: mean, median, mode, quantiles. Building contingency table, correlation, co-variance.

Unit 5

Plotting Data: Data visualization using Scatter plot, Line graph, Histogram, Boxplot.

Practical

1. Find measures of central tendencies for the given data.
2. Draw the box plot for the given data and analyse skewness.
3. For the given data, plot the PDF.
4. Make visual representations of data using library Matplotlib and apply basic principles of data graphics to create rich analytic graphs for available datasets.
5. Randomly generate 30 numbers in the range of 1 to 40 and do the following
 - a) Generate box plot
 - b) Identify outliers, if any
 - c) Display 5 point summary of data distribution

Use data set of your choice from Open Data Portal (<https://data.gov.in/>) for the following exercises.

6. Read the all rows from the CSV file, with header. Write an R script to:
 - a) create a subset of the data records that satisfy a condition.
 - b) find suitable descriptive statistics for each column.
 - c) draw boxplot for the numeric attributes and identify outliers, if any
 - d) find correlation for each pair of numeric attributes, and draw scatter plot matrix.
 - e) draw histograms, pie charts for categorical attributes.

- f) draw the probability density curve for numeric attributes.
7. Read the CSV file, without headers and
 - a. Find the number of records which are noise free
 - b. Clean data after removing noise
 - c. Normalize quantitative features in range of [0,1]
 8. Practical based on vectors, arrays and lists, data frames
 9. Practical based on reading/writing data from/to files.
 10. Practical based on data cleaning and transformation
 11. Practical based on linear regression
 12. Practical based on visualizing data as Scatter Plot, line graph, histogram, boxplot, line plots regression, word clouds, and exporting plots as images
- Projects and Case Studies to be done as decided by the department in the beginning of the semester.

References

Cotton, R. (2017). *Learning R, A step by step function guide to data analysis*. O'reilly (SPD).

Additional Resources

1. Gardener, M. (2017). *Beginning R, The statistical programming language*. WILEY.
2. Teetor, P. (2017). *R Cookbook (10th Edition reprint)*. O'reilly (SPD).

Web Resources

<https://jrnold.github.io/r4ds-exercise-solutions/index.html>

<https://www.r-project.org/>

<https://cran.r-project.org/>

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 4	Unit 1 - Introduction to Programming Structures: R interpreter, Introduction to major R data structures like
-------------------	--

	vectors, matrices, arrays, list and data frames, Flow control and loops, looping over list and array, user-defined functions.
Week 5 - 7	Unit 2 -File Handling: Installing, loading and using packages for reading data from files
Week 8- 9	Unit 3 - Data Preprocessing and Transformation: Handling of missing data, Data cleaning and transformation
Week 10 - 12	Unit 4 - Data Exploration: Exploring data using statistical methods: mean, median, mode, quantiles. Building contingency table, correlation, co-variance.
Week 13 - 15	Unit 5 - Plotting Data: Data visualization using Scatter plot, Line graph, Histogram, Boxplot.

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Data exploration, Data analytics, Data visualization, Statistical analysis

Programming in C++ (BSCS08A)

Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective

The course introduces Object Oriented Programming Language C++ with the objective to use object oriented features to develop efficient programs. The focus is to equip the students with adequate high-level object-oriented programming features using C++.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. solve simple programming problems using iteration and selection, and basic constructs: structures, arrays and functions.
2. create classes and their objects and use access specifiers for data hiding depicting advantage of Abstraction.
3. construct classes for code reusability depicting advantage of Inheritance.
4. implement Function Overloading depicting advantage of Polymorphism.
5. create file, read/write from/to files.

Unit 1

Introduction to C++: Need and characteristics of Object-Oriented Programming, Structure of a C++ Program (main () function, header files, output, input, comments), compile and execute a simple program.

Unit 2

Data types and Expression: Keywords, built in data types, variables and constants, naming convention, Input-Output statements, expressions and operators, precedence of operators, typecasting, library functions.

Unit 3

Control Constructs in C++ : Decision making using selection constructs, looping constructs , control constructs.

Unit 4

User defined Data types and functions: User defined data types, defining and initializing structures, derived data types, defining and initializing single and multi dimensional arrays, and user defined functions, passing arguments to functions, returning values from functions, inline functions, default arguments.

Unit 5

Classes and Objects: Need of abstraction, encapsulation, inheritance and polymorphism, creating classes, objects as function arguments, modifiers and access control, constructors and destructors, Implementation of single level inheritance, implementation of polymorphism, function overloading.

Unit 6

File Handling: File I/O Basics, read and write operations.

Practical

1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not.
3. Write a menu driven program for following:
 - a) display a Fibonacci series
 - b) compute Factorial of a number
 - c) to check whether a given number is odd or even.
 - d) to check whether a given string is palindrome or not.
4. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
5. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
7. Design a class named Car, having registration number, model and engine as its private members. Here engine is an object of a class called Engine with the private members: Chassis number and make. Define a suitable constructor of Car and override toString() Method to print the details of a car. Assume appropriate data types for the instance Members of the classes. Write a Java program to test the above class.
8. Write a program that computes the area of a circle, rectangle and a Cylinder using function overloading.

References

1. Lafore, R. *Object Oriented Programming in C++ (4th Edition)*. SAMS Publishing.

Additional Resources

1. Balaguruswamy, E. (2017). *Object Oriented Programming with C++ (7th edition)*. McGraw-Hill Education.
2. Kanetkar, Y. P. (2015). *Let us C++ (2nd Edition)*. BPB Publishers.
3. Stroustrup, B. (2013). *The C++ Programming Language (4th Edition)*. Pearson Education.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 2	Unit 1- Introduction to C++ : Need and characteristics of Object-Oriented Programming, Structure of a C++ Program (main () function, header files, Output, Input, comments), compile and execute a simple program
Week 3 - 4	Unit 2-Data types and Expression: Keywords, built in data types, variables and constants, naming convention, Input-Output statements, expressions and operators, precedence of operators, typecasting, library functions.
Week 5 - 7	Unit 3-Control Constructs in C++ : Decision making using selection constructs, looping constructs , control constructs.
Week 7 - 9	Unit 4 -User defined Data types and functions: User defined data types, defining and initializing structures, derived data types, defining and initializing single and multi dimensional arrays, and user defined functions, passing arguments to functions, returning values from functions, inline functions, default arguments.
Week 10 - 13	Unit 5 -Classes and Objects: Need of abstraction, encapsulation, inheritance and polymorphism, creating classes, objects as function arguments, modifiers and access control, constructors and destructors, Implementation of single level inheritance, implementation of polymorphism, function overloading.
Week 14 - 15	Unit 6-File Handling: File I/O basics, read and write operations.

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz,as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Abstraction, Encapsulation, Inheritance and Polymorphism

Programming in Java (BSCS08B)

Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective

This course introduces fundamental concepts of Object Oriented Programming using Java. Basic concepts such as data types, expressions, control structures, functions and arrays are covered. Students are exposed to extensive Java programming to solve practical programming problems.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. develop and execute Java programs using iteration and selection.
2. create classes and their objects.
3. implement OOPS concepts to solve problems using JAVA

Unit 1

Introduction to Java: Features of Java, JDK environment, structure of Java programs

Unit 2

Programming Fundamentals: Data types, variables, operators, expressions, arrays, keywords, naming convention, decision making constructs , iteration, type casting, methods.

Unit 3

Object Oriented Programming Overview: Abstraction, encapsulation, inheritance, polymorphism.

Unit 4

Classes and Objects: Creating classes and objects, modifiers and access control, constructors, implementation of single and multilevel inheritance, implementation of polymorphism using overloading, overriding and dynamic method dispatch.

Unit 5

Strings: String class methods, string buffer methods.

Practical

9. Write a program to find the largest of n natural numbers.
10. Write a program to find whether a given number is prime or not.
11. Write a menu driven program for following:
 - a) display a Fibonacci series
 - b) compute Factorial of a number
 - c) to check whether a given number is odd or even.
 - d) to check whether a given string is palindrome or not.
12. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
13. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
14. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
15. Design a class named Car, having registration number, model and engine as its private members. Here engine is an object of a class called Engine with the private members: Chassis number and make. Define a suitable constructor of Car and override toString() Method to print the details of a car. Assume appropriate data types for the instance Members of the classes. Write a Java program to test the above class.
16. Write a program that computes the area of a circle, rectangle and a Cylinder using function overloading.

References

1. Horstmann, C. S. (2017). *Core Java - Vol. I – Fundamentals (10th Edition)*. Pearson.

Additional Resources

1. Balagurusamy, E. (2014). *Programming with JAVA: A Primer (5th Edition)*. McGraw Hill Education (India) Private Limited.
2. Schildt, H. (2018). *Java: The Complete Reference (10th Edition)*. McGraw-Hill Education.
3. Schildt, H. & Skrien, D. (2013). *Java Fundamentals - A comprehensive Introduction*. TMH.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments

- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 2	Unit 1 - Introduction to Java Features of Java, JDK environment, structure of Java programs
Week 3 - 5	Unit 2 - Programming Fundamentals Data types, variables, operators, expressions, arrays, keywords, naming convention, decision making constructs , iteration, type casting, methods.
Week 6 - 7	Unit 3 - Object Oriented Programming Overview Abstraction, encapsulation, inheritance, polymorphism
Week 8 - 12	Unit 4 - Classes and Objects Creating classes and objects, modifiers and access control, constructors, implementation of single and multilevel inheritance, implementation of polymorphism using overloading, overriding and dynamic method dispatch
Week 13 - 15	Unit 5 - Strings String class methods, string buffer methods

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Abstraction, encapsulation, inheritance, polymorphism.

Advanced Programming in Java (BSCS09A)

Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective

This course builds over basic Java language skills acquired by the student in earlier semester. The students are exposed to the advanced features available in Java such as exception handling, file handling, interfaces, packages and GUI programming.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. implement Exception Handling and File Handling.
2. implement multiple inheritance using Interfaces.
3. logically organize classes and interfaces using packages
4. use AWT classes to design GUI applications.

Unit 1

Review of Object Oriented Programming and Java Fundamentals : Structure of Java programs, classes and objects, data types, type casting, looping constructs.

Unit 2

Interfaces: Interface basics, defining, implementing and extending interfaces; implementing multiple inheritance using interfaces.

Unit 3

Packages: Basics of packages, creating and accessing packages, system packages, creating user defined packages.

Unit 4

Exception Handling : Using the main keywords of exception handling: try, catch, throw, throws and finally, nested try, multiple catch statements, creating user defined exceptions.

Unit 5

File Handling : Byte stream, character stream, file I/O basics, file read/write operations.

Unit 6

GUI Programming : AWT classes, event handling.

Practical

- 1) Implement Abstraction, Encapsulation, Inheritance, Polymorphism
- 2) Implement multiple inheritance using interfaces
- 3) Create user defined packages
- 4) Create user defined exceptions
- 5) Implement file operations
- 6) Create Applets

More exercises as announced by instructor in the laboratory.

References

1. Horstmann, C. S. (2017). *Core Java - Vol. I – Fundamentals (10th Edition)*. Pearson.

Additional Resources

1. Balagurusamy, E. (2014). *Programming with JAVA: A Primer (5th Edition)*. McGraw Hill Education (India) Private Limited.
2. Schildt, H. (2018). *Java: The Complete Reference (10th Edition)*. McGraw-Hill Education.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 2	Unit 1 - Review of Object Oriented Programming and Java Fundamentals Structure of Java programs, classes and objects, data types, type casting, looping constructs.
Week 3 - 6	Unit 2- Interfaces Interface basics, defining, implementing and extending interfaces; implementing multiple inheritance using interfaces
Week 7 - 8	Unit 3 - Packages Basics of packages, creating and accessing packages, system packages, creating user defined packages
Week 9 - 10	Unit 4- Exception Handling Using the main keywords of exception handling: try, catch, throw, throws and finally, nested try, multiple catch statements, creating user defined exceptions
Week 10 - 12	Unit 5-File Handling : Byte stream, character stream, file I/O basics, file read/write operations.
Week 13 - 15	Unit 6 - GUI Programming : AWT classes, event handling.

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Interface, Byte stream, Exception Handling, AWT, Event handling.

Web Design using HTML5 (BSCS09B)

Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective

The course introduces the basics of HTML5 including CSS styling. It helps students learn how to plan and design effective web pages and producing effective websites.

Course Learning Outcomes

On successful completion of this course, the student will be able to:

1. define the principles and basics of Web page design.
2. recognize the elements of HTML.
3. apply basic concepts of CSS.
4. publish web pages.

Unit 1

Introduction: Introduction to HTML: What is HTML, HTML Documents, Basic structure of an HTML document, creating an HTML document, markup tags, heading-paragraphs, line breaks, HTML tags.

Unit 2

Elements of HTML: Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls.

Unit 3

Introduction to Cascading Style Sheets: Concept of CSS, Creating Style Sheet, CSS Properties, CSS Styling(Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model(Introduction, Border properties, Padding Properties, Margin properties).

Unit 4

CSS Advanced: CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute selector), CSS Color.

Unit 5

Web Designs: Creating page Layout and Site Designs, Creating the Web Site, Saving the web site, Working on the web site, Creating web site structure, Creating Titles for web pages, Themes-Publishing web sites.

Practical

1. Creating HTML documents with various elements
2. Implementing Cascading style sheets
3. Creating and hosting websites

More exercises as announced by instructor in the laboratory.

Mini project for creating and hosting websites.

References

1. Boehm, A., & Ruvalcaba, Z. (2018). *Munarch's HTML5 and CCS3 (4th Edition)*. Mike Murach & Associates.

Additional Resources

1. Minnick, J. (2015). *Web Design with HTML5 and CSS3 (8th Edition)*. Cengage Learning.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 3	Unit I - Introduction: Introduction to HTML: What is HTML, HTML Documents, Basic structure of an HTML document, creating an HTML document, markup tags, heading-paragraphs, line breaks, HTML tags.
Week 4 - 6	Unit 2 - Elements of HTML: Introduction to elements of HTML, working with text, lists, tables, frames, hyperlinks, images, multimedia, forms and controls.
Week 7-10	Unit 3-Introduction to Cascading Style Sheets: Concept of CSS, Creating Style Sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model(Introduction, Border properties, Padding Properties, Margin properties).
Week 11 - 13	Unit 4-CSS Advanced: CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), CSS Color.
Week 14 - 15	Unit 5-Web Designs: Creating page Layout and Site Designs.

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz,as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Web Design, HTML, CSS, Web Publishing

Android Programming (BSCS10A)

Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective

The course is designed for students to learn to develop android applications. They will learn android architecture and key principles underlying its design.

Course Learning Outcome

On successful completion of the course, students will be able to:

1. describe the design of Android operating system.
2. describe various components of Android applications.
3. design user interfaces using various widgets, dialog boxes, menus.
4. design application with interaction among various activities/applications using intents.
5. develop application(s) with database handling.

Unit 1

Introduction: Review to JAVA & OOPS Concepts, introduction to Android operating systems and its development tools, android architecture along with components including activities, view and view group, services, content providers, broadcast receivers, intents, parcels, instance state. Android virtual device manager, Android SDK manager, Android emulator, Dalvik debug monitor service and debug bridge.

Unit 2

User Interface Architecture: Application context, intents, explicit intents, returning results from activities, implicit intents, intent filter and intent resolution, and applications of implicit intents, activity life cycle, activity stack, application's priority and its process' states, fragments and its life cycle.

Unit 3

User Interface Design: Layouts, optimizing layout hierarchies, form widgets, text fields, button control, toggle buttons, spinners, auto complete textview, edittext, images, image buttons, menu, dialog.

Unit 4

Broadcast receivers: Broadcast sender, receiver, broadcasting events with intents, listening for broadcasts with broadcast receivers, broadcasting ordered intents, broadcasting sticky intents, pending intents.

Unit 5

Database using SQLite: SQLite, content values and cursors, creating SQLite databases, querying a database, adding, updating, and removing rows.

Practical

1. Create "Hello World" application. That will display "Hello World" in the middle of the screen in the emulator. Also display "Hello World" in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.

4. Create a menu with 5 options and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message.
8. Create an application to Create, Insert, update, Delete and retrieve operation on the database.

References

1. Griffiths, D., & Griffiths, D. (2015). *Head First Android Development*. O'reilly.
2. Meier, R. (2012). *Professional Android™ 4 Application Development*. John Wiley & Sons, Inc..

Additional Resources

1. Murphy, M. L. (2018). *The Busy Coder's Guide to Android Development*. CommonsWare.
2. Phillips, B., Stewart, C., Hardy, B. & Marsicano, K. (2015). *Android Programming: The Big Nerd Ranch Guide*. Big Nerd Ranch, LLC.
3. Sheusi, J. C. (2013). *Android Application Development for Java Programmers*. Cengage Learning.

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 - 3	Unit 1 - Introduction: Review to JAVA & OOPS Concepts, introduction to Android operating systems and its development tools, android architecture along with components including activities, view and view group, services, content providers, broadcast receivers, intents, parcels, instance state. Android virtual device manager, Android SDK manager, Android emulator, Dalvik debug monitor service and debug bridge
Week 4 – 6	Unit 2 - User Interface Architecture: Application context, intents, explicit intents, returning results from activities, implicit intents, intent filter and intent resolution, and applications of implicit intents, activity life cycle, activity stack, application's priority and its process' states, fragments and its life cycle.

Week 7 – 8	Unit 3 - User Interface Design: Layouts, optimizing layout hierarchies, form widgets, text fields, button control, toggle buttons, spinners, auto complete textview, edittext, images, image buttons, menu, dialog.
Week 9 – 10	Unit 4 - Broadcast receivers: Broadcast sender, receiver, broadcasting events with intents, listening for broadcasts with broadcast receivers, broadcasting ordered intents, broadcasting sticky intents, pending intents.
Week 11 – 15	Unit 5 - Database using SQLite: SQLite, content values and cursors, creating SQLite databases, querying a database, adding, updating, and removing rows

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz, as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Android architecture, Android virtual device manager, Android SDK manager, Android emulator, Broadcast senders & receivers

PHP Programming (BSCS10B) Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective

This course will introduce server side scripting to students through PHP programming language. They will learn to design web applications with a specific functionality, and dynamic websites requiring handling/processing data input by users.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. use different data types and control structures in PHP.
2. handle arrays and strings in PHP.
3. create dynamic interactive web pages with PHP.
4. use PHP built-in functions as well as define custom functions.
5. perform data validation in PHP.
6. manipulate and manage a database using PHP.

Unit 1

Introduction: Introduction to three tier web application development, front end, business layer and back end connectivity, role of PHP in web application development, software requirements.

Unit 2

Starting PHP Programming: Basics of PHP programming, variables, scope of a variable, expressions, operators, operator precedence, simple procedural scripts, decision making based on conditions, case structure, loops.

Unit 3

Modular Programming: Functions and objects, Passing parameters.

Unit 4

Strings and Arrays: Creating and accessing strings, built-in functions for string and string formatting, creating index based and associative array, accessing array elements.

Unit 5

Forms and form processing: Capturing form data, GET and POST form methods, processing of form data, and use of regular expressions.

Unit 6

Integrating PHP & DBMS: Connecting PHP and DBMS, creating database, defining database structure and accessing data stored in tables using PHP.

Practical

- 1) Write a PHP script to input three numbers and print the largest number.

- 2) Write a function to calculate the factorial of a number (non-negative integer), which accepts the number as an argument. Use this function to compute $C(n,r)$ as:
- 3) WAP to check whether the given number is prime or not.
- 4) Write a PHP script to accept a string from user, and print its reverse as output.
- 5) Write a script to check if the input string consists of lowercase characters only.
- 6) Write a PHP script to check whether a string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
- 7) WAP to sort an array of numbers.
- 8) Write a PHP script to remove whitespaces from a string.
 Sample string : The quick brown fox
 Expected Output : Thequickbrownfox
- 9) Write a PHP script to find the sum of first n odd numbers.
- 10) Create a login page, which asks the user for a username and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.
- 11) Write a PHP script that checks if a string contains another string.
- 12) Create a simple 'birthday countdown' script, the script will count the number of days between current day and birth day.
- 13) Create a script to construct the following pattern, using nested for loop:

```

*
* *
* * *
* * * *
* * * * *

```
- 14) Write a simple PHP program to check that emails are valid.
- 15) WAP to print first n even numbers.
- 16) \$color = array('white', 'green', 'red') Write a PHP script which will display the colors in the following way : Output : white, green, red, • green • red • white
- 17) Using switch case and dropdown list display a "Hello" message depending on the language selected in drop down list.
- 18) Write a PHP program to print Fibonacci series using recursion.
- 19) Write a PHP script to replace the first 'the' of the following string with 'That'.
 Sample : 'the quick brown fox jumps over the lazy dog'.

References

1. Nixon, R. (2014). Learning PHP, MySQL, JavaScript, CSS & HTML5. 3rd Edition, O'reilly.

Additional Resources

1. Boronczyk, T., & Psinas, M. E. (2008). *PHP and MYSQL (Create-Modify-Reuse)*. Wiley

India Private Limited.

2. Holzner, S. (2007). *PHP: The Complete Reference*. McGraw Hill Education (India).
 3. Sklar, D., & Trachtenberg, A. (2014). *PHP Cookbook: Solutions & Examples for PHP Programmers*. O'Reilly Media.
 4. Welling, L., Thompson, L. (2008). *PHP and MySQL Web Development. 4th Edition*, Addison-Wesley Professional.
-

Teaching Learning Process

- Talk and chalk method
- Computer based presentations by teachers.
- Group Discussions
- Assignments
- Offline and online Quiz
- Presentations by group of students for enhanced learning.

Tentative weekly teaching plan is as follows:

Week 1 – 2	Unit 1 - Introduction: Introduction to three tier web application development, front end, business layer and back end connectivity, role of PHP in web application development, software requirements
Week 3 – 4	Unit 2 - Starting PHP Programming: Basics of PHP programming, variables, scope of a variable, expressions, operators, operator precedence, simple procedural scripts, decision making based on conditions, case structure, loops
Week 5 – 6	Unit 3 - Modular Programming: Functions and objects, passing parameters
Week 7 – 10	Unit 4 - Strings and Arrays: Creating and accessing strings, built-in functions for string and string formatting, creating index based and associative array, accessing array elements
Week 11 – 12	Unit 5 - Forms and form processing: Capturing form data, GET and POST form methods, processing of form data, and use of regular expressions
Week 13 – 15	Unit 6 - Integrating PHP & DBMS: Connecting PHP and DBMS, creating database, defining

	database structure and accessing data stored in tables using PHP
--	--

Assessment Methods

- Unit-wise assignments, presentations, viva, quiz,as announced by the instructor in the class
- End semester exam
- Internal assessment

Keywords

Server-side scripting, Web applications, Dynamic Websites, Database integration.

Acknowledgement (in alphabetical order)

Alka Khurana	Hansraj College
Anamika Gupta	Shaheed Sukhdev College of Business Studies
Anuja Soni	Deen Dayal Upadhyay College
Aparna Datt	P.G.D.A.V College
Archna Singhal	Indraprastha College for Women
Arpita Aggarwal	P.G.D.A.V College
Arpita Sharma	Deen Dayal Upadhyay College
Aruna Jain	Bharati College
Bharti	Hans Raj College
Bharti Kumar	Shyam Lal College (Eve.)
Bhavna Gupta	Keshav Mahavidyalaya
Divya Kawatra	Hansraj College
Geetanjali Kher	Kirori Mal College
Harita Ahuja	Acharya Narendra Dev College
Harmeet Kaur,	Hans Raj College
Hema Banati	Dayal Singh College
Manisha Bansal	Indraprastha College for Women
Manju Bhardwaj	Maitreyi College
Megha Khandelwal	Deptt. of Computer Science
Nagendra	Bhagini Nivedita College
Naveen Kumar	Deptt. of Computer Science
Neelima Gupta	Deptt. of Computer Science
Nidhi Arora	Kalindi College
Nisha	Deptt. of Computer Science
PK Hazra	Deptt. of Computer Science
Preeti Marwaha	Acharya Narendra Dev College
Priti Sehgal	Keshav Mahavidyalaya
Priyanka Rathi	Deptt. of Computer Science
Priyanka Sharma	Acharya Narendra Dev College
Punam Bedi	Deptt. of Computer Science
Rajni Bala	Deen Dayal Upadhyay College
Rakhi Saxena	Deshbandhu College
Rampal Rana	Deen Dayal Upadhyay College
Reena Kasana	Deptt. of Computer Science
Roli Bansal	Keshav Mahavidyalaya
Ronnie Chakre	Deptt. of Computer Science
Rupali Ahuja	Maitreyi College
S K Muttou	Deptt. of Computer Science
Sahil Pathak	Ramanujan College
Sapna Varshney	Deptt. of Computer Science
Sarabjeet Kochhar	Indraprastha College for Women
Seema Aggarwal	Miranda House
Shalini Sharma	Kalindi College
Sharanjit Kaur	Acharya Narendra Dev College
Shikha Gupta	Shaheed Sukhdev College of Business Studies

Sonika Thakral
Sujata Khatri
Sunita Narang
Vandana Kalra
Vasudha Bhatnagar
Vinita Jindal
Vipin Kumar Rathi

Shaheed Sukhdev College of Business Studies
Deen Dayal Upadhyay College
Acharya Narendra Dev College
SGGSCC
Deptt. of Computer Science
Keshav Mahavidyalaya
Ramanujan College

DUCS

DUCS

DUCS

दिल्ली विश्वविद्यालय UNIVERSITY OF DELHI

Bachelor of Science (Hons) Chemistry
(Effective from Academic Year 2019-20)



**Revised Syllabus as approved by
Academic Council**

Date: 15 & 16 July 2019

No:

Executive Council

Date: 20 & 21 July 2019

No:

**Applicable for students registered with Regular Colleges, Non Collegiate
Women's Education Board and School of Open Learning**

List of Contents

Page No.

Preamble	004
1. Introduction to B.Sc.(Hons.) Chemistry Programme	005
2. Learning Outcome-based Curriculum Framework in B.Sc. (Hons.) Chemistry	005
2.1 Nature and Extent of the Programme B.Sc. (Hons.) Chemistry	005
2.2 Aims of Bachelor Degree Programme in B.Sc. (Hons.) Chemistry	005
3. Graduate Attributes in B.Sc. (Hons.) Chemistry	005
4. Qualification Descriptors for Graduates B.Sc. (Hons.) Chemistry	007
5. Programme Learning Outcomes in B.Sc. (Hons.) Chemistry	008
6. Structure of the programme in B.Sc. (Hons.) Chemistry	009
6.1 Semester-wise Distribution of Courses and Credit Distribution for BSc (Hons) Chemistry	011
7. Teaching-Learning Process	015
8. Assessment Methods	015
9. Courses for Programme BSc (Hons) Chemistry	016
9.1 Core Courses	016
9.1.1 CHEMISTRY - C I: INORGANIC CHEMISTRY - I Atomic Structure & Chemical Bonding	016
9.1.2 CHEMISTRY - C II: PHYSICAL CHEMISTRY – I States of Matter & Ionic Equilibrium	019
9.1.3 CHEMISTRY – C III: ORGANIC CHEMISTRY – I Basics and Hydrocarbons	023
9.1.4 CHEMISTRY - C IV: PHYSICAL CHEMISTRY – II Chemical Thermodynamics and its Applications	027
9.1.5 CHEMISTRY - CV: INORGANIC CHEMISTRY – II s- and p-Block Elements	030
9.1.6 CHEMISTRY - CVI: ORGANIC CHEMISTRY – II Halogenated Hydrocarbons and Oxygen Containing Functional Groups	034
9.1.7 CHEMISTRY - CVII: PHYSICAL CHEMISTRY–III Phase Equilibria and Electrochemical Cells	037
9.1.8 CHEMISTRY – C VIII: INORGANIC CHEMISTRY – III Coordination Chemistry	040
9.1.9 CHEMISTRY - CIX: ORGANIC CHEMISTRY – III Nitrogen containing functional groups, Polynuclear Hydrocarbons, Heterocyclic Chemistry, Alkaloids and Terpenes	043
9.1.10 CHEMISTRY - CX: PHYSICAL CHEMISTRY–IV Conductance & Chemical Kinetics	047
9.1.11 CHEMISTRY - CXI: ORGANIC CHEMISTRY – IV Biomolecules	050
9.1.12 CHEMISTRY - CXII: PHYSICAL CHEMISTRY–V Quantum Chemistry & Spectroscopy	053
9.1.13 CHEMISTRY - CXIII: INORGANIC CHEMISTRY – IV Organometallic Chemistry & Bio-inorganic Chemistry	056

9.1.14 CHEMISTRY - CXIV: ORGANIC CHEMISTRY – V	060
Spectroscopy & Applied Organic Chemistry	
9.2 Discipline Specific Elective Courses (DSE)	063
9.2.1 Novel Inorganic Solids (DSE-1)	063
9.2.2 Inorganic Materials of Industrial Importance (DSE-2)	066
9.2.3 Applications of Computers in Chemistry (DSE-3)	070
9.2.4 Analytical Methods in Chemistry (DSE-4)	073
9.2.5 Molecular Modelling and Drug Design (DSE-5)	076
9.2.6 Polymer Chemistry (DSE-6)	080
9.2.7 Research Methodology for Chemistry (DSE-7)	084
9.2.8 Green Chemistry (DSE-8)	086
9.2.9 Industrial Chemicals and Environment (DSE-9)	091
9.2.10 Instrumental Methods of Chemical Analysis (DSE-10)	094
9.2.11 Nanoscale Materials and Their Applications (DSE-11)	098
9.2.12 Dissertation (DSE-12)	101
9.3 Skill Enhancement Courses (SEC)	102
9.3.1 IT Skills for Chemists (SEC-1)	102
9.3.2 Basic Analytical Chemistry (SEC-2)	105
9.3.3 Chemical Technology & Society (SEC-3)	107
9.3.4 Cheminformatics (SEC-4)	109
9.3.5 Business Skills for Chemists (SEC-5)	112
9.3.6 Intellectual Property Rights (SEC-6)	114
9.3.7 Analytical Clinical Biochemistry (SEC-7)	117
9.3.8 Green Methods in Chemistry (SEC-8)	120
9.3.9 Pharmaceutical Chemistry (SEC-9)	123
9.3.10 Chemistry of Cosmetics & Perfumes (SEC-10)	125
9.3.11 Pesticides Chemistry (SEC-11)	128
9.3.12 Fuel Chemistry (SEC-12)	130
9.4 Generic Elective Courses (GE)	133
9.4.1 Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons (GE-1)	133
9.4.2 Chemical Energetics, Equilibria & Functional Group Organic Chemistry-I (GE-2)	137
9.4.3 Solutions, Phase Equilibrium, Conductance, Electrochemistry & Functional Group Organic Chemistry-II (GE-3)	142
9.4.4 Chemistry of s- and p-block elements, States of matter and Chemical Kinetics (GE-4)	146
9.4.5 Chemistry of d-block elements, Quantum Chemistry and Spectroscopy (GE-5)	150
9.4.6 Organometallics, Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy (GE-6)	155
9.4.7 Molecules of life (GE-7)	159
9.4.8 Green Chemistry: Designing Chemistry for Human Health and Environment (GE-8)	162
10. Acknowledgement	167

Preamble

The objective of any programme at Higher Education Institute is to prepare their students for the society at large. The University of Delhi envisions all its programmes in the best interest of their students and in this endeavour, it offers a new vision to all its Under-Graduate courses. It imbibes a Learning Outcome-based Curriculum Framework (LOCF) for all its Under Graduate programmes.

The LOCF approach is envisioned to provide a focused, outcome-based syllabus at the undergraduate level with an agenda to structure the teaching-learning experiences in a more student-centric manner. The LOCF approach has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice. The Under-Graduate Programmes will prepare the students for both, academia and employability.

Each programme vividly elaborates its nature and promises the outcomes that are to be accomplished by studying the courses. The programmes also state the attributes that it offers to inculcate at the graduation level. The graduate attributes encompass values related to well-being, emotional stability, critical thinking, social justice and also skills for employability. In short, each programme prepares students for sustainability and life-long learning.

The new curriculum of BSc (Hons) Chemistry offer courses in the areas of inorganic, organic, physical, materials and analytical. All the courses are having defined objectives and Learning Outcomes, which will help prospective students in choosing the elective courses to broaden their skills in the field of chemistry and interdisciplinary areas. The courses will train students with sound theoretical and experimental knowledge that suits the need of academics and industry. The courses also offers ample skills to pursue research as career in the filed of chemistry and allied areas. As usual, B.Sc. (Hons.) Chemistry programme offered by one of the largest and oldest Departments in the country will continue to produce best minds to meet the demands of society.

The University of Delhi hopes the LOCF approach of the programme BSc (Hons) Chemistry will help students in making an informed decision regarding the goals that they wish to pursue in further education and life, at large.

1. Introduction to B.Sc. (Hons.) Chemistry

The Choice Based Credit System (CBCS) provides an opportunity to a student to choose courses from the syllabus comprising Core, Elective and Skill based courses. It offers a flexibility of programme structure while ensuring that the student gets a strong foundation in the subject and gains in-depth knowledge. The learning outcome based curriculum framework (LOCF) will provide students with a clear purpose to focus their learning efforts and enable them to make a well judged choice regarding the course they wish to study. This will suit the present day needs of students in terms of securing their paths towards higher studies or employment.

Programme Duration and Design

The B.Sc. (Hons.) Chemistry course is a six semester course spread over three academic years. The teaching – learning process involves theory and practical classes and will be student centered. Apart from the conventional chalk and talk method, power point presentations, audio – video tools, class discussions, simulations and virtual labs (wherever possible) will be used. Students will be encouraged to carry out short term projects and participate in industrial and institutional visits, seminars and workshops. Assessment will be based on continuous evaluation (class test, presentation, group discussion, quiz, assignment etc.) and end of semester examination. Each theory paper will be of 100 marks out of which 25% marks are for internal assessment while a practical paper will be of 50 marks comprising 50% internal assessment.

2. Learning Outcome-based Curriculum Framework in BSc (Hons.) Chemistry

The Learning Outcomes-based Curriculum Framework (LOCF) for the B.Sc. (Hons.) degree in Chemistry provides a broad structural framework that can accommodate the current curricular needs as well as gives sufficient flexibility to include changes in content that assume importance as the frontiers of science grow. The inherent flexibility in framework allows design of course basket in tune with individual preferences. The basic uniformity in core course design ensures smooth movement across universities in the country.

2.1 Nature and Extent of B.Sc. (Hons.) Chemistry

The B.Sc. (Hons.) Chemistry programme covers a wide range of basic and applied courses as well as courses of interdisciplinary nature.

2.2 Aims of the Bachelors Degree Programme in B.Sc. (Hons.) Chemistry

The core courses offered in the programme aim to build a strong conceptual chemical knowledge base in the student, the contents of electives and skill enhancement courses help them explore their fitness and suitability to pursue studies in these areas.

3. Graduate Attributes in B.Sc. (Hons.) Chemistry

Though a student pursuing an undergraduate degree in a science discipline is inherently curiosity driven and has the ability to observe and integrate rationally, here are the additional attributes that distinguish a student graduating with an honours degree in chemistry:

(i) Disciplinary Knowledge:

The student has acquired in-depth knowledge of the various concepts and theoretical principles and is aware of their manifestations. An understanding of the centrality of chemistry is usually evident from familiarity with interfacial disciplines. A graduate in chemistry is expected to be thoroughly conversant with all basic analytical, qualitative and quantitative laboratory techniques and demonstrate meticulousness in operation. She/he is aware of the importance of working with safety and consciousness in laboratory and actively seeks information about health and environmental safety of chemicals that are used in the laboratories and follows protocols for their safe disposal.

(ii) Communication skills:

Effective communication is a much desirable attribute across courses. However, a chemistry honours student is expected to assimilate technical information about chemistry from various sources and convey it to intended audience, both orally and in writing in an intelligible manner.

(iii) Critical thinking:

Critical thinking as an attribute enables a student to analyze a problem, assess it, reconstruct it and solve it.

(iv) Problem solving:

An integral part of chemistry curriculum is problem solving. The student will be equipped to solve problems of numerical, synthetic and analytical nature that are best approached with critical thinking.

(v) Analytical reasoning:

The student will be able to draw logical conclusions based on a group of observations, facts and rules.

(vi) Research related skills:

The student is inquisitive about processes and phenomena happening during experiments in laboratories and seeks answers through the research path.

(vii) Cooperation/Team work:

Teams may comprise of peers in classroom, laboratory or any other team of members from diverse fields. The student is capable of contributing meaningfully to team ethos and goals.

(viii) Scientific reasoning:

Students learn to investigate, experiment, relate information and draw logical conclusions based on scientific reasoning.

(ix) Reflective thinking:

Reflective thinking focuses on the process of making judgments about what has happened. The students learn to review their experience and make a plan for future actions in a similar situation with a view to improve.

(x) Information/digital literacy:

Increasing use of instruments having interface with computers and use of computers in laboratory work creates this attribute. A student with degree in chemistry is able to employ knowledge and skill in computers in a variety of situations- data analysis, computing as well as information retrieval and library use.

(xi) Self-directed learning:

Students are encouraged to explore the many sources of information available to them. Various activities require the students to find relevant information and educate themselves.

(xii) Multicultural competence:

The student recognizes that all persons are unique in their own way and appreciates the differences in cultural background, religious beliefs, and socio-economic status.

(xiii) Moral and ethical awareness/reasoning:

The student is aware of what constitutes unethical behaviour-- plagiarism, fabrication and misrepresentation or manipulation of data.

(xiv) Leadership readiness/qualities:

Leadership is essential in making teamwork into a reality. Working in teams promotes both teamwork and leadership qualities in the student.

(xv) Lifelong learning:

Having a strong conceptual framework in the subject along with the skills of teamwork, analytical reasoning, problem solving, critical thinking etc. make the students lifelong learners.

4. Qualification Descriptors for Graduates in B.Sc. (Hons.) Chemistry

The qualification description for B.Sc. (Hons.) programme in Chemistry includes

- Demonstration of a comprehensive knowledge based on concepts, principles and theories relating to chemistry that spans the traditional sub-disciplines (inorganic chemistry, organic chemistry, physical chemistry, analytical chemistry and biochemistry) as well as advanced and emerging topics.
- Demonstration of an ability to apply underlying concepts and principles outside the context in which they were first studied and in interdisciplinary scenarios.
- Acquisition of competence in the use of routine materials, techniques and practices of chemistry.
- Exhibition of skills required for conducting the documented laboratory procedures as well as well-developed skills for the gathering, evaluation, analysis and presentation of information, ideas, concepts and quantitative and/or qualitative data.
- Acquisition of skills in the operation of standard chemical instrumentation.
- Demonstration of skills in the use of safety data sheets, safe-handling of chemical materials, considering their physical and chemical properties including any specific hazards associated with their use.
- Development of literature searching and information management skills.

- Acquisition of the ability for responsible treatment of data, proper citation of others' work, and the standards related to plagiarism.
- Development of awareness of the role of chemistry in contemporary societal and global issues, including areas such as sustainability and green chemistry.
- Development of the appreciation of the uses of chemistry in daily life.
- Development of competence in intellectual, practical and transferable skills (Communication skills, IT skills, Interpersonal skills) necessary for employment as a professional chemist

5. Programme Learning Outcomes in B.Sc. (Hons.) Chemistry

The B.Sc.(Hons) programme in Chemistry is designed to develop in students in depth knowledge of the core concepts and principles that are central to the understanding of this core science discipline. Undergraduates pursuing this programme of study go through laboratory work that specifically develops their quantitative and qualitative skills, provides opportunities for critical thinking and team work, and exposes them to techniques useful for applied areas of scientific study.

- **Knowledge: Width and depth:** Students acquire theoretical knowledge and understanding of the fundamental concepts, principles and processes in main branches of chemistry, namely, organic chemistry, inorganic chemistry, physical chemistry, analytical chemistry and biochemistry. In depth understanding is the outcome of transactional effectiveness and treatment of specialized course contents. Width results from the choice of electives that students are offered.
- **Laboratory Skills: Quantitative, analytical and instrument based:** A much valued learning outcome of this programme is the laboratory skills that students develop during the course. Quantitative techniques gained through hands on methods opens choice of joining the industrial laboratory work force early on. The programme also provides ample training in handling basic chemical laboratory instruments and their use in analytical and biochemical determinations. Undergraduates on completion of this programme can cross branches to join analytical, pharmaceutical, material testing and biochemical labs besides standard chemical laboratories.
- **Communication:** Communication is a highly desirable attribute to possess. Opportunities to enhance students' ability to write methodical, logical and precise reports are inherent to the structure of the programme. Techniques that effectively communicate scientific chemical content to large audiences are acquired through oral and poster presentations and regular laboratory report writing.
- **Capacity Enhancement:** Modern day scientific environment requires students to possess ability to think independently as well as be able to work productively in groups. This requires some degree of balancing. The chemistry honours programme course is designed to take care of this important aspect of student development through effective teaching learning process.
- **Portable Skills:** Besides communication skills, the programme develops a range of portable or transferable skills in students that they can carry with them to their new work environment after completion of chemistry honours programme. These are problem solving, numeracy and mathematical skills- error analysis, units and conversions, information retrieval skills, IT skills and organizational skills. These are valued across work environments.

6. Structure of the Programme in B.Sc. (Hons.) Chemistry

The programme includes Core Courses and Elective Courses. The Core Courses are all compulsory courses. There are three types of Elective Courses – Discipline Specific Elective (DSE), Generic Elective (GE), Skill Enhancement Courses (SEC). In addition there are two compulsory Ability Enhancement Courses (AEC). The Core, DSE and GE Courses are six credit courses; the SEC, AEC are four credit courses.

To acquire a B.Sc. (Hons) Chemistry degree, the student will study fourteen Core Courses, two Ability Enhancement compulsory courses, two Skill Enhancement Courses, four Discipline Specific Elective Courses and four Generic Elective Courses.

The student will study two Core Courses each, in Semesters I and II, three Core Courses each in Semesters III and IV and two Core Courses each in Semesters V and VI. The programme offers several Discipline-Specific Electives, of which the student will study two in each of the Semesters V and VI.

Different Generic Elective courses are offered to students of B.Sc. (Hons) Chemistry Programme by other Departments of the College and the student will have the option to choose one GE course each in Semesters I, II, III, and IV. **At least two papers of Mathematics are compulsory for admission to M.Sc. Chemistry in University of Delhi, thus students are advised to opt for the same.** The Department of Chemistry offers eight GE courses to students of other disciplines (refer to * on page 13).

Students will study one Skill Enhancement Course each in Semesters III and IV. The two compulsory Ability Enhancement Courses are Environmental Sciences and English Communication and the student will study one each in Semesters I and II.

Structure of the B.Sc. (Hons) Chemistry Programme under Choice Based Credit System

Semester	CORE COURSE (14)*	Ability Enhancement Compulsory Course (AECC) (2)*	Skill Enhancement Course (SEC) (2)*	Elective: Discipline Specific DSE (4)*	Elective: Generic (GE) (4)*
I	C-1 C-2	AECC-1			GE-1
II	C-3 C-4	AECC-2			GE-2
III	C-5 C-6 C-7		SEC-1		GE-3
IV	C-8 C-9 C-10		SEC-2		GE-4
V	C-11 C-12			DSE-1, DSE-2	
VI	C-13 C-14			DSE-3, DSE-4	

* Number of courses student has to study

6.1 Semester-wise Distribution of Courses for B.Sc. (Hons) Chemistry Programme under CBCS and Credit Distribution

CORE COURSES –14 (six credits each) – Each course has 4 Periods/week for Theory, 4 Periods/week for Practical			
SEMESTER	COURSE CODE	NAME OF THE COURSE	CREDITS T=Theory Credits P=Practical Credits
I	CHEMISTRY – C I	Inorganic Chemistry I:Atomic Structure & Chemical Bonding	T=4 P=2
I	CHEMISTRY – C II	Physical Chemistry I:States of Matter & Ionic Equilibrium	T=4 P=2
II	CHEMISTRY – C III	Organic Chemistry I:Basics and Hydrocarbons	T=4 P=2
II	CHEMISTRY – C IV	Physical Chemistry II:Chemical Thermodynamics and its Applications	T=4 P=2
III	CHEMISTRY – C V	Inorganic Chemistry II:s- and p-Block Elements	T=4 P=2
III	CHEMISTRY – C VI	Organic Chemistry II:Halogenated Hydrocarbons and Oxygen Containing Functional Groups	T=4 P=2
III	CHEMISTRY – C VII	Physical Chemistry III:Phase Equilibria and Electrochemical Cells	T=4 P=2
IV	CHEMISTRY – C VIII	Inorganic Chemistry III:Coordination Chemistry	T=4 P=2
IV	CHEMISTRY – C IX	Organic Chemistry III:Nitrogen containing functional groups, Polynuclear Hydrocarbons, Heterocyclic Chemistry, Alkaloids and Terpenes	T=4 P=2
IV	CHEMISTRY – C X	Physical Chemistry IV: Conductance & Chemical Kinetics	T=4 P=2
V	CHEMISTRY – C XI	Organic Chemistry IV: Biomolecules	T=4 P=2
V	CHEMISTRY – C XII	Physical Chemistry V: Quantum Chemistry & Spectroscopy	T=4 P=2
VI	CHEMISTRY – C XIII	Inorganic Chemistry IV: Organometallic Chemistry& Bioinorganic Chemistry	T=4 P=2
VI	CHEMISTRY – C XIV	Organic Chemistry V: Spectroscopy& Applied Organic Chemistry	T=4 P=2
Credits: 14× 6 = 84			

ABILITY ENHANCEMENT COMPULSORY COURSES (AECC) – 2 (4 credits each)			
SEMESTER	COURSE CODE	NAME OF THE COURSE	CREDITS T=Theory Credits P=Practical Credits
	AEC-I	Environmental Science	T = 4
	AEC-II	English Communication	T = 4
Credits: 2 × 4 = 08			

SKILL ENHANCEMENT ELECTIVE COURSES (SEC) – 2 (four credits each, refer to *** on page 14)			
SEMESTER	COURSE CODE	NAME OF THE COURSE	CREDITS T=Theory Credits P=Practical Credits
	CHEMISTRY-SEC-1	IT Skills for Chemists	T=2 P=2
	CHEMISTRY-SEC-2	Basic Analytical Chemistry	T=2 P=2
	CHEMISTRY-SEC-3	Chemical Technology & Society	T=4
	CHEMISTRY-SEC-4	Cheminformatics	T=2 P=2
	CHEMISTRY-SEC-5	Business Skills for Chemists	T=4
	CHEMISTRY-SEC-6	Intellectual Property Rights	T=4
	CHEMISTRY-SEC-7	Analytical Clinical Biochemistry	T=2 P=2
	CHEMISTRY-SEC-8	Green Methods in Chemistry	T=2 P=2
	CHEMISTRY-SEC-9	Pharmaceutical Chemistry	T=2 P=2
	CHEMISTRY-SEC-10	Chemistry of Cosmetics & Perfumes	T=2 P=2
	CHEMISTRY-SEC-11	Pesticide Chemistry	T=2 P=2
	CHEMISTRY-SEC-12	Fuel Chemistry	T=2 P=2
			Credits: 2 × 4 = 08

DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) – 4 (six credits each, refer to ** on page 14)			
Each course has 4 Periods/week for Theory, 4 Periods/week for Practical			
SEMESTER	COURSE CODE	NAME OF THE COURSE	CREDITS T=Theory Credits P=Practical Credits
	CHEMISTRY-DSE-1	Novel Inorganic Solids	T=4 P=2
	CHEMISTRY-DSE-2	Inorganic Materials of Industrial Importance	T=4 P=2
	CHEMISTRY-DSE-3	Applications of Computers in Chemistry	T=4 P=2
	CHEMISTRY-DSE-4	Analytical Methods in Chemistry	T=4 P=2
	CHEMISTRY-DSE-5	Molecular Modelling & Drug Design	T=4 P=2
	CHEMISTRY-DSE-6	Polymer Chemistry	T=4 P=2
	CHEMISTRY-DSE-7	Research Methodology for Chemistry	T=5 P=1
	CHEMISTRY-DSE-8	Green Chemistry	T=4 P=2
	CHEMISTRY-DSE-9	Industrial Chemicals & Environment	T=4 P=2
	CHEMISTRY-DSE-10	Instrumental Methods of Chemical Analysis	T=4 P=2
	CHEMISTRY-DSE-11	Nanoscale Materials and their Applications	T=4 P=2
	CHEMISTRY-DSE-12	Dissertation	6
			Credits: 4 × 6 = 24

GENERIC ELECTIVES COURSES (GE)– 4(six credits each) –Offered by other Departments. Please refer to the syllabus of other departments (Mathematics, Physics, Economics and computer science).			
SEMESTER	COURSE CODE	NAME OF THE COURSE	CREDITS T=Theory Credits P=Practical Credits or Tutorial Credits
I		GE 1	6
II		GE 2	6
III		GE 3	6
IV		GE 4	6
Credits: $4 \times 6 = 24$			

TOTAL CREDITS = 148

Note: Wherever there is a practical there will be no tutorial and vice-versa. The size of the group for practical papers is recommended to be maximum of 12 to 15 students.

***Generic Elective Papers (GE) for other Departments/Disciplines: (Credit: 06 each – 4T + 2P)**

1. Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons
2. Chemical Energetics, Equilibria & Functional Group Organic Chemistry-I
3. Solutions, Phase Equilibrium, Conductance, Electrochemistry & Functional Group Organic Chemistry-II
4. Chemistry of s- and p-block elements, States of matter and Chemical Kinetics
5. Chemistry of d-block elements, Quantum Chemistry and Spectroscopy
6. Organometallics, Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy
7. Molecules of life
8. Green Chemistry: Designing Chemistry for human health and environment

****Discipline Specific Elective Courses: (Credit: 06 each) (4 courses to be selected)-DSE 1-4**

DSE 1: Choose any one of the following

1. Novel Inorganic Solids
2. Inorganic Materials of Industrial Importance

DSE 2: Choose any one of the following

1. Applications of Computers in Chemistry
2. Analytical Methods in Chemistry
3. Green Chemistry
4. Industrial Chemicals & Environment
5. Dissertation

DSE 3 and 4: Choose any one option each from Group A and Group B

Group A

1. Analytical Methods in Chemistry
2. Polymer Chemistry
3. Nanoscale Materials and their Applications
4. Instrumental Methods of Chemical Analysis

Group B

1. Applications of Computers in Chemistry
2. Molecular Modelling & Drug Design
3. Research Methodology for Chemistry
4. Green Chemistry
5. Dissertation

All colleges will float more than one DSE course for DSE 2, DSE3 and DSE 4 to enable students to have a choice. Students may opt for a dissertation as a DSE course in Semester VI. It will be a six credit course. The number of students who will be allowed to opt for this will vary from college to college depending upon the infrastructural facilities and may vary each year. The college may announce the number of seats for Dissertation/project work well in advance and choose students for the same. It will involve experimental work under the supervision of a faculty member. Internal and external examiners will evaluate the project and the report should be sent to examiners in advance (prior to the day of examination).

*****Skill Enhancement Courses** - In the following papers students should submit a project or case studies.

- Chemical Technology & Society
- Business Skills for Chemists
- Intellectual Property Rights

7. Teaching – learning process:

B.Sc. (Hons) Chemistry programme is a three-year degree programme designed to provide students with a sound theoretical background and practical training in all aspects of chemistry and helps them develop an appreciation of the importance of chemistry in different contexts. The programme includes foundational as well as in-depth courses that span the traditional sub-disciplines of chemistry. Along with the above Core Courses there are Discipline Specific Elective Courses, Generic Elective Courses and Ability Enhancement Courses which address the need of the hour.

These courses are delivered through classroom, laboratory work, projects, case studies and field work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models, softwares).

The laboratory training complements the theoretical principles learned in the classroom and includes synthesis of molecules, measurement of chemical properties and phenomenon, hands-on experience with modern instruments, computational data analysis, modelling and laboratory safety procedures.

Different pedagogies such as problem-based learning, peer-led instruction, and technology-aided instruction (blended learning) are adopted wherever suitable. These promote independent thinking, critical thinking and reasoning and a perspective of chemistry as a scientific process of discovery. Students are encouraged to work together in groups which leads to development of interpersonal skills like communication and team work.

The student will participate in industrial visits that will lay strong foundation for a successful career as a professional chemist by providing him/her useful information related to the practical aspects of the course and giving an insight to future areas of employment.

8. Assessment methods:

Assessment methods have two major objectives:

- The primary one is to assess the learning outcomes of the course in tune with the broad outcomes of strengthening core theoretical knowledge base and practical laboratory skills. This is assessed by comprehensive summative end-semester examinations conducted for both theory and practical courses. Also In-course assessments are given in every course in order to assess the students mastery of various learning outcomes. These assessments include individual assignments, group assignments, laboratory notebooks, written reports, quizzes, class tests and periodical tests.
- Another objective is to improve the students' learning and teachers' teaching. Results of assessments and their critical analysis are used to improve the process further by focusing on the areas that need conceptual strengthening, laboratory exposure or design of new experiments.

CORE COURSE

SEMESTER I

Course Code: CHEMISTRY - C I: INORGANIC CHEMISTRY - I

Course Title: Atomic Structure & Chemical Bonding

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The course reviews the structure of the atom, which is a necessary pre-requisite in understanding the nature of chemical bonding in compounds. It provides basic knowledge about ionic, covalent and metallic bonding and explains that chemical bonding is best regarded as a continuum between the three cases. It discusses the periodicity in properties with reference to the *s* and *p* block, which is necessary in understanding their group chemistry.

Learning Outcomes:

By the end of the course, the students will be able to:

- Solve the conceptual questions using the knowledge gained by studying the quantum mechanical model of the atom, quantum numbers, electronic configuration, radial and angular distribution curves, shapes of *s*, *p*, and *d* orbitals, and periodicity in atomic radii, ionic radii, ionization energy and electron affinity of elements.
- Draw the plausible structures and geometries of molecules using Radius Ratio Rules, VSEPR theory and MO diagrams (homo- & hetero-nuclear diatomic molecules).
- Understand the concept of lattice energy using Born-Landé and Kapustinskii expression.
- Rationalize the conductivity of metals, semiconductors and insulators based on the Band theory.
- Understand the importance and application of chemical bonds, inter-molecular and intra-molecular weak chemical forces and their effect on melting points, boiling points, solubility and energetics of dissolution.

Unit 1:

Atomic Structure: Recapitulation of Bohr's theory, its limitations and atomic spectrum of hydrogen atom. Wave mechanics: de Broglie equation, Heisenberg's Uncertainty Principle and its significance.

Schrödinger's wave equation, significance of ψ and ψ^2 . Quantum mechanical treatment of H- atom, Quantum numbers and their significance. Normalized and orthogonal wave functions. Sign of wave functions. Radial and angular wave functions for hydrogen atom. Radial and angular distribution curves. Shapes of *s*, *p*, and *d* orbitals, Relative energies of orbitals.

Pauli's Exclusion Principle, Hund's rule of maximum spin multiplicity, Aufbau principle and its limitations.

(Lectures: 14)

Unit 2:

Periodicity of Elements: Brief discussion of the following properties of the elements, with reference to *s*- & *p*-block and the trends shown:

- (a) Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.
- (b) Atomic and ionic radii
- (c) Ionization enthalpy, Successive ionization enthalpies and factors affecting ionization enthalpy and trends in groups and periods.
- (d) Electron gain enthalpy and trends in groups and periods.
- (e) Electronegativity, Pauling's/ Allred Rochow's scales. Variation of electronegativity with bond order, partial charge, hybridization, group electronegativity.

(Lectures: 16)

Unit 3:

Chemical Bonding

Ionic bond: General characteristics, types of ions, size effects, radius ratio rule and its limitations. Packing of ions in crystals. Born-Landé equation with derivation and importance of Kapustinskii expression for lattice energy. Madelung constant, Born-Haber cycle and its application, Solvation energy.

Covalent character in ionic compounds, polarizing power and polarizability. Fajan's rules and consequences of polarization.

(Lectures: 10)

Unit 4:

Covalent bond: Valence Bond theory (*Heitler-London* approach). Energetics of hybridization, equivalent and non-equivalent hybrid orbitals. Bent's rule, Resonance and resonance energy.

Ionic character in covalent compounds: Bond moment and dipole moment. Percentage ionic character from dipole moment and electronegativity difference.

Molecular orbital theory. Molecular orbital diagrams of diatomic and simple polyatomic molecules N_2 , O_2 , C_2 , B_2 , F_2 , CO , NO , and their ions; HCl (idea of *s-p* mixing and orbital interaction to be given).

(Lectures: 10)

Unit 5:

VSEPR Theory: Lewis structure, Valence shell electron pair repulsion theory (VSEPR), shapes of the following simple molecules and ions containing lone pairs and bond pairs of electrons: H_2O , NH_3 , PCl_3 , PCl_5 , SF_6 , ClF_3 , I_3^- , BrF_2^+ , PCl_6^- , ICl_2^- , ICl_4^- , and SO_4^{2-} .

Multiple bonding (σ and π bond approach) and bond lengths.

(Lectures: 5)

Unit 6:

Metallic Bond: Qualitative idea of valence bond and band theories. Semiconductors and insulators, defects in solids.

Weak Chemical Forces: van der Waals forces, ion-dipole forces, dipole-dipole interactions, induced dipole interaction, Hydrogen bonding (theories of hydrogen bonding, valence bond treatment).

Effects of weak chemical forces, melting and boiling points, solubility, energetics of dissolution process.

(Lectures: 5)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Titrimetric Analysis: (i) Calibration and use of apparatus (ii) Preparation of solutions of titrants of different Molarity/Normality.

2. Acid-Base Titrations: Principles of acid-base titrations to be discussed.

(i) Estimation of sodium carbonate using standardized HCl.

(ii) Estimation of carbonate and hydroxide present together in a mixture.

(iii) Estimation of carbonate and bicarbonate present together in a mixture.

(iv) Estimation of free alkali present in different soaps/detergents

3. Oxidation-Reduction Titrimetry: Principles of oxidation-reduction titrations (electrode potentials) to be discussed.

(i) Estimation of Fe(II) and oxalic acid using standardized KMnO_4 solution

(ii) Estimation of oxalic acid and sodium oxalate in a given mixture.

(iii) Estimation of Fe(II) with $\text{K}_2\text{Cr}_2\text{O}_7$ using internal indicator (diphenylamine, N-phenylanthranilic acid) and discussion of external indicator.

References:

Theory:

1. Lee, J.D.; (2010), **Concise Inorganic Chemistry**, Wiley India.
2. Huheey, J.E.; Keiter, E.A.; Keiter, R. L.; Medhi, O.K. (2009), **Inorganic Chemistry- Principles of Structure and Reactivity**, Pearson Education.

3. Douglas, B.E.; McDaniel, D.H.; Alexander, J.J.(1994),**Concepts and Models of Inorganic Chemistry**, John Wiley & Sons.
4. Atkins, P.W.; Overton, T.L.; Rourke, J.P.; Weller, M.T.; Armstrong, F.A. (2010),**Shriver and Atkins Inorganic Chemistry**, 5th Edition, Oxford University Press.

Practicals:

1. Jeffery, G.H.; Bassett, J.; Mendham, J.; Denney, R.C. (1989),**Vogel's Textbook of Quantitative Chemical Analysis**, John Wiley and Sons.

Additional Resources:

1. Wulfsberg, G (2002),**Inorganic Chemistry**, Viva Books Private Limited.
2. Miessler, G.L.; Fischer P.J.; Tarr, D. A. (2014),**Inorganic Chemistry**, 5th Edition, Pearson.

Teaching Learning Process:

- Conventional chalk and board teaching,
- Class interactions and discussions
- Power point presentation on important topics.

Assessment Methods:

- Presentations by Individual Student/ Group of Students
- Class Tests at Periodic Intervals.
- Written assignment(s)
- End semester University Theory and Practical Examination

Keywords:

Atomic Structure, Wave function, Quantum Numbers, Electronegativity, Ionic Bonding, Dipole Moment, VSEPR Theory, Covalent Bonding, Multiple Bonding, Molecular Orbitals, Bonding MO, Antibonding MO, Homonuclear, Heteronuclear, Metallic Bonding, Weak Chemical Forces.

Course Code: CHEMISTRY - C II: PHYSICAL CHEMISTRY - I

Course Title: States of Matter & Ionic Equilibrium

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

- To develop basic and advance concepts regarding the three states of matter.
- To derive the expressions for determining the physical properties of gases, liquids and solids.

- To study the concept of ionization in aqueous solution, pH, buffers and various applications of ionization.

Learning Outcomes:

By the end of the course, students will be able to:

- Derive mathematical expressions for different properties of gas, liquid and solids and understand their physical significance.
- Explain the crystal structure and calculate related properties of cubic systems.
- Explain the concept of ionization of electrolytes with emphasis on weak acid and base and hydrolysis of salt.
- Apply the concepts of gas equations, pH and electrolytes while studying other chemistry courses and ever day life.

Unit 1:

Gaseous state: Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path and viscosity of gases, including their temperature and pressure dependence, relation between mean free path and coefficient of viscosity, calculation of σ from η ; variation of viscosity with temperature and pressure. Maxwell distribution and its use in evaluating molecular velocities (average, root mean square and most probable) and average kinetic energy, law of equipartition of energy, degrees of freedom and molecular basis of heat capacities. Behaviour of real gases: Deviations from ideal gas behaviour, compressibility factor, Z , and its variation with pressure and temperature for different gases. Causes of deviation from ideal behaviour. Equation of states for real gases; van der Waals equation of state, its derivation and application in explaining real gas behaviour, Virial coefficients, calculation of Boyle temperature. Isotherms of real gases and their comparison with van der Waals isotherms, continuity of states, critical state, relation between critical constants and van der Waals constants, law of corresponding states.

(Lectures: 22)

Unit 2:

Liquid state: Qualitative treatment of the structure of the liquid state; physical properties of liquids; vapour pressure, surface tension and coefficient of viscosity, and their determination. Effect of addition of various solutes on surface tension and viscosity. Explanation of cleansing action of detergents. Temperature variation of viscosity of liquids and comparison with that of gases.

(Lectures: 6)

Unit 3:

Solid state: Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, qualitative idea of point and space groups, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, a simple account of rotating crystal method and powder pattern method. Analysis of powder diffraction patterns of NaCl, CsCl and KCl.

(Lectures: 12)

Unit 4:

Ionic equilibria: Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono and diprotic acids. Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts.

Buffer solutions; derivation of Henderson equation and its applications. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle. Qualitative treatment of acid – base titration curves (calculation of pH at various stages). Theory of acid–base indicators; selection of indicators and their limitations.

(Lectures: 20)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Surface tension measurements using Stalagmometer.

- Determine the surface tension of aqueous solutions by (i) drop number (ii) drop weight method.
- Study the variation of surface tension with different concentration of detergent solutions. Determine CMC.

2. Viscosity measurement using Ostwald's viscometer.

- Determination of co-efficient of viscosity of an unknown aqueous solution.
- Study the variation of co-efficient of viscosity with different concentration of Poly Vinyl Alcohol (PVA) and determine molar mass of PVA.
- Study the variation of viscosity with different concentration of sugar solutions.

3. Determination of molecular weight of a volatile compound using Victor Meyer's method.

4. Solid State:

- Indexing of a given powder diffraction pattern of a cubic crystalline system.

4. pH-metry:

- Study the effect of addition of HCl/NaOH on pH to the solutions of acetic acid, sodium acetate and their mixtures.
- Preparation of buffer solutions of different pH values
 - Sodium acetate-acetic acid
 - Ammonium chloride-ammonium hydroxide

- iii. pH metric titration of (i) strong acid with strong base, (ii) weak acid with strong base and determination of dissociation constant of a weak acid.

References:

Theory:

1. Atkins, P.W.; Paula, J.de. (2014), **Atkin's Physical Chemistry Ed.**, 10th Edition, Oxford University Press.
2. Ball, D. W. (2017), **Physical Chemistry**, 2nd Edition, Cengage Learning, India.
3. Castellan, G. W. (2004), **Physical Chemistry**, 4th Edition, Narosa.
4. Kapoor, K.L. (2015), **A Textbook of Physical Chemistry**, Vol 1, 6th Edition, McGraw Hill Education.

Practical:

1. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), **Senior Practical Physical Chemistry**, R. Chand & Co, New Delhi.
2. Kapoor, K.L. (2019), **A Textbook of Physical Chemistry**, Vol.7, 1st Edition, McGraw Hill Education.
3. Garland, C. W.; Nibler, J. W.; Shoemaker, D. P. (2003), **Experiments in Physical Chemistry**, 8th Edition, McGraw-Hill, New York.

Additional Resources:

1. Moore, W.J. (1972), **Physical Chemistry**, 5th Edition, Longmans Green & Co. Ltd.
2. Glasstone, S. (1948), **Textbook of Physical Chemistry**, D. Van Nostrand company, New York.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

- Graded assignments
- Conventional class tests
- Class seminars by students on course topics with a view to strengthening the content through width and depth
- Quizzes
- End semester university examination.

Keywords:

States of matter, ideal/real gases, critical constants, viscosity, surface tension, symmetry, Crystal lattice/Systems, X-ray diffraction, Bragg's law, ionic equilibria, solubility product, pH, indicator.

SEMESTER II

Course Code: CHEMISTRY – CIII: ORGANIC CHEMISTRY - I

Course Title: Basics and Hydrocarbons

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The core course Organic Chemistry I is designed in a manner that it forms a cardinal part of the learning of organic chemistry for the subsequent semesters. The course is infused with the recapitulation of fundamentals of organic chemistry and the introduction of a new concept of visualizing the organic molecules in a three-dimensional space. To establish the applications of these concepts, the functional groups- alkanes, alkenes, alkynes and aromatic hydrocarbons are introduced. The constitution of the course strongly aids in the paramount learning of the concepts and their applications.

Learning Objectives:

On completion of the course, the student will be able to:

- Understand and explain the different nature and behavior of organic compounds based on fundamental concepts learnt.
- Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved.
- Learn and identify many organic reaction mechanisms including Free Radical Substitution, Electrophilic Addition and Electrophilic Aromatic Substitution.
- Understand the fundamental concepts of stereochemistry.

Unit 1:

Recapitulation of Basics of Organic Chemistry

Hybridisation: Shapes of molecules

Electronic displacements and their applications: Inductive, electromeric, resonance and mesomeric effects and hyperconjugation.

Concept of dipole moment, acidity and basicity and pK_a values.

Homolytic and heterolytic fissions with suitable examples. Types, shape and relative stability of carbocations, carbanions, carbenes and free radicals.

Weaker forces like van der Waals forces and hydrogen bonding

Electrophiles and nucleophiles, and introduction to types of organic reactions: addition, elimination and substitution reactions.

(Lectures: 6)

Unit 2:

Stereochemistry

Stereoisomerism: Optical activity and optical isomerism, asymmetry, chirality, enantiomers, diastereomers. specific rotation; Configuration and projection formulae: Newmann, Sawhorse, Fischer and their interconversion. Chirality in molecules with one and two stereocentres; meso configuration. Racemic mixture and their resolution. Relative and absolute configuration: D/L and R/S designations. Geometrical isomerism: cis-trans, syn-anti and E/Z notations using CIP rules.

(Lectures: 18)

Unit 3:

Carbon-Carbon sigma bonds (Alkanes and Cycloalkanes)

General methods of preparation- Wurtz and Wurtz Fittig reaction, Corey House synthesis, physical and chemical properties of alkanes, Free radical substitutions; Halogenation, concept of relative reactivity v/s selectivity.

Conformational analysis of alkanes (Conformations, relative stability and energy diagrams of Ethane, Propane and butane). General molecular formulae of cycloalkanes and relative stability, Baeyer strain theory, Cyclohexane conformations with energy diagram, Axial and equatorial positions. Conformations of monosubstituted cyclohexanes.

(Lectures: 16)

Unit 4:

Carbon-Carbon pi Bonds (Alkenes and Alkynes)

Structure and isomerism. General methods of preparation, physical and chemical properties. Mechanism, of E1, E2, E1cb reactions, Saytzeff and Hoffmann eliminations, Electrophilic Additions, mechanism with suitable examples, (Markownikoff/Antimarkownikoff addition), *syn* and *anti*-addition; addition of H₂, X₂, oxymercuration-demercuration, hydroboration-oxidation, ozonolysis, hydroxylation, Diels Alder reaction, 1,2- and 1,4-addition reactions in conjugated dienes.

Mechanism of allylic and benzylic bromination in propene, 1-butene, toluene, ethyl benzene.

Reactions of alkynes; acidity, electrophilic and nucleophilic additions, hydration to form carbonyl compounds, Alkylation of terminal alkynes.

(Lectures: 8)

Unit 5:

Aromatic Hydrocarbons

Concept of Aromaticity, Huckel's rule, aromatic character of arenes, cyclic carbocations and carbanions with suitable examples and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation, Friedel Crafts alkylation/ acylation with their mechanism. Directing effects of groups in electrophilic substitution.

(Lectures: 12)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Calibration of a thermometer.
2. Organic Preparation (any one of the following):
 - a. Bromination of acetanilide/aniline/phenol
 - b. Nitration of nitrobenzene/toluene
3. Purification of organic compounds by crystallization using the following solvents:
 - a. Water
 - b. Alcohol
 - c. Alcohol-Water
4. Determination of the melting points of prepared organic compounds (Kjeldahl method and electrically heated melting point apparatus)
5. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds.
6. Determination of boiling point of liquid compounds. (boiling point lower than and more than 100 °C by distillation and capillary method)
7. Chromatography
 - a. Separation of a mixture of two amino acids by ascending and radial paper chromatography
 - b. Separation of a mixture of two sugars by ascending paper chromatography.
- c. Separation of a mixture of o-and p-nitrophenol or o-and p-aminophenol by thin layer chromatography (TLC).
8. Detection of extra elements.

References:

Theory:

1. Morrison, R. N.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. **Organic Chemistry** (Volume 1 & 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

3. Chandra, R. ; Singh, S.; Singh, A. (2019), **Basic Organic Chemistry**, Arcler Press.
4. Eliel, E. L.; Wilen, S. H.(1994),**Stereochemistry of Organic Compounds**; Wiley: London.
5. Singh, S.P.; Prakash, O.,(2017), **Reaction Mechanism in organic chemistry**, Laxmi Publications.

Practical:

1. Mann, F. G.; Saunders, B. C. (2009), **Practical Organic Chemistry**, Pearson Education.
2. Ahluwalia, V.K.; Dhingra, S. (2004),**Comprehensive Practical Organic Chemistry: Qualitative Analysis**, University Press.
3. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R.(2012),**Vogel's Textbook of Practical Organic Chemistry**, Pearson.
4. Leonard, J.; Lygo, B.; Procter, G. **Advanced Practical Organic Chemistry**, CRC Press.

Additional Resources:

1. Solomons, T. W. G.; Fryhle, C. B. ; Snyder, S. A. (2016),**Organic Chemistry**, 12th Edition, Wiley.
2. Bruice, P. Y. (2017),**Organic Chemistry**, 8th Edition, Pearson.
3. Clayden, J.; Greeves, N.; Warren, S. (2012), **Organic Chemistry**, Oxford.
4. Nasipuri, D.(2018), **Stereochemistry of Organic Compounds: Principles and Applications**, 3rd Edition, New Age International.
5. Gunstone, F. D. (1975), **Guidebook to Stereochemistry**, Prentice Hall Press.

Teaching Learning Process:

- Lectures in class rooms
- Peer learning
- Hands-on learning using 3-D models, videos, presentations, seminars
- Technology driven Learning
- Industry visits

Assessment Methods:

- Continuous Evaluation: Monitoring the progress of student's learning
- Class Tests, Worksheets and Quizzes
- Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking skills and personality
- Semester-end Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout the semester.

Keywords:

Alkanes, Alkenes, Alkynes, Aromatic Hydrocarbons, Cycloalkanes, Hybridisation, Stereochemistry.

Course Code: CHEMISTRY - C IV: PHYSICAL CHEMISTRY - II

Course Title: Chemical Thermodynamics and its Applications

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lecture: Theory- 60, Practical-60)

Objectives:

The aim of this course is to make students understand thermodynamic concepts, terminology, properties of thermodynamic systems, laws of thermodynamics and their correlation with other branches of physical chemistry and make them able to apply thermodynamic concepts to the system of variable compositions, equilibrium and colligative properties.

Learning Outcomes:

By the end of the course, students will be able to:

- Understand the three laws of thermodynamics, concept of State and Path functions, extensive and intensive properties.
- Derive the expressions of ΔU , ΔH , ΔS , ΔG , ΔA for ideal gases under different conditions.
- Explain the concept of partial molar properties.
- Explain the thermodynamic basis of colligative properties and applications in surroundings

Unit 1:

Chemical Thermodynamics: Intensive and extensive variables; state and path functions; isolated, closed and open systems.

Mathematical treatment - Exact and inexact differential, Partial derivatives, Euler's reciprocity rule, cyclic rule.

(Lectures: 6)

Unit 2:

First law: Concept of heat, Q , work, W , internal energy, U , and statement of first law; enthalpy, H , relation between heat capacities, Joule Thompson Porous Plug experiment, Nature of Joule Thompson coefficient, calculations of Q , W , ΔU and ΔH for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabatic conditions.

Thermochemistry: Enthalpy of reactions: standard states; enthalpy of neutralization, enthalpy of hydration, enthalpy of formation and enthalpy of combustion and its applications, bond dissociation energy and bond enthalpy; effect of temperature (Kirchhoff's equations) on enthalpy of reactions.

(Lectures: 14)

Unit 3:

Second Law: Concept of entropy; statement of the second law of thermodynamics, Carnot cycle. Calculation of entropy change for reversible and irreversible processes (for ideal gases). Free Energy Functions: Gibbs and Helmholtz energy; variation of S , G , A with T , V , P ; Free energy change and spontaneity (for ideal gases). Relation between Joule-Thomson coefficient and other thermodynamic parameters; inversion temperature; Gibbs-Helmholtz equation; Maxwell relations; thermodynamic equation of state.

(Lectures: 16)

Unit 4:

Third Law: Statement of third law, unattainability of absolute zero, calculation of absolute entropy of molecules, concept of residual entropy, calculation of absolute entropy of solid, liquid and gases.

(Lectures: 4)

Unit 5:

Systems of Variable Composition: Partial molar quantities, dependence of thermodynamic parameters on composition; Gibbs Duhem equation, chemical potential of ideal mixtures, Change in thermodynamic functions on mixing of ideal gases.

Chemical Equilibrium: Criteria of thermodynamic equilibrium, degree of advancement of reaction, Chemical equilibria in ideal gases, Thermodynamic derivation of relation between Gibbs free energy of a reaction and reaction quotient, Equilibrium constants and their dependence on temperature, pressure and concentration, Le Chatelier's Principle (Quantitative treatment), Free energy of mixing and spontaneity, Equilibrium between ideal gases and a pure condensed phase.

(Lectures: 10)

Unit 6:

Solutions and Colligative Properties: Dilute solutions; lowering of vapour pressure, Raoult's law, Henry's law. Thermodynamic basis of the colligative properties - lowering of vapour pressure, elevation of Boiling Point, Depression of Freezing point and Osmotic pressure and derivation of expressions for these using chemical potential. Application of colligative properties in calculating molar masses of normal, dissociated and associated solutes in solutions. Concept of activity and activity coefficients.

(Lectures: 10)

Practical:

(Credits: 2, Laboratory periods: 60)

Thermochemistry:

1. Determination of heat capacity of a calorimeter for different volumes using (i) change of enthalpy data of a known system and (ii) heat gained equal to heat lost by cold water and hot water respectively
2. Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide.

3. Determination of the enthalpy of ionization of ethanoic acid.
4. Determination of integral enthalpy (endothermic and exothermic) solution of salts.
5. Determination of basicity of a diprotic acid by the thermochemical method for different additions of a base.
6. Determination of enthalpy of hydration of salt.
7. To study the effect of concentration of solute on elevation of boiling point of water.
8. To study the elevation in boiling point on adding same concentrations of electrolyte and non-electrolyte to a specific volume of water.

References:

Theory:

1. Peter, A.; Paula, J. de. (2011), **Physical Chemistry**, 9th Edition, Oxford University Press.
2. Castellan, G. W. (2004), **Physical Chemistry**, 4th Edition, Narosa.
3. Kapoor, K.L.(2015), **A Textbook of Physical Chemistry**, Vol 2, 6th Edition, McGraw Hill Education.
4. Kapoor, K.L.(2013), **A Textbook of Physical Chemistry**, Vol 3, 3rd Edition, McGraw Hill Education.
5. McQuarrie, D. A.; Simon, J. D. (2004), **Molecular Thermodynamics**, Viva Books Pvt. Ltd.

Additional Resources:

1. Levine, I.N.(2010), **Physical Chemistry**, Tata Mc Graw Hill.
2. Assael, M. J.; Goodwin, A. R. H.; Stamatoudis, M.; Wakeham, W. A.; Will, S.(2011), **Commonly asked Questions in Thermodynamics**. CRC Press.

Practicals:

1. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), **Senior Practical Physical Chemistry**, R. Chand & Co, New Delhi.
2. Kapoor, K.L. (2019), **A Textbook of Physical Chemistry**, Vol.7, 1st Edition, McGraw Hill Education.
3. Garland, C. W.; Nibler, J. W.; Shoemaker, D. P.(2003), **Experiments in Physical Chemistry**, 8th Edition, McGraw-Hill, New York.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Frequent use of molecular models for demonstration and providing students in groups to explore building models themselves
- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

- Graded assignments
- Conventional class tests
- Class seminars by students on course topics with a view to strengthening the content through width and depth
- Quizzes
- End semester university examination.

Keywords:

Thermodynamics, State/Path Functions, Heat, Thermal equilibrium, Spontaneity, Work Function, Entropy, Chemical Potential, Partial Molar Quantities, Le Chatelier's Principle, Colligative Properties

SEMESTER III

Course Code: CHEMISTRY - CV: INORGANIC CHEMISTRY - II

Course Title: s- and p-Block Elements

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lecture: Theory- 60, Practical-60)

Objectives:

The course reviews the general principles of metallurgy and s-, p-block elements. It reviews the terms minerals, ores, concentration, benefaction, calcination, roasting, refining, etc. and explains the principles of oxidation and reduction as applied to the extraction procedures. Methods of purification of metals, such as electrolytic, oxidative refining, Van Arkel-De Boer process and Mond's process are discussed and applications of thermodynamic concepts like that of Gibbs energy and entropy to the extraction of metals are reviewed. It further discusses the patterns and trends exhibited by s and p block elements and their compounds with emphasis on synthesis, structure, bonding and uses.

Learning Outcomes:

By the end of the course, the students will be able to:

- Learn the fundamental principles of metallurgy and understand the importance of recovery of by-products during extraction.
- Understand the basic and practical applications in various fields of metals and alloy behavior and their manufacturing processes.

- Apply the thermodynamic concepts like that of Gibbs energy and entropy to the principles of extraction of metals.
- Understand the periodicity in atomic and ionic radii, electronegativity, ionization energy, electron affinity of elements of the periodic table.
- Understand oxidation states with reference to elements in unusual and rare oxidation states like carbides and nitrides.
- Understand vital role of sodium, potassium, calcium and magnesium ions in biological systems and the use of caesium in devising photoelectric cells.

Unit 1:

General Principles of Metallurgy: Chief modes of occurrence of metals based on standard electrode potentials. Ellingham diagrams for reduction of metal oxides using carbon and carbon monoxide as reducing agent. Electrolytic Reduction, Hydrometallurgy with reference to cyanide process for silver and gold. Methods of purification of metals: Electrolytic process, Van Arkel-De Boer process, Zone refining.

(Lectures: 6)

Unit 2:

Chemistry of s-Block Elements

General characteristics: melting point, flame colour, reducing nature, diagonal relationships and anomalous behavior of first member of each group.

Reactions of alkali and alkaline earth metals with oxygen, hydrogen, nitrogen and water.

Common features such as ease of formation, thermal stability and solubility of the following alkali and alkaline earth metal compounds: hydrides, oxides, peroxides, superoxides, carbonates, nitrates, sulphates.

Complex formation tendency of s-block elements; structure of the following complexes: crown ethers and cryptates of Group I; basic beryllium acetate, beryllium nitrate, EDTA complexes of calcium and magnesium.

Solutions of alkali metals in liquid ammonia and their properties.

(Lectures: 22)

Unit 3:

Chemistry of p- Block Elements

Electronic configuration, atomic and ionic size, metallic/non-metallic character, melting point, ionization enthalpy, electron gain enthalpy, electronegativity, Catenation, Allotropy of C, P, S; inert pair effect, diagonal relationship between B and Si and anomalous behaviour of first member of each group.

(Lectures: 6)

Unit 4:

Structure, bonding and properties: acidic/basic nature, stability, ionic/covalent nature, oxidation/reduction, hydrolysis, action of heat of the following:

- Hydrides: hydrides of Group 13 (only diborane), Group 14, Group 15 (EH_3 where E = N, P, As, Sb, Bi), Group 16 and Group 17.
- Oxides: oxides of phosphorus, sulphur and chlorine
- Oxoacids: oxoacids of phosphorus and chlorine; peroxyacids of sulphur
- Halides: halides of silicon and phosphorus

(Lectures: 15)

Unit 5:

Preparation, properties, structure and uses of the following compounds:

- Borazine
- Silicates, silicones,
- Phosphonitrilic halides $\{(\text{PNCl}_2)_n$ where $n = 3$ and $4\}$
- Interhalogen and pseudohalogen compounds
- Clathrate compounds of noble gases, xenon fluorides (MO treatment of XeF_2).

(Lectures: 11)

Practical:

(Credits: 02, Laboratory periods: 60)

(A) Iodo / Iodimetric Titrations

- Estimation of Cu(II) and $\text{K}_2\text{Cr}_2\text{O}_7$ using sodium thiosulphate solution (Iodometrically).
- Estimation of antimony in tartar-emetic iodimetrically
- Estimation of Iodine Content in iodized salt

(B) Complexometric titrations using disodium salt of EDTA

- Estimation of Mg^{2+} , Zn^{2+}
- Estimation of Ca^{2+} by substitution method
- Estimation of Calcium content in milk.

(C) Paper chromatographic separation of following metal ions:

- Ni (II) and Co (II)
- Cu(II) and Cd(II)

(D) Inorganic preparations

(i) Cuprous Chloride, Cu_2Cl_2

(ii) Aluminium potassium sulphate $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ (potash alum) or Chromium potassium sulphate $\text{KCr}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ (chrome alum).

References:

Theory:

1. Lee, J.D.; (2010), **Concise Inorganic Chemistry**, Wiley India.
2. Huheey, J.E.; Keiter, E.A.; Keiter, R. L.; Medhi, O.K. (2009), **Inorganic Chemistry- Principles of Structure and Reactivity**, Pearson Education.
3. Douglas, B.E.; McDaniel, D.H.; Alexander, J.J. (1994), **Concepts and Models of Inorganic Chemistry**, John Wiley & Sons.
4. Atkins, P.W.; Overton, T.L.; Rourke, J.P.; Weller, M.T.; Armstrong, F.A. (2010), **Shriver and Atkins Inorganic Chemistry**, 5th Edition, Oxford University Press.
5. Miessler, G.L.; Fischer P.J.; Tarr, D. A. (2014), **Inorganic Chemistry**, 5th Edition, Pearson.

Practicals:

1. Jeffery, G.H.; Bassett, J.; Mendham, J.; Denney, R.C. (1989), **Vogel's Textbook of Quantitative Chemical Analysis**, John Wiley and Sons.

Teaching Learning Process:

- Conventional methods of teaching learning e.g. Lectures, use of chalk, blackboard and models.
- ICT enabled teaching learning.
- Group discussions and quiz.

Assessment Methods:

- Test / Examination
- Assignment
- Projects based on the real world application of important elements and their compounds
- End semester university theory and practical examination.

Keywords:

s-block elements, p-block elements, metallurgy, Ellingham Diagram, Zone Refining, Borazine, Silicates, Interhalogen, Pseudohalogen compounds.

Course Code: CHEMISTRY - CVI: ORGANIC CHEMISTRY - II
Course Title: Halogenated Hydrocarbons and Oxygen Containing Functional Groups
Total Credits: 06 (Credits: Theory-04, Practical-02)
(Total Lectures: Theory- 60, Practical-60)

Objectives:

The core course Organic Chemistry II is designed in a manner that gives a better understanding of the organic functional groups, which include halogenated hydrocarbons and oxygen containing functional groups and their reactivity patterns. The detailed reactions mechanistic pathways for each functional group will be discussed to unravel the spectrum of organic chemistry and the extent of organic transformations.

Learning Outcomes:

On completion of the course, the student will be able to:

- Understand preparation, properties and reactions of haloalkanes, haloarenes and oxygen containing functional groups.
- Use the synthetic chemistry learnt in this course to do functional group transformations.
- To propose plausible mechanisms for any relevant reaction.

Unit 1:

Chemistry of Halogenated Hydrocarbons:

Alkyl halides: Methods of preparation and properties, nucleophilic substitution reactions – S_N1 , S_N2 and S_Ni mechanisms with stereochemical aspects and effect of solvent; nucleophilic substitution vs. elimination.

Aryl halides: Preparation (including preparation from diazonium salts) and properties, nucleophilic aromatic substitution; S_NAr , Benzyne mechanism.

Relative reactivity of alkyl, allyl, benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.

Organometallic compounds of Mg (Grignard reagent) – Use in synthesis of organic compounds.

(Lectures: 16)

Unit 2:

Alcohol, Phenol, Ether and Epoxides

Alcohols: preparation, properties and relative reactivity of 1°, 2°, 3° alcohols, Bouveault–Blanc Reduction; Oxidation of diols by periodic acid and lead tetraacetate, Pinacol–Pinacolone rearrangement.

Phenols: Preparation and properties; Acidity and affecting factors, Ring substitution reactions, Reimer–Tiemann and Kolbe's–Schmidt Reactions, Fries and Claisen rearrangements and their mechanism.

Ethers and Epoxides: Preparation and reactions with acids. Reactions of epoxides with alcohols, ammonia and LiAlH_4 .

(Lectures: 16)

Unit 3:

Carbonyl Compounds

Structure, reactivity, preparation and properties;

Nucleophilic additions, Nucleophilic addition-elimination reactions with ammonia derivatives with mechanism.

Mechanisms of Aldol and Benzoin condensation, Knoevenagel condensation, Claisen-Schmidt, Perkin, Cannizzaro and Wittig reaction, Beckmann and Benzil-Benzilic acid rearrangements, haloform reaction and Baeyer Villiger oxidation, α -substitution reactions, oxidations and reductions (Clemmensen, Wolff-Kishner, LiAlH_4 , NaBH_4 , MPV, PDC)

Addition reactions of α , β - unsaturated carbonyl compounds: Michael addition.

Active methylene compounds: Keto-enol tautomerism. Preparation and synthetic applications of diethyl malonate and ethyl acetoacetate.

(Lectures: 16)

Unit 4:

Carboxylic acids and their derivatives

General methods of preparation, physical properties and reactions of monocarboxylic acids, effect of substituents on acidic strength. Typical reactions of dicarboxylic acids, hydroxy acids and unsaturated acids.

Preparation and reactions of acid chlorides, anhydrides, esters and amides;

Comparative study of nucleophilic substitution at acyl group–Mechanism of acidic and alkaline hydrolysis of esters, Claisen condensation, Dieckmann and Reformatsky reactions, Hoffmann-bromamide degradation and Curtius rearrangement.

(Lectures: 12)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Functional group tests for alcohols, phenols, carbonyl and carboxylic acid group
2. Organic Preparations
 - i. Acetylation of one of the following compounds: amines (aniline, o-, m-, p- toluidines and o-, m-, p-anisidine) and phenols (β -naphthol, vanillin, salicylic acid) by any one method:
 - a. Using conventional method.
 - b. Using green approach
 - ii. Benzoylation of one of the following amines (aniline, o-, m-, p- toluidines and o-, m-, p-anisidine) and one of the following phenols (β -naphthol, resorcinol, p- cresol) by Schotten-Baumann reaction.
 - iii. Oxidation of ethanol/ isopropanol (Iodoform reaction).
 - iv. Selective reduction of meta dinitrobenzene to m-nitroaniline.
 - v. Hydrolysis of amides and esters.
 - vi. Semicarbazone of any one of the following compounds: acetone, ethyl methyl ketone, cyclohexanone.
 - vii. S-Benzylisothiuronium salt of one each of water soluble and water insoluble acids (benzoic acid, oxalic acid, phenyl acetic acid and phthalic acid).
 - viii. Aldol condensation using either conventional or green method.

The above derivatives should be prepared using 0.5-1g of the organic compound. The solid samples must be collected and may be used for recrystallization and melting point.

References:

Theory:

1. Morrison, R. N.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. **Organic Chemistry** (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Ahluwalia, V.K.; Bhagat, P.; Aggarwal, R.; Chandra, R. (2005), **Intermediate for Organic Synthesis**, I.K.International.
4. Solomons, T. W. G.; Fryhle, C. B. ; Snyder, S. A. (2016),**Organic Chemistry**, 12th Edition, Wiley.
5. Chandra, R. ; Singh, S.; Singh, A. (2019), **Organic reactions and their nomenclature**, Arcler Press.

Practical:

1. Mann, F. G.; Saunders, B. C. (2009),**Practical Organic Chemistry**, Pearson Education.
2. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R.(2012),**Vogel's Textbook of Practical Organic Chemistry**, Pearson.
3. Ahluwalia, V.K.; Aggarwal, R.(2004),**Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis**, University Press.

4. Ahluwalia, V.K.; Dhingra, S. (2004), **Comprehensive Practical Organic Chemistry: Qualitative Analysis**, University Press.

Additional References:

1. Mukherji, S.M.; Singh, S.P. (2017), **Reaction Mechanism in Organic Chemistry**, Trinity Press.
2. Carey, F.A.; Sundberg, R. J. (2007), **Advanced Organic Chemistry: Part B: Reaction and Synthesis**, Springer.
3. Bruice, P.Y. (2015), **Organic Chemistry** 3rd Edition, Pearson.
4. Patrick, G. (2003), **BIOS Instant Notes in Organic Chemistry**, Viva Books.

Teaching Learning Process:

Lectures, ICT enabled teaching, group discussion and quiz will be part of the teaching learning process.

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Alkyl halides, Alcohols, Phenols, Ethers, Carbonyl Compounds

Course Code: CHEMISTRY - CVII: PHYSICAL CHEMISTRY–III

Course Title: Phase Equilibria and Electrochemical Cells

Total Credits: 06 (Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The aim of this course is to make students understand phase, co-existence of phases, phase diagram, CST and distribution law and concepts of electrochemical cells, electrode potential, electrochemical series and learn about surface phenomenon, adsorption isotherms, BET Equation.

Learning Outcomes:

By the end of the course, students will be able to:

- Understand phase equilibrium, criteria, CST, Gibbs-Duhem-Margules equation.
- Learn the working of electrochemical cells, galvanic cell, corrosion and happenings in surroundings related to electrochemistry.

Unit 1:

Phase Equilibria: Concept of phases, components and degrees of freedom, derivation of Gibbs Phase Rule for nonreactive and reactive systems; Clausius-Clapeyron equation and its applications to solid-liquid, liquid-vapour and solid-vapour equilibria, phase diagram for one component systems (H_2O and S), with applications. A comparison between the phase diagram of CO_2 and H_2O . Phase diagrams for systems of solid-liquid equilibria involving eutectic, congruent and incongruent melting points. Binary solutions: Gibbs-Duhem-Margules equation, its derivation and applications to fractional distillation of binary miscible liquids (ideal and non-ideal), azeotropes, lever rule, partial miscibility of liquids, CST, miscible pairs, steam distillation. Nernst distribution law: its derivation and applications.

(Lectures: 27)

Unit 2:

Electrochemical Cells: Rules of oxidation/reduction of ions based on half-cell potentials, applications of electrolysis in metallurgy and industry. Chemical cells, reversible and irreversible cells with examples. Electromotive force of a cell and its measurement, Nernst equation; Standard electrode (reduction) potential and its application to different kinds of half-cells. Application of EMF measurements in determining (i) free energy, enthalpy and entropy of a cell reaction, (ii) equilibrium constants, and (iii) pH values, using hydrogen, quinone-hydroquinone, glass and $\text{SbO/Sb}_2\text{O}_3$ electrodes. Concentration cells with and without transference, liquid junction potential; determination of activity coefficients and transference numbers. Qualitative discussion of potentiometric titrations (acid-base, redox, precipitation).

(Lectures: 27)

Unit 3:

Surface chemistry: Physical adsorption, chemisorption, adsorption isotherms (Langmuir and Freundlich). Nature of adsorbed state. Qualitative discussion of BET.

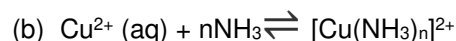
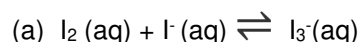
(Lectures: 6)

Practical:

(Credits: 2, Laboratory periods: 60)

Phase Equilibria:

1. Determination of critical solution temperature and composition at CST of the phenol water system and to study the effect of impurities of sodium chloride and succinic acid on it.
2. Phase equilibria: Construction of the phase diagram using cooling curves or ignition tube method: a. simple eutectic and b. congruently melting systems.
3. Distribution of acetic/ benzoic acid between water and chloroform or cyclohexane.
4. Study of equilibrium of any one of the following reactions by distribution method:



Potentiometry:

1. Perform the following potentiometric titrations: i. Strong acid vs. strong base ii. Weak acid vs. strong base iii. Dibasic acid vs. strong base iv. Potassium dichromate vs. Mohr's salt.

References:

Theory:

1. Atkins, P.W.; Paula, J.de. (2014), **Atkin's Physical Chemistry Ed.**, 10th Edition, Oxford University Press.
2. Castellan, G. W. (2004), **Physical Chemistry**, 4th Edition, Narosa.
3. Kapoor, K.L.(2013), **A Textbook of Physical Chemistry**, Vol 3, 3rd Edition, McGraw Hill Education.
4. Kapoor, K.L.(2015), **A Textbook of Physical Chemistry**, Vol 5, 3rd Edition, McGraw Hill Education.
5. McQuarrie, D. A.; Simon, J. D. (2004), **Molecular Thermodynamics**, Viva Books Pvt. Ltd.

Practical:

1. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), **Senior Practical Physical Chemistry**, R. Chand & Co, New Delhi.
2. Kapoor, K.L. (2019), **A Textbook of Physical Chemistry**, Vol.7, 1st Edition, McGraw Hill Education.
3. Garland, C. W.; Nibler, J. W.; Shoemaker, D. P.(2003), **Experiments in Physical Chemistry**, 8th Edition, McGraw-Hill, New York.

Additional Resources:

1. Engel, T.; Redi, P. (2013), **Physical Chemistry**, 3rd Edition, Pearson Education.
2. Levine, I.N.(2010), **Physical Chemistry**, Tata Mc Graw Hill.
3. Assael, M. J.; Goodwin, A. R. H.; Stamatoudis, M.; Wakeham, W. A.; Will, S.(2011), **Commonly asked Questions in Thermodynamics**. CRC Press.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Phase equilibrium, Degree of freedom, Gibbs Phase Rule, CST, Electrode potential, Galvanic cell, Battery, Surface chemistry.

SEMESTER IV

Course Code: CHEMISTRY – CVIII: INORGANIC CHEMISTRY - III

Course Title: Coordination Chemistry

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lecture: Theory- 60, Practical-60)

Objectives:

The course introduces the students to coordination compounds which find manifold applications in diverse areas like qualitative and quantitative analysis, metallurgy, as catalysts in industrial processes as medicines, paints and pigments as well as in life. The student is also familiarized with the d and f block elements and get an idea about horizontal similarity in a period in addition to vertical similarity in a group.

Learning Outcomes:

By the end of the course, the students will be able to:

- Understand the terms, ligand, denticity of ligands, chelate, coordination number and use standard rules to name coordination compounds.
- Discuss the various types of isomerism possible in such compounds and understand the types of isomerism possible in a metal complex.
- Use Valence Bond Theory to predict the structure and magnetic behaviour of metal complexes and understand the terms inner and outer orbital complexes
- Explain the meaning of the terms Δ_o , Δ_t , pairing energy, CFSE, high spin and low spin and how CFSE affects thermodynamic properties like lattice enthalpy and hydration enthalpy
- Explain magnetic properties and colour of complexes on basis of Crystal Field Theory
- Understand the important properties of transition metals like variable oxidation states, colour, magnetic and catalytic properties and use Latimer diagrams to predict and identify species which are reducing, oxidizing and tend to disproportionate and calculate step potentials
- Understand reaction mechanisms of coordination compounds and differentiate between kinetic and thermodynamic stability.

Unit 1:

Coordination Chemistry:

Recapitulation of Werner's Coordination theory

IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. with coordination numbers 4 and 6. A brief idea about chelate effect and labile and inert complexes.

Valence bond theory and its application to complexes of coordination numbers 4 and 6. Examples of inner and outer orbital complexes.

Crystal field theory, measurement of Δ_o . Calculation of CFSE in weak and strong fields, concept of pairing energies, factors affecting the magnitude of Δ_o . Octahedral vs. tetrahedral coordination, tetragonal distortions from octahedral geometry Jahn-Teller theorem, square planar geometry. Qualitative aspect of Ligand field and MO Theory (for octahedral σ -donor, π - acceptor and π - donor complexes).

(Lectures: 26)

Unit 2:

Transition Elements: General group trends with special reference to electronic configuration, colour, variable valency, magnetic properties (no temperature dependence), catalytic properties, and ability to form complexes. Latimer diagrams of Mn, Fe and Cu in acidic and basic media

A brief discussion of differences between the first, second and third transition series.

Some important compounds of Cr, Mn, Fe and Co and their roles as laboratory reagents;

Potassium dichromate, potassium permanganate, potassium ferrocyanide, potassium ferricyanide, sodium nitroprusside and sodium cobaltinitrite.

(Lectures: 14)

Unit 3:

Lanthanoids and Actinoids: A brief discussion of electronic configuration, oxidation states, colour, spectral and magnetic properties. Lanthanoid contraction (causes and effects) separation of lanthanoids by ion exchange method.

(Lectures: 6)

Unit 4:

Inorganic Reaction Mechanism: Introduction to inorganic reaction mechanisms. Concept of reaction pathways, transition state, intermediate and activated complex. Substitution reactions in square planar complexes, Trans- effect, theories of trans-effect. Thermodynamic and Kinetic stability (using VBT).

(Lectures: 14)

Practical:

(Credits: 2, Laboratory periods: 60)

Gravimetry

1. Estimation of Ni(II) using dimethylglyoxime (DMG).
2. Estimation of copper as CuSCN.
3. Estimation of iron as Fe₂O₃ by precipitating iron as Fe(OH)₃.
4. Estimation of Al(III) by precipitating with oxine and weighing as Al(oxine)₃ (aluminium oxinate).

Inorganic Preparations

1. Tetraamminecopper (II) sulphate, [Cu(NH₃)₄]SO₄.H₂O
2. Acetylacetonate complexes of Cu²⁺/Fe³⁺
3. Potassium tri(oxalato)ferrate(III)

Properties of Complexes

1. Measurement of 10Dq/ Δ_o by spectrophotometric method.
2. Verification of spectrochemical series.
3. Synthesis of ammine complexes of Ni(II) and its ligand exchange reactions (e.g. bidentate ligands like acetylacetone, DMG, glycine) by substitution method.

References:

Theory:

1. Atkins, P.W.; Overton, T.L.; Rourke, J.P.; Weller, M.T.; Armstrong, F.A. (2010), **Shriver and Atkins Inorganic Chemistry**, 5th Edition, Oxford University Press.
2. Miessler, G.L.; Fischer P.J.; Tarr, D. A. (2014), **Inorganic Chemistry**, 5th Edition, Pearson.
3. Huheey, J.E.; Keiter, E.A.; Keiter, R. L.; Medhi, O.K. (2009), **Inorganic Chemistry- Principles of Structure and Reactivity**, Pearson Education.
4. Pfennig, B. W. (2015), **Principles of Inorganic Chemistry**. John Wiley & Sons.
5. Cotton, F.A.; Wilkinson, G.(1999), **Advanced Inorganic Chemistry** Wiley-VCH.

Practicals:

1. Jeffery, G.H.; Bassett, J.; Mendham, J.; Denney, R.C. (1989), **Vogel's Textbook of Quantitative Chemical Analysis**, John Wiley and Sons.
2. Marr, G.; Rockett, B.W. (1972), **Practical Inorganic Chemistry**, Van Nostrand Reinhold.

Teaching Learning Process:

Lectures, ICT enabled teaching, presentations by students, group discussion and quiz will be the part of teaching learning process.

Assessment Methods:

Assignments, class test, quiz, viva voce and end semester university examinations will be the mode of assessment.

Keywords:

Crystal field theory, Dq, CFSE, Nomenclature, Latimer diagram, Lanthanoids, Magnetic properties.

Course Code: CHEMISTRY - CIX: ORGANIC CHEMISTRY – III

Course Title: Nitrogen containing functional groups, Polynuclear Hydrocarbons, Heterocyclic Chemistry, Alkaloids and Terpenes.

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The Core Course Organic Chemistry III is infused with the details of Nitrogen containing functional groups and introduction of polynuclear hydrocarbons, heterocyclic systems and natural compounds viz. terpenes and alkaloids. A comprehensive understanding of these topics will be developed by taking examples of representative members of each class. The chemical synthesis, properties and reactions of these compounds will be discussed in detail. This course will also discuss some of the key applications of each class of compounds in diverse fields.

Learning Outcomes:

On completion of this course, the students will be able to:

- Gain theoretical understanding of chemistry of compounds having nitrogen containing functional groups, heterocyclics, polynuclear hydrocarbons, alkaloids and terpenes which includes various methods for synthesis through application of the synthetic organic chemistry concepts learnt so far.
- Become familiar with their particular properties, chemical reactions, criterion of aromaticity with reference to polynuclear hydrocarbons and heterocyclic compounds, trends in basicity of amines and heterocyclic compounds and their behaviour at different pH.
- Learn practical approach to structural elucidation of organic compounds with specific examples of terpenes and alkaloids.
- Predict the carbon skeleton of amines and heterocyclic compounds via use of Hoffmann's exhaustive methylation and Emde's modification methods.
- Understand the applications of these compounds including their medicinal applications through their reaction chemistry.

Unit 1:

Nitrogen Containing Functional Groups

Preparation, properties and important reactions of amines and diazonium salts, nitro compounds, nitriles and isonitriles.

A) Amines: Introduction, classification, chirality in amines (pyramidal inversion), importance and general methods of preparation.

Properties: Physical properties, Basicity of amines: Effect of substituents, solvent and steric effects. Distinction between Primary, secondary and tertiary amines using Hinsberg's method and nitrous acid. Discussion of the following reactions with emphasis on the mechanistic pathway: Gabriel Phthalimide synthesis, Hoffmann- Bromamide reaction, Carbylamine reaction, Mannich reaction, Hoffmann's exhaustive methylation, Hofmann-elimination reaction and Cope elimination.

Diazonium Salts: Preparation and synthetic applications of diazonium salts including preparation of arenes, haloarenes, phenols, cyano and nitro compounds. Coupling reactions of diazonium salts(preparation of azo dyes).

B) Nitro compounds (Aliphatic and Aromatic):Nomenclature, classification and general methods of preparation: from alkyl halides, alkanes, oxidation of amines and oximes and diazonium salts.

Properties: Physical properties, discussion on the following reactions with mechanism:

Reaction with alkali and its synthetic applications, condensation reaction, Mannich reaction, Hydrolysis,Reduction-electrolytic reduction, reduction in acidic, basic and neutral medium (for aromatic compounds),reaction with nitrous acid, Electrophilic substitution-Halogenation, nitration and sulphonation reaction, and Nucleophilic substitution on the ring.

C) Nitriles: Introduction, Nomenclature and uses. Preparation from the following reactions: Dehydration of amides and aldoximes, substitution reaction in alkyl halides and tosylates, from Grignard reagents and from dehydrogenation of primary amines.

Properties: Physical properties, discussion on the following reactions with mechanism:

Reaction with Grignard reagent, hydrolysis,addition reaction with HX , NH_3 ,reaction with aqueous ROH , Reduction reactions-catalytic reduction and Stephen's reaction, Condensation reactions-Thorpe Nitrile Condensation.

D) Isonitriles: Introduction, Nomenclature and uses. Preparation from the following reactions:

Carbylamine reaction, substitution in alkyl halides and dehydrogenation of N-substituted formamides.

Properties: Physical properties, discussion on the following reactions with mechanism:

Hydrolysis, reduction, addition of HX , X_2 and sulphur, Grignard reaction, oxidation and rearrangement.

(Lectures: 18)

Unit 2:

Polynuclear Hydrocarbons

Introduction, Classification,Structure, Nomenclature and uses. Aromaticity of polynuclear hydrocarbons, structure elucidation of Naphthalene and general methods of preparation of naphthalene, phenanthrene and anthracene(including Haworth method,Friedel Craft acylation, Diels Alder reaction,Elbs reaction and Pschorr Synthesis).Relative reactivity of naphthalene, phenanthrene and anthracene in comparison to benzene.

Properties: Physical properties, discussion on the following reaction (with mechanism) for Naphthalene, Anthracene and Phenanthrene:

Addition reactions, Oxidation, Electrophilic substitution- Friedel Craft reaction, Chloromethylation, Halogenation, Formylation, Nitration and sulphonation. Reduction reaction and Diels Alder reaction.

(Lectures:8)

Unit 3:

Heterocyclic Compounds

Introduction, importance, classification and nomenclature of heterocyclic compounds (containing only one hetero atom). General discussion on the following aspects of heterocyclic compounds: Structure, aromaticity in 5-membered and 6-membered rings containing one heteroatom; Basicity and relative reactivity towards electrophilic substitution reactions(amongst five membered and six membered rings)

General methods of synthesis for: Furan, Pyrrole (Paal-Knorr synthesis, Knorr pyrrole synthesis, Hantzsch synthesis), Thiophene, Pyridine (Hantzsch synthesis), Indole(Fischer indole synthesis and Madelung synthesis, reduction of o-nitrobenzaldehyde), Quinoline and isoquinoline, (Skraup synthesis, Friedlander's synthesis, Knorr quinoline synthesis, Doebner-Miller synthesis, Bischler-Napieralski reaction, Pictet-Spengler reaction, Pomeranz-Fritsch reaction)

Properties: Physical properties, discussion on the following reaction (with mechanism) for Furan, Pyrrole, thiophene, Pyridine, Indole, Quinoline and Isoquinoline: Electrophilic substitution- Nitration, sulphonation, halogenation, Formylation, acylation, mercuration and carboxylation. Oxidation,Reduction, Addition, Reactions showing acidic /basic character.Reaction with diazonium salts, Ring opening, Ring expansion and Nucleophilic substitution reaction wherever applicable should be discussed

(Lectures: 22)

Unit 4:

Alkaloids

Introduction, Natural occurrence, Classification, Uses, general structural features, general methods for structure elucidation including Hoffmann's exhaustive methylation and Emde's method. Structure elucidation, synthesis and physiological action of Nicotine.

(Lectures: 6)

Unit 5:

Terpenes

Introduction, Occurrence, Uses, classification, isoprene and special isoprene rule; general methods of structure elucidation including distinction between isopropylidene and isopropenyl group, Elucidation of structure, synthesis and industrial applicationof Citral.

(Lectures: 6)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Qualitative analysis of unknown organic compounds containing simple functional groups (alcohols, carboxylic acids, phenols, carbonyl compounds and esters).
2. Isolation of caffeine from tea leaves.
3. Estimation of aniline by any one of the following methods: a) Acetylation b) Bromate-bromide method

References:

Theory:

1. Morrison, R. T.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. **Organic Chemistry** (Volume 1 & 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Solomons, T. W. G.; Fryhle, C. B.; Snyder, S. A. (2016), **Organic Chemistry**, 12th Edition, Wiley.
4. Clayden, J.; Greeves, N.; Warren, S.; Wothers, P. (2013), **Organic Chemistry**, Oxford University Press.
5. Gilchrist, T.L. (1997), **Heterocyclic Chemistry**, Pearson Education.
6. Ram V. J.; Sethi, A.; Nath, M.; Pratap, R.; (2019), **The Chemistry of Heterocycles (Nomenclature and Chemistry of three to five membered Heterocycles)**, Elsevier publication.
7. Ram V. J.; Sethi, A.; Nath, M.; Pratap, R.; (2019), **The Chemistry of Heterocycles (Chemistry of six to eight membered N, O, S, P and Se heterocycles)**, Elsevier publication.

Practical:

1. Mann, F. G.; Saunders, B. C. (2009), **Practical Organic Chemistry**, Pearson Education.
2. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. (2012), **Vogel's Textbook of Practical Organic Chemistry**, Pearson.
3. Ahluwalia, V.K.; Aggarwal, R. (2004), **Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis**, University Press.

Teaching Learning Process:

Lectures and ICT enabled teaching will be used to convey the concepts.

Assessment Methods:

Students' evaluation will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Nitrogen containing functional groups, Polynuclear hydrocarbons, Heterocyclic compounds, Terpenes and Alkaloids, Synthetic Organic Chemistry.

Course Code: CHEMISTRY - CX: PHYSICAL CHEMISTRY–IV

Course Title: Conductance & Chemical Kinetics

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

This course aims to make the students understand conductance, anomaly of strong electrolytes, laws governing migration of ions in solutions and application of conductance measurement for titration methods and have understanding of kinetics of chemical reaction, catalysis and photochemical reactions.

Learning Outcomes:

By the end of this course, students will be able to:

- Explain the chemistry of conductance and its variation with dilution, migration of ions in solutions.
- Learn the applications of conductance measurements,
- Have understanding of rate law and rate of reaction, theories of reaction rates and catalysts; both chemical and enzymatic
- Have knowledge of the laws of absorption of light energy by molecules and the subsequent photochemical reactions.

Unit 1:

Conductance: Quantitative aspects of Faraday's laws of electrolysis, Arrhenius theory of electrolytic dissociation. Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Molar conductivity at infinite dilution. Kohlrausch's law of independent migration of ions. Debye-Huckel-Onsager equation, Wien effect, Debye-Falkenhagen effect, Walden's rule. Ionic velocity, mobility and their determination, transference number and its relation to ionic mobility, determination of transference number using Hittorf and Moving Boundary methods. Applications of conductance measurement: (i) degree of dissociation of weak electrolytes, (ii) ionic product of water (iii) solubility and solubility product of sparingly soluble salts, (iv) conductometric titrations, (v) hydrolysis constants of salts.

(Lectures:18)

Unit 2:

Chemical Kinetics: Order and molecularity of a reaction, rate laws in terms of the advancement of a reaction, differential and integrated form of rate expressions up to second order reactions, experimental methods for determination of rate laws, kinetics of complex reactions (integrated rate expressions up to first order only): (i) Opposing reactions (ii) parallel reactions and (iii) consecutive reactions and their differential rate equations (steady-state approximation in reaction mechanisms) (iv) chain reactions. Temperature dependence of reaction rates; Arrhenius equation; activation energy. Collision theory of reaction rates, Lindemann mechanism, qualitative treatment of the theory of absolute reaction rates.

(Lectures:22)

Unit 3:

Catalysis: Types of catalyst, specificity and selectivity, mechanisms of catalyzed reactions at solid surfaces. Enzyme catalysis, Michaelis-Menten mechanism, acid-base catalysis.

(Lectures:8)

Unit 4:

Photochemistry: Characteristics of electromagnetic radiation, Jablonski Diagram. Lambert-Beer's law and its limitations, physical significance of absorption coefficients. Laws of photochemistry, quantum yield, actinometry, examples of low and high quantum yields, photochemical equilibrium and the differential rate of photochemical reactions, photosensitized reactions, quenching. Role of photochemical reactions in biochemical processes, photostationary states, chemiluminescence. Jablonsky diagram.

(Lectures:12)

Practical:

(Credits: 2, Laboratory periods: 60)

Conductometry

1. Determination of cell constant
2. Determination of conductivity, molar conductivity, degree of dissociation and dissociation constant of a weak acid.
3. Perform the following conductometric titrations: i. Strong acid vs. strong base, ii. Weak acid vs. strong base, iii. Mixture of strong acid and weak acid vs. strong base, iv. strong acid vs. weak base.

Chemical Kinetics:

1. To study the kinetics of Acid hydrolysis of methyl acetate with hydrochloric acid using integrated rate law method.
2. To study the kinetics of Iodide-persulphate reaction by Initial rate method.
3. To study the kinetics of iodine-persulphate reaction using integrated rate law method.
4. To study the kinetics of iodine clock reaction.
5. To study the kinetics of Saponification of ethyl acetate.
6. Comparison of the strengths of HCl and H₂SO₄ by studying the kinetics of hydrolysis of methyl acetate.
7. To determine the degree of hydrolysis and hydrolysis constant of aniline hydrochloride in aqueous solution.

8. To relate the rate of the reaction between Calcium carbonate and Hydrochloric acid to the amount of carbon dioxide formed and study the effect of change in concentration of reactants and the temperature on rate of the reaction.

References:

Theory:

1. Atkins, P.W.; Paula, J.de. (2014), **Atkin's Physical Chemistry Ed.**, 10th Edition, Oxford University Press.
2. Kapoor, K.L.(2015), **A Textbook of Physical Chemistry**, Vol 1, 6th Edition, McGraw Hill Education.
3. Kapoor, K.L.(2015), **A Textbook of Physical Chemistry**, Vol 5, 3rd Edition, McGraw Hill Education.
4. Laidler K.J. (2003), **Chemical Kinetics**, 3rd Edition, Pearson Education India.
5. Castellan, G. W. (2004), **Physical Chemistry**, 4th Edition, Narosa.

Practicals:

1. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), **Senior Practical Physical Chemistry**, R. Chand & Co, New Delhi.
2. Kapoor, K.L. (2019), **A Textbook of Physical Chemistry**, Vol.7, 1st Edition, McGraw Hill Education.
3. Garland, C. W.; Nibler, J. W.; Shoemaker, D. P.(2003), **Experiments in Physical Chemistry**, 8th Edition, McGraw-Hill, New York.

Additional Resources:

1. Barrow, G.M. (2006), **Physical Chemistry**, 5th Edition, McGraw Hill.
2. Rogers, D.W.(2010), **Concise Physical Chemistry**, Wiley.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

Students' evaluation will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Conductance, Transference Number, Rate law, Order of reaction, Elementary and Complex Reactions, Reaction mechanism, Steady state Principle. Activation Energy, Catalysis, Photochemistry.

SEMESTER V

Course Code: CHEMISTRY - CXI: ORGANIC CHEMISTRY - IV

Course Title: Biomolecules

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

This core course aims to introduce the learner to the fascinating chemistry of some biomolecules, i.e., amino acids, peptides, proteins, carbohydrates, lipids and nucleic acids that work within biological systems. It aims to build the concept of metabolism by the study of chemistry and energetics of biological system.

Learning Outcomes:

On completion of this course, the students will be able to:

- Understand and demonstrate how structure of biomolecules determines their reactivity and biological functions.
- Gain insight into concepts of heredity through the study of genetic code, replication, transcription and translation.
- Demonstrate understanding of metabolic pathways, their inter-relationship, regulation and energy production from biochemical processes.

Unit 1:

Nucleic Acids:

Structure of components of nucleic acids: Bases, Sugars, Nucleosides and Nucleotides. Nomenclature of nucleosides and nucleotides, structure of polynucleotides (DNA and RNA), concept of DNA duplex formation and its characterization. Biological roles of DNA and RNA. Concept of heredity: Genetic Code, Replication, Transcription and Translation.

(Lectures: 12)

Unit 2:

Amino Acids, Peptides and Proteins

Amino acids, Peptides and their classification. α -Amino Acids - Synthesis, ionic properties and reactions. Zwitterions, pKa values, isoelectric point and electrophoresis; Study of peptides: determination of their

primary structure-end group analysis. Synthesis of peptides using N-protecting, C-protecting and C-activating groups, Solid-phase synthesis; primary, secondary and tertiary structures of proteins, Denaturation of proteins.

(Lectures: 12)

Unit 3:

Enzymes

Introduction, classification and characteristics of enzymes. Salient features of active site of enzymes. Mechanism of enzyme action (taking chymotrypsin as an example), factors affecting enzyme action, coenzymes and cofactors (NAD,FAD), specificity of enzyme action (including stereospecificity), enzyme inhibitors and their importance.

(Lectures: 6)

Unit 4:

Carbohydrates and lipids

Occurrence, classification and their biological importance. Monosaccharides: Constitution and absolute configuration of glucose and fructose, epimers and anomers, mutarotation, determination of ring size of glucose and fructose, Haworth projection and conformational structures; Interconversion of aldoses and ketoses; Killiani-Fischer synthesis and Ruff degradation; Disaccharides – Structure elucidation of maltose, lactose and sucrose. Polysaccharides – Elementary treatment of starch, cellulose and glycogen.

Introduction to oils and fats; common fatty acids present in oils and fats, Hydrogenation of fats and oils, Saponification value, acid value, iodine number. Reversion and rancidity.

(Lectures: 21)

Unit 5:

Concept of Energy in Biosystems

Introduction to metabolism (catabolism, anabolism). ATP: The universal currency of cellular energy, ATP hydrolysis and free energy change. Agents for transfer of electrons in biological redox systems: NAD⁺, FAD. Outline of catabolic pathways of carbohydrate-glycolysis, fermentation, Krebs cycle. Caloric value of food, standard caloric content of food types.

(Lectures: 9)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Estimation of glucose by Fehling's solution.
2. Study of the titration curve of glycine.

3. Estimation of proteins by Lowry's method.
4. Study of the action of salivary amylase on starch under optimum conditions.
5. Effect of temperature on the action of salivary amylase.
6. Isolation and estimation of DNA using cauliflower/onion.
7. Saponification value of the given oil.
8. Determination of Iodine number of the given oil.

References:

Theory:

1. Berg, J.M.; Tymoczko, J.L.; Stryer, L. (2006), **Biochemistry**. W.H. Freeman and Co.
2. Nelson, D.L.; Cox, M.M.; Lehninger, A.L. (2009), **Principles of Biochemistry**. W.H. Freeman and Co.
3. Murray, R.K., Granner, D.K., Mayes, P.A.; Rodwell, V.W. (2009), **Harper's Illustrated Biochemistry**. Lange Medical Books/McGraw-Hill.
4. Brown, T.A. (2018) **Biochemistry**, (First Indian addition 2018) Viva Books.

Practical:

1. **Manual of Biochemistry Workshop**, 2012, Department of Chemistry, University of Delhi.
2. Kumar, A.; Garg, S.; Garg, N. (2012), **Biochemical Tests: Principles and Protocols**. Viva Books.

Additional Resources:

1. Finar, I.L. (2008), **Organic Chemistry**, Volume 2, 5th Edition, Pearson Education.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods
- Frequent use of molecular models for demonstration and providing students in groups to explore building models themselves
- Engaging students in cooperative learning
- Learning through quiz design
- Problem solving to enhance comprehension

Assessment Methods:

- Graded assignments
- Conventional class tests
- Class seminars by students on course topics with a view to strengthening the content through width and depth
- Quizzes
- Term papers

Keywords:

Amino acids, peptides, proteins, solid phase peptide synthesis, Killiani-Fischer synthesis, Amadori rearrangement, Lobry de Bruyn van Ekenstein rearrangement, Krebs cycle, Glycolysis, Enzymes, Inhibitors.

Course Code: CHEMISTRY - CXII: PHYSICAL CHEMISTRY-V

Course Title: Quantum Chemistry & Spectroscopy

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The aim of this course is to make students understand the limitations of classical mechanics and the need of quantum chemistry, familiarize them with postulates of quantum chemistry and apply the same to derive equations for various models and hydrogen atoms. Understand the basis of molecular spectroscopy and its applications.

Learning Outcomes:

By the end of this course, students will be able to:

- Learn about limitations of classical mechanics and solution in terms of quantum mechanics for atomic/molecular systems.
- Develop an understanding of quantum mechanical operators, quantization, probability distribution, uncertainty principle and application of quantization to spectroscopy.
- Interpret various types of spectra and know about their application in structure elucidation

Unit 1:

Quantum Chemistry: Postulates of quantum mechanics, quantum mechanical operators and commutation rules, Schrödinger equation and its application to free particle and particle in a box (rigorous treatment), quantization of energy levels, zero-point energy and Heisenberg Uncertainty principle; wave functions, probability distribution functions, nodal properties, Extension to two and three dimensional boxes, separation of variables, degeneracy.

Qualitative treatment of simple harmonic oscillator model of vibrational motion: Setting up of Schrödinger equation and discussion of solution and wave functions. Vibrational energy of diatomic molecules and zero-point energy.

Angular momentum. Rigid rotator model of rotation of diatomic molecule. Schrödinger equation in Cartesian and spherical polar coordinates (derivation not required). Separation of variables. Spherical harmonics. Discussion of solution (Qualitative).

(Lectures: 22)

Unit 2:

Qualitative treatment of hydrogen atom and hydrogen-like ions: setting up of Schrödinger equation in spherical polar coordinates, radial part and quantization of energy (only final energy expression). Average and most probable distances of electron from nucleus. Setting up of Schrödinger equation for many-electron atoms (He, Li). Need for approximation methods. Statement of variation theorem and application to simple systems (particle-in-a-box, harmonic oscillator, hydrogen atom).

(Lectures: 8)

Unit 3:

Molecular Spectroscopy: Interaction of electromagnetic radiation with molecules and various types of spectra; Born Oppenheimer approximation.

Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic and linear triatomic molecules, isotopic substitution.

Vibrational spectroscopy: Classical equation of vibration, computation of force constant, amplitude of diatomic molecular vibrations, anharmonicity, Morse potential, dissociation energies, fundamental frequencies, overtones, hot bands, degrees of freedom for polyatomic molecules, modes of vibration, concept of group frequencies.

Vibration-rotation spectroscopy: diatomic vibrating rotator, P, Q, R branches.

Raman spectroscopy: Qualitative treatment of Rotational Raman effect; Vibrational Raman spectra, Stokes and anti-Stokes lines; their intensity difference, rule of mutual exclusion.

Electronic spectroscopy: Franck-Condon principle, electronic transitions, singlet and triplet states, fluorescence and phosphorescence, dissociation and predissociation, calculation of electronic transitions of polyenes using free electron model.

Nuclear Magnetic Resonance (NMR) spectroscopy: Principles of NMR spectroscopy, Larmor precession, chemical shift and low resolution spectra, different scales (δ and τ), spin-spin coupling and high resolution spectra, interpretation of PMR spectra of simple organic molecules like methanol, ethanol, acetaldehyde, acetic acid and aromatic proton.

(Lectures:30)

Practical:

(Credits: 2, Laboratory periods: 60)

Colorimetry:

1. Verify Lambert-Beer's law and determine the concentration of $\text{CuSO}_4/\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$ in a solution of unknown concentration.
2. Determine the concentrations of KMnO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$ in a mixture.
3. Study the kinetics of iodination of propanone in acidic medium.

4. Determine the amount of iron present in a sample using 1, 10-phenanthroline.
5. Determine the dissociation constant of an indicator (phenolphthalein).
6. Study the kinetics of interaction of crystal violet/ phenolphthalein with sodium hydroxide.

Spectrophotometry:

1. Study the 200-500 nm absorbance spectra of KMnO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$ (in 0.1 M H_2SO_4) and determine the λ_{max} values. Calculate the energies of the two transitions in different units (kJ molecule^{-1} , kJ mol^{-1} , cm^{-1} , eV).
2. Study the pH-dependence of the UV-Vis spectrum (200-500 nm) of $\text{K}_2\text{Cr}_2\text{O}_7$.
3. Record the 200-350 nm UV spectra of the given compounds (acetone, acetaldehyde, 2-propanol, acetic acid) in water. Comment on the effect of structure on the UV spectra of organic compounds.
4. Analysis of the given vibration-rotation spectrum of HCl (g)

References:

Theory:

1. Banwell, C.N.; McCash, E.M.(2006), **Fundamentals of Molecular Spectroscopy**, Tata McGraw-Hill.
2. Kapoor, K.L.(2015), **A Textbook of Physical Chemistry**, McGraw Hill Education, ,Vol 4, 5th Edition, McGraw Hill Education.
3. House, J.E.(2004), **Fundamentals of Quantum Chemistry**, 2nd Edition, Elsevier.
4. McQuarrie, D.A.(2016), **Quantum Chemistry**, Viva Books.
5. Chandra, A. K.(2001), **Introductory Quantum Chemistry**, Tata McGraw-Hill.
6. Kakkar, R. (2015), **Atomic & Molecular Spectroscopy**, Cambridge University Press.

Practical:

1. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), **Senior Practical Physical Chemistry**, R. Chand & Co, New Delhi.
2. Kapoor, K.L. (2019), **A Textbook of Physical Chemistry**, Vol.7, 1st Edition, McGraw Hill Education.
3. Garland, C. W.; Nibler, J. W.; Shoemaker, D. P.(2003), **Experiments in Physical Chemistry**, 8th Edition, McGraw-Hill, New York.

Additional Resources:

1. Engel, T.; Reid, P.(2013), **Quantum Chemistry and Spectroscopy**, Pearson.
2. Atkins, P.W.; Friedman, R. (2010), **Molecular Quantum Mechanics**, 5th Edition, Oxford University Press.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.

- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

Students' evaluation will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Quantum mechanics, Operators, Schrodinger equation, Hydrogen like atoms, Approximation methods, Spectroscopy, Franck-Codon principle, Raman effect.

SEMESTER VI

Course Code: CHEMISTRY - CXIII: INORGANIC CHEMISTRY - IV

Course Title: Organometallic Chemistry & Bio-inorganic Chemistry

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The course introduces some important topics of Inorganic Chemistry in a compact way. Unit 1 of the course introduces students to the basic principles of qualitative inorganic analysis. The influence of solubility products and the common ion effect on the separation of cations is made clear. Interfering anions are identified and their removal is studied. Unit 2, an introduction to the very important area of organometallic chemistry including classification of organometallic compounds, the concept of hapticity and the 18-electron rule governing the stability of a wide variety of organometallic species. Specific organometallic compounds are studied in detail to further understand the basic concepts: metal carbonyls, metal alkyls, Zeise's salt and ferrocene. Unit 4 takes this a step further by covering catalysis, an important application of organometallic compounds. Under Unit 3, bioinorganic chemistry, the student learns the importance of inorganic chemical species, especially metals, in biological systems, through discussions on metal-containing enzymes, the sodium-potassium pump and the applications of iron in physiology, including iron transport and storage system.

Learning Outcomes:

By the end of the course, the students will be able to:

- Understand and explain the basic principles of qualitative inorganic analysis

- Apply 18-electron rule to rationalize the stability of metal carbonyls and related species
- Understand the nature of Zeise's salt and compare its synergic effect with that of carbonyls.
- Identify important structural features of the metal alkyls tetrameric methyl lithium and dimeric trialkyl aluminium and explain the concept of multicenter bonding in these compounds
- Diagrammatically explain the working of the sodium-potassium pump in organisms and the factors affecting it and understand and describe the active sites and action cycles of the metalloenzymes carbonic anhydrase and carboxypeptidase
- Explain the sources and consequences of excess and deficiency of trace metals and learn about the toxicity of certain metal ions, the reasons for toxicity and antidotes
- Explain the use of chelating agents in medicine and, specifically, the role of cisplatin in cancer therapy and explain the applications of iron in biological systems with particular reference to haemoglobin, myoglobin, ferritin and transferrin
- Get a general idea of catalysis and describe in detail the mechanism of Wilkinson's catalyst, Zeigler- Natta catalyst and synthetic gasoline manufacture by Fischer-Tropsch process.

Unit 1:

Theoretical Principles in Qualitative Analysis (H₂S Scheme)

Basic principles involved in analysis of cations and anions. Solubility products, common ion effect. Principles involved in separation of cations into groups and choice of group reagents. Interfering anions (fluoride, borate, oxalate and phosphate), need to remove them after Group II and methods of removal. Analysis of insoluble substances.

(Lectures: 12)

Unit 2:

Organometallic Compounds

Definition and classification of organometallic compounds on the basis of bond type. Concept of hapticity of organic ligands. Metal carbonyls: 18 electron rule, electron count of mononuclear, polynuclear and substituted metal carbonyls of 3d series. General methods of preparation (direct combination, reductive carbonylation, thermal and photochemical decomposition) of mono and binuclear carbonyls of 3d series. Structures of mononuclear and binuclear carbonyls of Cr, Mn, Fe, Co and Ni using VBT. π -acceptor behaviour of CO (MO diagram of CO to be discussed), synergic effect and use of IR data to explain extent of back bonding.

Zeise's salt: Preparation and structure, evidences of synergic effect and comparison of synergic effect with that in carbonyls.

Metal Alkyls: Important structural features of methyl lithium (tetramer) and trialkyl aluminium (dimer), concept of multicentre bonding in these compounds.

Ferrocene: Preparation, physical properties and reactions (acetylation, alkylation, metallation, Mannich Condensation). Structure and aromaticity. Comparison of aromaticity and reactivity with that of benzene.

(Lectures: 22)

Unit 3:

Bioinorganic Chemistry

Metal ions present in biological systems, classification of elements according to their action in biological system. Geochemical effect on the distribution of metals. Sodium / K-pump, carbonic anhydrase and carboxypeptidase. Excess and deficiency of some trace metals. Toxicity of metal ions (Hg, Pb, Cd and As), reasons for toxicity, Use of chelating agents in medicine, Cisplatin as an anti-cancer drug.

Iron and its application in bio-systems, Haemoglobin, Myoglobin; Storage and transfer of iron.

(Lectures: 18)

Unit 4:

Catalysis by Organometallic Compounds

General principles of catalysis, properties of catalysts, homogeneous and heterogeneous catalysis (catalytic steps, examples and industrial applications), deactivation and regeneration of catalysts, catalytic poison, promoter.

Study of the following industrial processes and their mechanism:

1. Alkene hydrogenation (Wilkinson's Catalyst)
2. Synthetic gasoline (Fischer Tropsch reaction)
3. Polymerisation of ethene using Ziegler-Natta catalyst

(Lectures: 8)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Qualitative semi-micro analysis of mixtures containing 3 anions and 3 cations. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested:

CO_3^{2-} , NO_2^- , S^{2-} , SO_3^{2-} , SO_4^{2-} , $\text{S}_2\text{O}_3^{2-}$, CH_3COO^- , F^- , Cl^- , Br^- , I^- , NO_3^- , BO_3^{3-} , $\text{C}_2\text{O}_4^{2-}$, PO_4^{3-} , NH_4^+ , K^+ , Pb^{2+} , Cu^{2+} , Cd^{2+} , Bi^{3+} , Sn^{2+} , Sb^{3+} , Fe^{3+} , Al^{3+} , Cr^{3+} , Zn^{2+} , Mn^{2+} , Co^{2+} , Ni^{2+} , Ba^{2+} , Sr^{2+} , Ca^{2+} , Mg^{2+}

2. Mixtures should preferably contain one interfering anion, or insoluble component (BaSO_4 , SrSO_4 , PbSO_4 , CaF_2 or Al_2O_3) or combination of anions e.g. CO_3^{2-} and SO_3^{2-} , NO_2^- and NO_3^- , Cl^- and Br^- , Cl^- and I^- , Br^- and I^- , NO_3^- and Br^- , NO_3^- and I^- . Spot tests should be done whenever possible.

References:

Theory:

1. Svehla, G. (1996), **Vogel's Qualitative Inorganic Analysis**, 7th Edition, Prentice Hall.
2. Huheey, J.E.; Keiter, E.A., Keiter, R. L.; Medhi, O.K. (2009), **Inorganic Chemistry- Principles of Structure and Reactivity**, Pearson Education.

3. Shriver, D.D.; Atkins, P.; Langford, C.H. (1994), **Inorganic Chemistry 2nd Ed.**, Oxford University Press.
4. Atkins, P.W.; Overton, T.L.; Rourke, J.P.; Weller, M.T.; Armstrong, F.A. (2010), **Shriver and Atkins Inorganic Chemistry**, 5th Edition, W. H. Freeman and Company.
5. Cotton, F.A.; Wilkinson, G.; Gaus, P.L. **Basic Inorganic Chemistry**, 3rd Edition, Wiley India.
6. Greenwood, N.N.; Earnshaw, A. (1997), **Chemistry of the Elements**, 2nd Edition, Elsevier (Ziegler Natta Catalyst and Equilibria in Grignard Solution).
7. Powell, P. (1988), **Principles of Organometallic Chemistry**, Chapman and Hall.

Practicals:

1. Vogel, A.I. (1972), **Qualitative Inorganic Analysis**, Longman.
2. Svehla, G. (1996), **Vogel's Qualitative Inorganic Analysis**, Prentice Hall.

Additional Resources:

1. Lippard, S.J.; Berg, J.M. (1994), **Principles of Bioinorganic Chemistry**, Panima Publishing Company.
2. Crabtree, Robert H. (2000), **The Organometallic Chemistry of the Transition Metals**. John Wiley.
3. Spessard, Gary O.; Miessler, Gary L. (1996), **Organometallic Chemistry**, Prentice-Hall.
4. Purcell, K.F.; Kotz, J.C. (1977), **Inorganic Chemistry**, W.B. Saunders Co.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

Students' evaluation will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Qualitative analysis; solubility products; common ion effect; interfering anion; Organometallic Compounds; carbonyls; 18-electron rule; synergic bonding; IR spectra of carbonyls; Zeise's salt; metal alkyls; ferrocene; Bioinorganic Chemistry; sodium-potassium pump; carboxypeptidase; carbonic anhydrase; haemoglobin, myoglobin; trace metals; metal toxicity; chelates in medicine; cisplatin; homogeneous and heterogeneous catalysis; Ziegler Natta catalyst; Wilkinson's catalyst; Fischer Tropsch process; ZSM 5.

Course Code: CHEMISTRY - CXIV: ORGANIC CHEMISTRY - V
Course Title: Spectroscopy and Applied Organic Chemistry
Total Credits: 06 (Credits: Theory-04, Practical-02)
(Total Lectures: Theory- 60, Practical-60)

Objectives:

The course introduces the learner to various tools and techniques for identifying and characterizing the organic compounds through their interactions with electromagnetic radiation viz. UV-Visible, IR and NMR spectroscopy. This course also deals with some classes of organic compounds finding applications in everyday life namely; polymers, dyes, and pharmaceutical compounds. The chemistry of these compounds in general will be explained through naturally occurring and synthetic compounds.

Learning Outcomes:

On completion of this course, the students will be able to:

- Gain insight into the basic principles of UV, IR and NMR spectroscopic techniques.
- Use spectroscopic techniques to determine structure and stereochemistry of known and unknown compounds.
- Develop a sound understanding of the structure of Pharmaceutical Compounds. They will also understand the importance of different classes of drugs and their applications for treatment of various diseases.
- Learn about the chemistry of natural and synthetic polymers including fabrics and rubbers.
- Understand the chemistry of biodegradable and conducting polymers and appreciate the need of biodegradable polymers with emphasis on basic principles.
- Learn about the theory of colour and constitution as well as the chemistry of dyeing.
- Know applications of various types of dyes including those in foods and textiles.

Unit 1:

Organic Spectroscopy

General principles Introduction to absorption and emission spectroscopy.

UV Spectroscopy: Types of electronic transitions, λ_{\max} , Chromophores and Auxochromes, Bathochromic and Hypsochromic shifts, Intensity of absorption; Application of Woodward Rules for calculation of λ_{\max} for the following systems: α,β -unsaturated aldehydes, ketones, carboxylic acids and esters; Conjugated dienes: alicyclic, homoannular and heteroannular; Extended conjugated systems (aldehydes, ketones and dienes); distinction between cis and trans isomers by UV.

IR Spectroscopy: Fundamental and non-fundamental molecular vibrations; IR absorption positions of O, N and S containing functional groups; Effect of H-bonding, conjugation, resonance and ring size on IR absorptions; Fingerprint region and its significance; application of IR in functional group analysis.

NMR Spectroscopy: Basic principles of Proton Magnetic Resonance, chemical shift and factors influencing it; Equivalent and non-equivalent protons, Spin – Spin coupling and coupling constant;

Anisotropic effects in alkene, alkyne, aldehydes and aromatics, Interpretation of NMR spectra of simple compounds. Applications of IR, UV and NMR for identification of simple organic molecules.

(Lectures: 30)

Unit 2:

Dyes

Classification, Colour and constitution; Mordant and Vat Dyes; Chemistry of dyeing.

Synthesis and applications of Azo dyes – Methyl orange, Congo red; Triphenyl methane dyes-Malachite green, Rosaniline and Crystal violet; Phthalein Dyes – Phenolphthalein; Natural dyes –Structure elucidation and synthesis of Alizarin and Indigotin; Edible Dyes with examples.

(Lectures: 8)

Unit 3:

Pharmaceutical Compounds

Classification, structure and therapeutic uses of antipyretics - Paracetamol (with synthesis); Analgesics- Ibuprofen (with synthesis); Antimalarials - Chloroquine (with synthesis); Antitubercular drugs - Isoniazid. An elementary treatment of Antibiotics and detailed study of chloramphenicol, Medicinal values of curcumin (haldi), azadirachtin (neem), vitamin C and antacid (ranitidine).

(Lectures: 10)

Unit 4:

Polymers

Introduction and classification including di-block, tri-block and amphiphilic polymers; weight average molecular weight, number average molecular weight, glass transition temperature (T_g) of polymers; Polymerisation reactions -Addition and condensation. Mechanism of cationic, anionic and free radical addition polymerization; Ziegler-Natta polymerisation of alkenes. Preparation and applications of plastics – thermosetting (phenol-formaldehyde, Polyurethanes) and thermosoftening (PVC, polythene); Fabrics – natural and synthetic (acrylic, polyamide, polyester). Rubbers – natural and synthetic, Buna-S, Chloroprene and Neoprene. Vulcanization - Polymer additives; Introduction to Biodegradable and conducting polymers with examples.

(Lectures: 12)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Qualitative analysis of unknown organic compounds containing monofunctional groups: aromatic hydrocarbons, aryl halides, carbohydrates, nitro compounds, amines, amides and simple compounds containing bifunctional groups, e.g. salicylic acid, cinnamic acid, nitrophenols.

2. Identification of simple organic compounds by IR and NMR spectroscopy(Spectra to be provided).

References:

Theory:

1. Pavia, D.L. **Introduction to Spectroscopy**, Cengage learning (India) Pvt. Ltd.
2. Morrison, R. T.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
3. Solomons, T.W.G. (2017),**Organic Chemistry**, John Wiley & Sons.
4. Kemp, W. (1991), **Organic Spectroscopy**, PalgraveMacmillan.
5. Silverstein, R.M.; Webster, F.X.; Kiemle, D.J.; Bryce, D.L. (2014),**Spectrometric Identification of Organic Compounds**,Wiley.

Practical:

1. Vogel, A.I. (2012),**Quantitative Organic Analysis**, Part 3, Pearson.
2. Mann, F.G.; Saunders, B.C. (2009),**Practical Organic Chemistry**, Pearson Education.
3. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. (2012),**Vogel's Textbook of Practical Organic Chemistry**, 5th Edition,Pearson.
4. Ahluwalia, V.K.; Dhingra, S. (2004),**Comprehensive Practical Organic Chemistry: Qualitative Analysis**, University Press.

Additional Resources:

1. Clayden, J.; Greeves, N.; Warren, S.; Wothers, P. (2013),**Organic Chemistry**, Oxford University Press.
2. Singh, J.; Ali, S.M.;Singh, J. (2010),**Natural Product Chemistry**, PrajatiPrakashan.
3. Billmeyer, F. W. (1984),**Textbook of Polymer Science**, John Wiley & Sons.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Frequent use of molecular models for demonstration and providing students in groups to explore building models themselves
- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

- Presentations by individual student/ small group of students
- Class tests at periodic intervals.
- Written assignment(s)
- Objective type chemical quizzes based on contents of the paper.
- End semester university theory and practical examination.

Keywords:

DISCIPLINE ELECTIVE COURSES (DSE)

Course Code: CHEMISTRY –DSE-1

Course Title: Novel Inorganic Solids

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

Solid-state chemistry also referred as material chemistry currently has emerged with great focus on novel inorganic solids. It has found enormous applications in both industrial and research arenas and has helped to shape modern day recyclable adsorbents and catalysts. Novel inorganic-organic hybrid nanocomposites have received a lot of attention because of their abundance and cost-effective nature they can be utilized as catalysts, as a nano reactor to host reactants for synthesis and for the controlled release of biomolecules. Materials such as semiconductors, metals, composites, nanomaterials, carbon or high-tech ceramics make life easier in this era and are great sources of industrial growth and technological changes. Therefore, its exposure to the undergraduates with science backgrounds can groom them for future researches.

Learning Outcomes:

By the end of the course, the student will be able to:

- Understand the mechanism of solid-state synthesis.
- Explain about the different characterization techniques and their principle.
- Understand the concept of nanomaterials, their synthesis and properties.
- Explain the mechanism of growth of self-assembled nanostructures.
- Appreciate the existence of bioinorganic nanomaterials.
- Explain the importance of composites, conducting polymers and their applications.
- Understand the usage of solid materials in various instruments, batteries, etc. which would help them to appreciate the real life importance of these materials

Unit 1:

Basic introduction to solid-state chemistry: Semiconductors, different types of semiconductors and their applications.

Synthesis of inorganic solids: Conventional heat and beat method, Co-precipitation method, Sol-gel method, Hydrothermal method, Chemical vapor deposition (CVD), Ion-exchange and Intercalation method.

(Lectures: 10)

Unit 2:

Characterization techniques of inorganic solids: Powder X-ray Diffraction, UV-visible spectroscopy, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Fourier-Transform Infrared (FTIR) spectroscopy, Brunauer–Emmett–Teller (BET) surface area analyser, Dynamic Light Scattering (DLS)

(Lectures: 10)

Unit 3:

Cationic, anionic and mixed solid electrolytes and their applications. Inorganic pigments – coloured, white and black pigments.

One-dimensional metals, molecular magnets, inorganic liquid crystals.

(Lectures: 10)

Unit 4:

Nanomaterials: Overview of nanostructures and nanomaterials, classification, preparation and optical properties of gold and silver metallic nanoparticles, concept of surface plasmon resonance, carbon nanotubes, inorganic nanowires, Bioinorganic nanomaterials, DNA and its nanomaterials, natural and artificial nanomaterials, self-assembled nanostructures, control of nanoarchitecture, one dimensional control.

(Lectures: 10)

Unit 5:

Composite materials: Introduction, limitations of conventional engineering materials, role of matrix in composites, classification, matrix materials, reinforcements, metal-matrix composites, polymer-matrix composites, fibre-reinforced composites, bio-nanocomposites, environmental effects on composites, applications of composites.

(Lectures: 10)

Unit 6:

Speciality polymers: Conducting polymers - Introduction, conduction mechanism, polyacetylene, polyparaphenylene, polyaniline and polypyrrole, applications of conducting polymers, ion-exchange resins and their applications.

Ceramic & Refractory: Introduction, classification, properties, manufacturing and applications of ceramics, refractory and superalloys as examples.

(Lectures: 10)

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Practical: Novel Inorganic Solids

1. Synthesis of silver nanoparticles by chemical methods and characterization using UV-visible spectrophotometer.
2. Synthesis of silver nanoparticles by green approach methods and characterization using UV-visible spectrophotometer.
3. Preparation of polyaniline and its characterization using UV-visible spectrophotometer.
4. Synthesis of metal sulphide nanoparticles (MnS, CdS, ZnS, CuS, NiO) and characterization using UV-visible spectrophotometer.
5. Intercalation of hydrogen in tungsten trioxide and its conductivity measurement using conductometer.
6. Synthesis of inorganic pigments (PbCrO₄, ZnCrO₄, Prussian Blue, Malachite).
7. Synthesis of pure ZnO and Cu doped ZnO nanoparticles.
8. Preparation of zeolite A and removal of Mg and Ca ions from water samples quantitatively using zeolite.

References:

Theory:

1. West, A. R. (2014), **Solid State Chemistry and Its Application**, Wiley.
2. Smart, L. E.; Moore, E. A., (2012), **Solid State Chemistry: An Introduction** CRC Press Taylor & Francis.
3. Rao, C. N. R.; Gopalakrishnan, J. (1997), **New Direction in Solid State Chemistry**, Cambridge University Press.
4. Poole Jr.; Charles P.; Owens, Frank J. (2003), **Introduction to Nanotechnology**, John Wiley and Sons.

Practicals:

1. Orbaek, W.; McHale, M.M.; Barron, A. R.; **Synthesis and Characterization of Silver Nanoparticles for An Undergraduate Laboratory**, J. Chem. Educ. 2015, 92, 339–344.
2. MacDiarmid, G.; Chiang, J.C.; Richter, A.F.; Somasiri, N.L.D.(1987), **Polyaniline: Synthesis and Characterization of the Emeraldine Oxidation State by Elemental Analysis**, L. Alcaeer (ed.), Conducting Polymers, 105-120, D. Reidel Publishing.
3. Cheng, K.H.; Jacobson, A.J.; Whittingham, M.S. (1981), **Hexagonal Tungsten Trioxide and Its Intercalation Chemistry**, Solid State Ionics, 5, 1981, 355-358.
4. Ghorbani H.R.; Mehr, F.P; Pazoki, H; Rahmani, B.M.; **Synthesis of ZnO Nanoparticles by Precipitation Method**, Orient J Chem 2015, 31(2).

Teaching Learning Process:

Blackboard, Power point presentations, Assignments, Field Trips to Industry, Different working models ICT enabled classes, Interactive sessions, Debate, recent literature using internet and research articles.

Assessment Methods:

Students' evaluation will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Solid State Chemistry, Nanomaterials, Solid electrolyte, Inorganic Pigments, Self-assembled, Composite Materials, Instrumentation, Polymers.

Course Code: CHEMISTRY –DSE-2

Course Title: Inorganic Materials of Industrial Importance

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The course introduces learners to the diverse roles of inorganic materials in the industry. It gives an insight into how these raw materials are converted into products used in day to day life. Students learn about silicates, fertilizers, surface coatings, batteries, engineering materials for mechanical construction as well as the emerging area of nano-sized materials. The course helps develop the interest of students in the frontier areas of inorganic and material chemistry.

Learning Outcomes:

By the end of the course, the students will be able to:

- Learn the composition and applications of the different kinds of glass.
- Understand glazing of ceramics and the factors affecting their porosity.
- Give the composition of cement and discuss the mechanism of setting of cement.
- Explain the suitability of fertilizers for different kinds of crops and soil.
- Explain the process of formulation of paints and the basic principle behind the protection offered by the surface coatings.
- Explain the principle, working and applications of different batteries.
- List and explain the properties of engineering materials for mechanical construction used in day to day life.
- Explain the synthesis and properties of nano-dimensional materials, various semiconductor and superconductor oxides.

Unit 1:

Silicate Industries

Glass: Glassy state and its properties, classification (silicate and non-silicate glasses). Manufacture and processing of glass. Composition and properties of the following types of glasses: Soda lime glass, lead

glass, armoured glass, different types of safety glass, borosilicate glass, fluorosilicate glass, coloured glass, photosensitive glass, photochromic glass, glass wool and optical fibre.

Ceramics: Brief introduction to types of ceramics. glazing of ceramics.

Cement: Manufacture of Portland cement and the setting process, Different types of cements: quick setting cements, eco-friendly cement (slag cement), pozzolana cement.

(Lectures: 10)

Unit 2:

Fertilizers:

Different types of fertilizers (N, P and K). Importance of fertilizers, chemistry involved in the manufacture of the following fertilizers: urea, ammonium nitrate, calcium ammonium nitrate, ammonium phosphates, superphosphate of lime, potassium chloride and potassium nitrate.

(Lectures: 10)

Unit 3:

Surface Coatings:

Brief introduction to and classification of surface coatings, paints and pigments: formulation, composition and related properties, pigment volume concentration (PVC) and critical pigment volume concentration (CPVC), fillers, thinners, enamels and emulsifying agents. Special paints: heat retardant, fire retardant, eco-friendly paints, plastic paints, water and oil paints. Preliminary methods for surface preparation, metallic coatings (electrolytic and electroless with reference to chrome plating and nickel plating), metal spraying and anodizing.

Contemporary surface coating methods like physical vapor deposition, chemical vapor deposition, galvanising, carburizing, sherardising, boriding, nitriding and cementation.

(Lectures: 18)

Unit 4:

Batteries:

Primary and secondary batteries, characteristics of an Ideal Battery, principle, working, applications and comparison of the following batteries: Pb- acid battery, Li-metal batteries, Li-ion batteries, Li-polymer batteries, solid state electrolyte batteries, fuel cells, solar cells and polymer cells.

(Lectures: 8)

Unit 5:

Engineering materials for mechanical construction:

Composition, mechanical and fabricating characteristics and applications of various types of cast irons, plain carbon and alloy steels, copper, aluminum and their alloys like duralumin, brasses and bronzes cutting tool materials, superalloys, thermoplastics, thermosets and composite materials.

(Lectures: 8)

Unit 6:

Nano dimensional materials

Introduction to zero, one and two-dimensional nanomaterial: Synthesis, properties and applications of fullerenes, carbon nanotubes, carbon fibres, semiconducting and superconducting oxides.

(Lectures: 6)

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Lab: Inorganic materials of industrial importance

4. Detection of constituents of Ammonium Sulphate fertilizer (Ammonium and Sulphate ions) by qualitative analysis and determine its free acidity.
5. Detection of constituents of CAN fertilizer (Calcium, Ammonium and Nitrate ions) fertilizer and estimation of Calcium content.
6. Detection of constituents of Superphosphate fertilizer (Calcium and Phosphate ions) and estimation of phosphoric acid content.
7. Detection of constituents of Dolomite (Calcium, Magnesium and carbonate ions) and determination of composition of Dolomite (Complexometric titration).
8. Analysis of (Cu, Ni) in alloy or synthetic samples (Multiple methods involving Complexometry, Gravimetry and Spectrophotometry).
9. Analysis of (Cu, Zn) in alloy or synthetic samples (Multiple methods involving Iodometry, Complexometry and Potentiometry).
10. Synthesis of pure ZnO and Cu doped ZnO nanoparticles.
11. Synthesis of silver nanoparticles by green and chemical approach methods and its characterization using UV-visible spectrophotometer.

References:

Theory:

1. West, A. R. (2014), **Solid State Chemistry and Its Application**, Wiley

- Smart, L. E.; Moore, E. A. (2012), **Solid State Chemistry An Introduction**, CRC Press Taylor & Francis.
- Atkins, P.W.; Overton, T.L.; Rourke, J.P.; Weller, M.T.; Armstrong, F.A.(2010), **Shriver and Atkins Inorganic Chemistry**, W. H. Freeman and Company.
- Kent, J. A. (ed) (1997), **Riegel's Handbook of Industrial Chemistry**, CBS Publishers, New Delhi.
- Poole Jr.; Charles P.; Owens, Frank J.(2003), **Introduction to Nanotechnology**, John Wiley and Sons.

Practical:

- Svehla, G.(1996), **Vogel's Qualitative Inorganic Analysis**, Prentice Hall.
- Banewicz, J. J.; Kenner, C.T. **Determination of Calcium and Magnesium in Limestones and Dolomites**, Anal. Chem., 1952, 24 (7), 1186–1187.
- Ghorbani, H. R.; Mehr, F.P.; Pazoki, H.; Rahmani B. M. **Synthesis of ZnO Nanoparticles by Precipitation Method**. Orient J Chem 2015;31(2).
- Orbaek, W.; McHale, M.M.; Barron, A.R. **Synthesis and characterization of silver nanoparticles for an undergraduate laboratory**, J. Chem. Educ. 2015, 92, 339–344.

Additional Resources:

- Kingery, W. D.; Bowen H. K.; Uhlmann, D. R. (1976), **Introduction to Ceramics**, Wiley Publishers, New Delhi.
- Gopalan, R. Venkappayya, D.; Nagarajan, S. (2004), **Engineering Chemistry**, Vikas Publications.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

Assessment will be done based on regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Silicates, Ceramics, Cement, Fertilizers, Surface Coatings, Batteries, Engineering materials for mechanical construction, Nano dimensional materials.

Course Code: CHEMISTRY –DSE-3

Course Title: Applications of Computers in Chemistry

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The aim of this paper is to make the students learn the working of computer and its applications in chemistry via programming language, QBASIC and use of software as a tool to understand chemistry, and solve chemistry based problems.

Learning Outcomes:

By the end of the course, the students will be able to:

- Have knowledge of most commonly used commands and library functions used in QBASIC programming.
- Develop algorithm to solve problems and write corresponding programs in BASIC for performing calculations involved in laboratory experiments and research work.
- Use various spreadsheet software to perform theoretical calculations and plot graphs

Unit 1:

Basic Computer system (in brief)

Hardware and Software; Input devices, Storage devices, Output devices, Central Processing Unit (Control Unit and Arithmetic Logic Unit); Number system (Binary, Octal and Hexadecimal Operating System); Computer Codes (BCD and ASCII); Numeric/String constants and variables. Operating Systems (DOS, WINDOWS, and Linux); Software languages: Low level and High Level languages (Machine language, Assembly language; QBASIC, FORTRAN and C++); Compiled versus interpreted languages. Debugging Software Products (Office, chemsketch, scilab, matlab, and hyperchem), internet application.

(Lectures: 5)

Unit 2:

Use of Programming Language for solving problems in Chemistry

Computer Programming Language- QBASIC, (for solving some of the basic and complicated chemistry problems). QB4 version of QBASIC can be used.

Programming Language – QBASIC; arithmetic expressions, hierarchy of operations, inbuilt functions. Syntax and use of the following QBASIC commands: INPUT and PRINT; GOTO, If, ELSEIF, THEN and END IF ; FOR and NEXT; Library Functions (ABS, ASC, CHR\$, EXP,INT, LOG, RND, SQR,TAB and trigonometric Functions), DIM, READ, DATA, REM, RESTORE, DEF FNR, GOSUB, RETURN, SCREEN, VIEW, WINDOW, LINE, CIRCLE, LOCATE, PSET

Simple programs using above mentioned commands.

Solution of quadratic equation, polynomial equations (formula, iteration, Newton – Raphson methods, binary bisection and Regula Falsi); Numerical differential, Numerical integration (Trapezoidal and Simpson's rule), Simultaneous equations, Matrix addition and multiplication, Statistical analysis.

QBASIC programs for Chemistry problems - Example: plotting van der Waals Isotherms (Simple Problem, available in general text books) and observe whether van der Waal gas equation is valid at temperatures lower than critical temperature where we require to solve a cubic equation and calculation of area under the curves (Complicated Problem, not available in general text books).

(Lectures: 40)

Unit 3:

Use of Software Products

Computer Software like Scilab, Excel, LibreOffice and Calc , to solve some of the plotting or calculation problems, Handling of experimental data

(Lectures: 15)

Practical:

(Credits: 2, Laboratory periods: 60)

Computer programs using QBASIC based on numerical methods

1. Roots of equations: (e.g. volume of gas using van der Waals equation and comparison with ideal gas, pH of a weak acid).
2. Numerical differentiation (e.g., change in pressure for small change in volume of a van der Waals gas, potentiometric titrations).
3. Numerical integration (e.g. entropy/ enthalpy change from heat capacity data).
4. Probability distributions (gas kinetic theory) and mean values.
5. Mean, standard deviation and Least square curve fitting method for linear equation.
6. Matrix operations: addition, multiplication and transpose
7. Graphic programs related to Chemistry problems. e.g. van der Waals isotherm, Compressibility versus pressure curves, Maxwell distribution curves, concentration-time graph, pH metric titration curve, conductometric titration curves, Lambert Beer's law graph, s, p, d orbital shapes, radial distribution curves, particle in one dimensional box.

Use of Software Products

1. Computer Software like Scilab and Excel, etc for data handling and manipulation.
2. Simple exercises using molecular visualization software.

3. Open source chemistry software to draw structures.

References:

Theory:

1. McQuarrie, D. A.(2008), **Mathematics for Physical Chemistry**, University Science Books.
2. Mortimer, R.(2005), **Mathematics for Physical Chemistry**, 3rd Edition, Elsevier.
3. Steiner, E.(1996), **The Chemical Maths Book**, Oxford University Press.
4. Yates, P. (2007), **Chemical Calculations**, CRC Press.
5. Harris, D. C.(2007), **Quantitative Chemical Analysis**, 6th Edition, Freeman, Chapters 3-5.

Practical:

1. Levie, R.D.(2001), **How to use Excel in analytical chemistry and in general scientific data analysis**, Cambridge University Press.
2. Noggle, J. H.(1985), **Physical Chemistry on a Microcomputer**, Little Brown & Co.
3. Venit, S.M.(1996), **Programming in BASIC: Problem solving with structure and style**, Jaico Publishing House.

Teaching Learning Process:

Conventional methods of teaching i.e. lectures, PPTs, Complete demonstrations of computer systems in chemistry using QBASIC -a DOS based language. Using DOSBOX emulator for different operating systems and running QB45 in it can solve this problem. Another version that runs on WINDOWS is QB64. This is compatible with most of the QBASIC commands.

Assessment Methods:

- The students to be assigned projects based on chemistry problems done in class or in practical classes and use BASIC program to solve it. The projects to be a part of internal assessment.
- Presentation
- Test
- Semester end examination

Keywords:

Hardware, software, programming language, ASCII, BCD, QBASIC, Library commands, mathematical operators, QBASIC commands.

Course Code: CHEMISTRY –DSE-4

Course Title: Analytical Methods in Chemistry

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The objective of this course is to make student aware of the concept of sampling, Accuracy, Precision, Statistical test data-F, Q and t test. The course exposes students to the laws of spectroscopy and selection rules governing the possible transitions in the different regions of the electromagnetic spectra. Thermal and electroanalytical methods of analysis are also dealt with. Students are exposed to important separation methods like solvent extraction and chromatography. The practicals expose students to latest instrumentation and they learn to detect analytes in a mixture.

Learning Outcomes:

By the end of this course, students will be able to:

- Perform experiment with accuracy and precision.
- Develop methods of analysis for different samples independently.
- Test contaminated water samples.
- Understand basic principle of instrument like Flame Photometer, UV-vis spectrophotometer.
- Learn separation of analytes by chromatography.
- Apply knowledge of geometrical isomers and keto-enol tautomers to analysis.
- Determine composition of soil.
- Estimate macronutrients using Flame photometry.

Unit 1:

Qualitative and quantitative aspects of analysis:

Sampling, evaluation of analytical data, errors, accuracy and precision, methods of their expression.

Normal law of distribution of indeterminate errors, statistical test of data; F, Q and t test, rejection of data, and confidence intervals.

(Lectures: 5)

Unit 2:

Optical methods of analysis

Origin of spectra, interaction of radiation with matter, fundamental laws of spectroscopy and selection rules

UV-Visible Spectrometry: Basic principles of instrumentation (choice of source, monochromator and detector) for single and double beam instrument; Transmittance. Absorbance and Beer-Lambert law

Basic principles of quantitative analysis: estimation of metal ions from aqueous solution, geometrical isomers, keto-enol tautomers.

Flame Atomic Absorption and Emission Spectrometry: Basic principles of instrumentation (choice of source, monochromator, detector, choice of flame and Burner designs). Techniques of atomization and sample introduction; Method of background correction, sources of chemical interferences and their method of removal, Techniques for the quantitative estimation of trace level of metal ions from water samples.

(Lectures: 25)

Unit 3:

Thermal methods of analysis:

Theory of thermogravimetry (TG) and basic principle of instrumentation of thermal analyser. Techniques for quantitative estimation of Ca and Mg from their mixture.

(Lectures: 5)

Unit 4:

Electroanalytical methods

Classification of electroanalytical methods, basic principle of pH metric, potentiometric and conductometric titrations. Techniques used for the determination of equivalence points. Techniques used for the determination of pK_a values.

(Lectures:10)

Unit 5:

Separation techniques

Solvent extraction: Classification, principle and efficiency of the technique.

Mechanism of extraction: extraction by solvation and chelation, Technique of extraction: batch, continuous and counter current extractions, Qualitative and quantitative aspects of solvent extraction: extraction of metal ions from aqueous solution, extraction of organic species from the aqueous and non-aqueous media.

Chromatography: Classification, principle and efficiency of the technique, Mechanism of separation: adsorption, partition & ion-exchange, Development of chromatograms: frontal, elution and displacement methods.

(Lectures:15)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Separation of mixtures by paper chromatography and reporting the R_f values:
 - (i) Co^{2+} and Ni^{2+} .
 - (ii) Amino acids present in the given mixture.
2. Solvent Extractions
 - (i) To separate a mixture of Ni^{2+} & Fe^{2+} by complexation with DMG and extracting the Ni^{2+} DMG complex in chloroform, and determine its concentration by spectrophotometry.
3. Analysis of soil:
 - (i) Determination of pH of soil.
 - (ii) Total soluble salt
 - (iii) Estimation of calcium and magnesium
 - (iv) Qualitative detection of nitrate and phosphate
4. Ion exchange:
 - (i) Determination of exchange capacity of cation exchange resins and anion exchange resins.
 - (ii) Separation of amino acids from organic acids by ion exchange chromatography.
5. Spectrophotometry
 - (i) Verification of Lambert-Beer's law and determination of concentration of a coloured species (CuSO_4 , KMnO_4 , CoCl_2 , CoSO_4)
 - (ii) Determination of concentration of coloured species via following methods;
 - (a) Graphical method, (b) Epsilon method, (c) Ratio method, (iv) Standard addition method

References:

Theory:

1. Willard, H.H.(1988),**Instrumental Methods of Analysis**, 7th Edition, Wardsworth Publishing Company.
2. Christian, G.D.(2004),**Analytical Chemistry**, 6th Edition, John Wiley & Sons, New York.
3. Harris, D. C.(2007),**Quantitative Chemical Analysis**,6th Edition, Freeman.
4. Khopkar, S.M. (2008), **Basic Concepts of Analytical Chemistry**, New Age International Publisher.
5. Skoog, D.A.; Holler F.J.; Nieman, T.A. (2005), **Principles of Instrumental Analysis**, Thomson Asia Pvt. Ltd.

Practical:

1. Jeffery, G.H.; Bassett, J.; Mendham, J.; Denney, R.C.(1989),**Vogel's Textbook of Quantitative Chemical Analysis**,John Wiley and Sons.

Teaching Learning Process:

- Teaching through audio-visual aids.
- Students are encouraged to participate actively in the classroom through regular presentations on curriculum based topics.
- As the best way to learn something is to do it yourself, practicals are planned in such a way so as to reinforce the topics covered in theory.

Assessment Methods:

- Presentations by individual student/ small group of students
- Class tests at periodic intervals.
- Written assignment(s)
- Objective type chemical quizzes based on contents of the paper.
- End semester university theory and practical examination.

Keywords:

Separation techniques, Solvent extraction, Ion-exchange, Optical methods, Flame Atomic Absorption and Emission Spectrometry, indeterminate errors, statistical test of data; F, Q and t tests. TGA.

Course Code: CHEMISTRY –DSE-5

Course Title: Molecular Modelling and Drug Design

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

Objective of this course is to make students learn the theoretical background of principles of computational techniques in molecular modelling, evaluation and applications of different methods for various molecular systems, energy minimization techniques, analysis of Mulliken Charge & ESP Plots and elementary idea of drug design.

Learning Outcomes:

By the end of this course, students will be able to:

- Understand theoretical background of computational techniques and selective application to various molecular systems.
- Learn Energy minimization methods through use of different force fields.
- Learn ESP Plots by suitable soft wares, electron rich and electron deficient sites,
- Compare computational and experimental results and explain deviations.
- Carry out Molecular dynamics (MD) and Monte Carlo (MC) simulations on several molecules and polymers.
- Learn QSAR properties and their role in molecular modelling, cheminformatics and drug discovery.
- Perform Optimization of geometry parameters of a molecule (such as shape, bond length and bond angle) through use of software like Chem Sketch and Argus Lab in interesting hands-on exercises.

Unit 1:

Introduction: Overview of Classical and Quantum Mechanical Methods (Ab initio, Semi-empirical, Molecular Mechanics, Molecular Dynamics and Monte Carlo) General considerations.

Coordinate systems: Cartesian and Internal Coordinates, Bond lengths, bond angles and torsion angles, Writing Z -matrix (ex: methane, ethane, ethene, ethyne, water, H₂O₂).

(Lectures: 8)

Unit 2:

Potential Energy Surfaces: Intrinsic Reaction Coordinates, Stationary points, Equilibrium points – Local and Global minima, concept of transition state with examples: Ethane, propane, butane, cyclohexane. Meaning of rigid and relaxed PES.

Applications of computational chemistry to determine reaction mechanisms.

Energy Minimization and Transition State Search: Geometry optimization, Methods of energy minimization: Multivariate Grid Search, Steepest Descent Method, Newton-Raphson method and Hessian matrix.

(Lectures: 12)

Unit 3:

Molecular Mechanics: Force Fields, Non-bonded interactions (van der Waals and electrostatic), how to handle torsions of flexible molecules, van der Waals interactions using Lennard-Jones potential, hydrogen bonding interactions, electrostatic term, Parameterization. Applications of MM, disadvantages, Software, Different variants of MM: MM1, MM2, MM3, MM4, MM+, AMBER, BIO+, OPLS.GUI.

(Lectures: 10)

Unit 4:

Molecular Dynamics: Radial distribution functions for solids, liquids and gases, intermolecular Potentials (Hard sphere, finite square well and Lennard-Jones potential), concept of periodic box, ensembles (microcanonical, canonical, isothermal – isobaric), Ergodic hypothesis. Integration of Newton's equations (Leapfrog and Verlet Algorithms), Rescaling, Simulation of Pure water – Radial distribution curves and interpretation, TIP & TIP3P, Typical MD simulation

Brief introduction to Langevin and Brownian dynamics

Monte Carlo Method: Metropolis algorithm.

(Lectures: 10)

Unit 5:

Huckel MO with examples: ethane, propenyl, cyclopropenyl systems, Properties calculated – energy, charges, dipole moments, bond order, electronic energies, resonance energies, Oxidation and reduction (cationic and anionic species of above systems)

Extension to Extended Huckel theory and PPP methods

Ab-initio methods: Writing the Hamiltonian of a system, Brief recap of H – atom solution, Units in quantum mechanical calculations, Born-Oppenheimer approximation (recap), Antisymmetry principle, Slater determinants, Coulomb and Exchange integrals,

Examples of He atom and hydrogen molecule, Hartree-Fock method

Basis sets, Basis functions, STOs and GTOs, diffuse and polarization functions. Minimal basis sets

Advantages of ab initio calculations, Koopman's theorem, Brief idea of Density Functional Theory

(Lectures: 12)

Unit 6:

Semi-empirical methods: Brief idea of CNDO, INDO, MINDO/3, MNDO, AM1, PM3 methods. Other file formats – PDB. Visualization of orbitals – HOMO, LUMO, ESP maps.

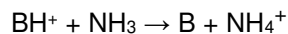
QSAR: Structure-activity relationships. Properties in QSAR (Partial atomic charges, polarizabilities, volume and surface area, log P, lipophilicity and Hammett equation and applications, hydration energies, refractivity). Biological activities (LD50, IC50, ED50.)

(Lectures: 8)

Practical:

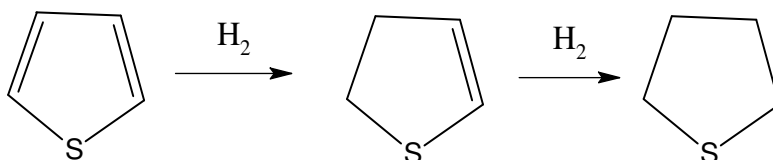
(Credits: 2, Laboratory periods: 60)

1. Plotting a 3D graph depicting a saddle point in a spreadsheet software.
2. Determine the enthalpy of isomerization of cis and trans 2-butene.
3. Determine the heat of hydrogenation of ethylene.
4. Compare the optimized C-C bond lengths and Wiberg bond orders in ethane, ethene, ethyne and benzene using PM3. Is there any relationship between the bond lengths and bond orders? Visualize the highest occupied and lowest unoccupied molecular orbitals of ethane, ethene, ethyne, benzene and pyridine.
5. Perform a conformational analysis of butane.
6. Compare the basicities of the nitrogen atoms in ammonia, methylamine, dimethylamine and trimethylamine by comparison of their Mulliken charges and ESP maps.
7. Compare the gas phase basicities of the methylamines by comparing the enthalpies of the following reactions:



where B = CH₃NH₂, (CH₃)₂NH, (CH₃)₃N

8. Arrange 1-hexene, 2-methyl-2-pentene, (E)-3-methyl-2-pentene, (Z)-3-methyl-2-pentene, and 2,3-dimethyl-2-butene in order of increasing stability.
9. Compare the optimized bond angles H₂O, H₂S, H₂Se using PM3.
10. Compare the HAH bond angles for the second row hydrides (BeH₂, CH₄, NH₃, H₂O) and compare with the results from qualitative MO theory.
11. (a) Compare the shapes of the molecules: 1-butanol, 2-butanol, 2-methyl-1-propanol, and 2-methyl-2-propanol. Note the dipole moment of each molecule. (b) Show how the shapes affect the trend in boiling points: (118 °C, 100 °C, 108 °C, 82 °C, respectively).
12. Compute the resonance energy of benzene by comparison of its enthalpy of hydrogenation with that of cyclohexene.
13. Plot the electrostatic potential mapped on electron density for benzene and use it to predict the type of stacking in the crystal structure of benzene dimer.
14. Predict the aromaticity of thiophene with respect to benzene by comparing the enthalpies of the following reactions:
 - (a) Hydrogenation of benzene to 1,3-cyclohexadiene and then 1,3-cyclohexadiene to cyclohexene.
 - (b)



15. Docking of Sulfonamide-type D-Glu inhibitor into MurD active site using Argus lab.

Note: Software: Argus Lab (www.planaria-software.com).

References:

Theory:

1. Lewars, E. (2003), **Computational Chemistry**, Kluwer academic Publisher.
2. Cramer, C.J.(2004),**Essentials of Computational Chemistry**, John Wiley & Sons.
3. Hinchcliffe, A. (1996),**Modelling Molecular Structures**, John Wiley & Sons.
4. Leach, A.R.(2001),**Molecular Modelling**, Prentice-Hall.

Practical:

1. Lewars, E. G. (2011),**Computational Chemistry**, Springer (India) Pvt. Ltd. Chapter 1 & 2.

2. Engel, T.; Reid, P.(2012),**Physical Chemistry**, Prentice-Hall. Chapter 26.

Teaching Learning Process:

Conventional methods of teaching i.e. lectures, PPTs, Hands on practice of molecule centric problems with maximum characterization parameters and recently designed lead drug molecules

Assessment Methods:

- Assignment based on Theoretical designing of small molecules of drug prospective
- Presentation on fundamentals of drug designing and molecular modelling
- Test
- Semester end examination

Keywords:

Molecular modelling, Quantum Mechanical Method, Cartesian Coordinates, Molecular Dynamics, Force Field, Software of Computational Chemistry.

Course Code: CHEMISTRY –DSE-6

Course Title: Polymer Chemistry

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The primary objective of this paper is to help the student to know about the synthesis, properties and applications of polymers.

Learning Outcomes:

By the end of this course, students will be able to:

- Know about history of polymeric materials and their classification
- Learn about different mechanisms of polymerization and polymerization techniques
- Evaluate kinetic chain length of polymers based on their mechanism
- Differentiate between polymers and copolymers
- Learn about different methods of finding out average molecular weight of polymers
- Differentiate between glass transition temperature (T_g) and crystalline melting point (T_m)
- Determine T_g and T_m
- Know about solid and solution properties of polymers
- Learn properties and applications of various useful polymers in our daily life.

This paper will give glimpse of polymer industry to the student and help them to choose their career in the field of polymer chemistry.

Unit 1:

Introduction and history of polymeric materials:

History of polymeric materials, Different schemes of classification of polymers, Polymer nomenclature, Molecular forces and chemical bonding in polymers, Texture of Polymers

Functionality and its importance:

Criteria for synthetic polymer formation, classification of polymerization processes, Relationships between functionality, extent of reaction and degree of polymerization Bifunctional systems, Poly-functional systems

(Lectures: 12)

Unit 2:

Kinetics of Polymerization

Mechanism of step growth polymerization, kinetics of step growth, radical chain growth, ionic chain (both cationic and anionic), Mechanism and kinetics of copolymerization, polymerization techniques

(Lectures: 8)

Unit 3:

Glass transition temperature (T_g) and determination of T_g , Free volume theory, WLF equation, Factors affecting glass transition temperature (T_g).

Crystallization and crystallinity: Determination of crystalline melting point and degree of crystallinity, Morphology of crystalline polymers, Factors affecting crystalline melting point.

Nature and structure of polymers-Structure Property relationships

(Lectures: 14)

Unit 4:

Determination of molecular weight of polymers (M_n , M_w , etc.) by end group analysis, viscometry, light scattering and osmotic pressure methods. Molecular weight distribution and its significance. Polydispersity index

Polymer Solution

Criteria for polymer solubility and Solubility parameter, Thermodynamics of polymer solutions, entropy, enthalpy and free energy change of mixing of polymers solutions.

Polymer Degradation

Thermal, oxidative, hydrolytic and photodegradation

(Lectures: 16)

Unit 5:

Properties of Polymers

(Physical, thermal, Flow & Mechanical Properties) Brief introduction to preparation, structure, properties and application of the following polymers: polyolefins, polystyrene and styrene copolymers, poly(vinyl chloride) and related polymers, poly(vinyl acetate) and related polymers, acrylic polymers, fluoro polymers, polyamides and related polymers. Phenol formaldehyde resins (Bakelite, Novolac), polyurethanes, silicone polymers, polydienes, Polycarbonates, Conducting Polymers: polyacetylene, polyaniline, poly(p-phenylene sulphide, polypyrrole, polythiophene

(Lectures: 10)

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Lab: Polymer chemistry

Polymer synthesis

1. Free radical solution polymerization of styrene (St) / Methyl Methacrylate (MMA)/MethylAcrylate (MA).
2. Preparation of nylon 6,6
3. Redox polymerization of acrylamide
4. Precipitation polymerization of acrylonitrile
5. Preparation of urea-formaldehyde resin
6. Preparations of novalac resin/resold resin.
7. Microscale Emulsion Polymerization of Poly(methylacrylate).

Polymer characterization

1. Determination of molecular weight of polyvinyl propylidene in water by viscometry:
2. Determination of the viscosity-average molecular weight of poly(vinyl alcohol) (PVOH) and the fraction of head-to-head monomer linkages in the polymer.
3. Determination of molecular weight by end group analysis of polymethacrylic acid.

Polymer analysis

1. Estimation of the amount of HCHO in the given solution by sodium sulphite method

2. IR studies of polymers
3. DSC (Differential Scanning Calorimetry) analysis of polymers
4. TG-DTA (Thermo-Gravimetry-Differential Thermal Analysis) of polymers

Suggested Additional Experiment:

1. Purification of monomer.
2. Emulsion polymerization of a monomer.

References:

Theory:

1. Carraher, C. E. Jr. (2013), **Seymour's Polymer Chemistry**, Marcel Dekker, Inc.
2. Odian, G. (2004), **Principles of Polymerization**, John Wiley.
3. Billmeyer, F.W. (1984), **Text Book of Polymer Science**, John Wiley.
4. Ghosh, P. (2001), **Polymer Science & Technology**, Tata McGraw-Hill.
5. Lenz, R.W. (1967), **Organic Chemistry of Synthetic High Polymers**, Interscience (Wiley).

Practical:

1. Allcock, H.R.; ; Lampe, F. W.; Mark, J. E.(2003), **Contemporary Polymer Chemistry**, Prentice-Hall.
2. Fried, J.R. (2003), **Polymer Science and Technology**, Prentice-Hall.
3. Munk, P.; Aminabhavi, T. M. (2002), **Introduction to Macromolecular Science**, John Wiley & Sons.
4. Sperling, L.H.(2005), **Introduction to Physical Polymer Science**, John Wiley & Sons.

Teaching-Learning Process:

- Teaching learning process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Bonding, Texture, Polymerization, Degradation, Polymer solution, Crystallization, Properties, Applications.

Course Code: CHEMISTRY –DSE-7

Course Title: Research Methodology For Chemistry

Total Credits: 06

(Credits: Theory-05, Tutorial-01)

(Total Lectures: Theory- 75, Tutorial-15)

Objectives:

The objective of this paper is to formulate the research problems and connect the research outcomes to the society. Student should be able to assess the local resources and opportunities in public domains. It further helps in gaining the knowledge of safety and ethical handlings of chemicals in lab and households.

Learning Outcomes:

By the end of the course, the students will be able to:

- Learn how to identify research problems.
- Evaluate local resources and need for addressing the research problem
- Find out local solution.
- Know how to communicate the research findings.

Unit 1:

Literature Survey

Print: Sources of information: Primary, secondary, tertiary sources; Journals: Journal abbreviations, abstracts, current titles, reviews, monographs, dictionaries, text-books, current contents, Introduction to Chemical Abstracts and Beilstein, Subject Index, Substance Index, Author Index, Formula Index, and other Indices with examples.

Digital: Web resources, E-journals, Journal access, TOC alerts, Hot articles, Citation index, Impact factor, H-index, E-consortium, UGC infonet, E-books, Internet discussion groups and communities, Blogs, Preprint servers, Search engines, Scirus, Google Scholar, ChemIndustry, Wiki- Databases, ChemSpider, Science Direct, SciFinder, Scopus.

Information Technology and Library Resources: The Internet and World Wide Web. Internet resources for chemistry. Finding and citing published information. Open source Lead lectures. Open source chemistry designing sources, Essentials of Problem formulation and communication with society.

(Lectures: 20)

Unit 2:

Methods of Scientific Research and Writing Scientific Papers

Reporting practical and project work. Idea about public funding agencies of research, Writing literature surveys and reviews. Organizing a poster display. Giving an oral presentation. Writing scientific papers – justification for scientific contributions, bibliography, description of methods, conclusions, the need for

illustration, style, publications of scientific work. Writing ethics. Avoiding plagiarism. Assessment of locally available resources.

(Lectures: 20)

Unit 3:

Chemical Safety and Ethical Handling of Chemicals

Safe working procedure and protective environment, protective apparel, emergency procedure and first aid, laboratory ventilation. Safe storage and use of hazardous chemicals, procedure for working with substances that pose hazards, flammable or explosive hazards, procedures for working with gases at pressures above or below atmospheric level. Safe storage and disposal of waste chemicals. Recovery, recycling and reuse of laboratory chemicals. Procedure for laboratory disposal of explosives. Identification, verification and segregation of laboratory waste. Disposal of chemicals in the sanitary sewer system. Incineration and transportation of hazardous chemicals.

(Lectures: 12)

Unit 4:

Data Analysis

The Investigative Approach: Making and Recording Measurements. SI Units and their use. Scientific method and design of experiments.

Analysis and Presentation of Data: Descriptive statistics. Choosing and using statistical tests. Chemometrics. Analysis of variance (ANOVA), Correlation and regression, Curve fitting, fitting of linear equations, simple linear cases, weighted linear case, analysis of residuals, General polynomial fitting, linearizing transformations, exponential function fit, r and its abuse. Basic aspects of multiple linear regression analysis.

Biostatistics: brief introduction and data handling.

(Lectures: 13)

Exposure of chemistry software

Chemistry Students must be given exposure to applications of molecular modelling softwares e.g. Hyperchem, Schrodinger etc. Hands on experiments of docking.

(Lectures: 10)

References:

Theory:

1. Dean, J.R.; Jones, A.M.; Holmes, D.; Reed, R.; Jones, A.Weyers, J. (2011), **Practical skills in chemistry**, Prentice-Hall.
2. Hibbert, D.B.; Gooding, J.J. (2006), **Data analysis for chemistry**, Oxford University Press.
3. Topping, J. (1984), **Errors of observation and their treatment**, Chapman Hall, London

4. Levie, R. de.(2001),**How to use Excel in analytical chemistry and in general scientific data analysis**, Cambridge University Press.
5. Le, C.T.; Eberly,L.E. (2016),**Introductory Biostatistics**, Wiley.

Additional Resources:

1. **Chemical safety matters IUPAC – IPCS**, Cambridge University Press, 1992.
2. **OSU safety manual 1.01**.

Teaching Learning Process

Lecture with conventional teaching aids, presentations, invited talks on thrusting areas, group discussions, literature survey and lab visit.

Assessment Methods

- Internal assessment through assignments and class test.
- Writing review on identified research problem
- Poster presentation
- End semester university examination

Keywords

Review of research papers, writing research papers, citation, and Laboratory safety.

Course Code: CHEMISTRY –DSE-8

Course Title: Green Chemistry

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

Today's society is moving towards becoming more and more environmentally conscious. There is rising concern of environmental pollution, depleting resources, climate change, ozone depletion, heaps and heaps of landfills piling up, legislation which is getting stringent with strict environmental laws, rising cost of waste deposits and so on. We are faced with a challenge to work towards sustainable practices. Green chemistry has arisen from these concerns. It is not a new branch of chemistry but the way chemistry should be practiced. Innovations and applications of green chemistry in education has helped companies not only gain environmental benefits but at the same time achieve economic and societal goals also. This is possible because these undergraduate students are ultimate scientific community of tomorrow.

Learning Outcomes:

By the end of this course, students will be able to:

- Understand the twelve principles of green chemistry and will build the basic understanding of toxicity, hazard and risk of chemical substances.
- Understand stoichiometric calculations and relate them to green chemistry metrics. They will learn about atom economy and how it is different from percentage yield.
- Learn to design safer chemical products and processes that are less toxic than current alternatives. Hence, they will understand the meaning of inherently safer design for accident prevention and the principle "what you don't have can't harm you"
- Understand benefits of use of catalyst and bio catalyst, use of renewable feed stock which helps in energy efficiency and protection of the environment, renewable energy sources, importance of reactions in various green solvents.
- Appreciate the use of green chemistry in problem solving skills, critical thinking and valuable skills to innovate and find out solution to environmental problems. Thus the students are able to realise that chemistry can be used to solve rather than cause environmental problems.
- Green chemistry is a way to boost profits, increase productivity and ensure sustainability with absolute zero waste. Success stories and real world cases also motivate them to practice green chemistry. These days customers are demanding to know about a product: Is it green? Does it contribute to global warming? Was it made from non depletable resources? Students have many career opportunities as "green" is the path to success.

Unit 1:

Introduction to Green Chemistry

What is Green Chemistry? Some important environmental laws, pollution prevention Act of 1990, emergence of green chemistry, Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry

(Lectures:5)

Unit 2:

Principles of Green Chemistry and Designing a Chemical synthesis

Twelve principles of Green Chemistry and their explanation with examples

Special emphasis on the following:

- Prevention of Waste/ by products; maximum incorporation of the materials used in the process into the final products, Environmental impact factor, waste or pollution prevention hierarchy
- Green metrics to assess greenness of a reaction, e.g. Atom Economy, calculation of atom economy of the rearrangement, addition, substitution and elimination reactions.
- Prevention/ minimization of hazardous/ toxic products reducing toxicity
- Risk = (function) hazard x exposure
- Designing safer chemicals with minimum toxicity yet has the ability to perform the desired functions
- Green solvents: super critical fluids with special reference to carbon dioxide, water as a solvent for organic reactions, ionic liquids, fluorous biphasic solvent, PEG, solventless processes, solvents obtained from renewable resources and how to compare greenness of solvents
- Energy requirements for reactions – alternative sources of energy: use of microwaves, ultrasonic energy and photochemical energy
- Selection of starting materials; should be renewable rather than depleting, Illustrate with few examples such as biodiesel and polymers from renewable resources (such as green plastic)
- Avoidance of unnecessary derivatization – careful use of blocking/protecting groups
- Use of catalytic reagents (wherever possible) in preference to stoichiometric reagents; catalysis and green chemistry, comparison of heterogeneous and homogeneous catalysis, biocatalysis, asymmetric catalysis and photocatalysis.

- Design for degradation: A product should not persist after the commercial function is over e.g. soaps and detergents, pesticides and polymers
- Strengthening/ development of analytical techniques to prevent and minimize the generation of hazardous substances in chemical processes.
- Prevention of chemical accidents designing greener processes, inherent safer design, principle of ISD "What you don't have cannot harm you", greener alternative to Bhopal Gas Tragedy (safer route to carbonyl) and Flixborough accident (safer route to cyclohexanol) subdivision of ISD, minimization, simplification, substitution, moderation and limitation.

(Lectures:25)

Unit 3:

Examples of Green Synthesis/ Reactions

- Green Synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis).
- Green Reagents: Non-phosgene Isocyanate Synthesis, Selective Methylation using dimethylcarbonate.
- Microwave assisted solvent free synthesis of copper phthalocyanine
- Microwave assisted reactions in water: Hofmann Elimination, methyl benzoate to benzoic acid and Decarboxylation reaction
- Ultrasound assisted reactions: sonochemical Simmons-Smith Reaction (Ultrasonic alternative to Iodine)

(Lectures:10)

Unit 4:

Real world case studies based on the Presidential green chemistry awards of EPA

- Surfactants for Carbon Dioxide – replacing smog producing and ozone depleting solvents with CO₂ for precision cleaning and dry cleaning of garments.
- A new generation of environmentally advanced wood preservatives: Getting the chromium and Arsenic out of pressure treated wood.
- An efficient, green synthesis of a compostable and widely applicable plastic (polylactic acid) made from corn.
- Healthier Fats and oils by Green Chemistry: Enzymatic Inter esterification for production of No Trans-Fats and Oils.
- Development of Fully Recyclable Carpet: Cradle to Cradle Carpeting.
- Using a naturally occurring protein to stimulate plant growth, improve crop quality, increase yields, and suppress disease.

(Lectures:10)

Unit 5:

Future Trends in Green Chemistry

Oxidation reagents and catalysts; Biomimicry and green chemistry, Biomimetic, Multifunctional Reagents; mechanochemical and solvent free synthesis of inorganic complexes; co crystal controlled solid state synthesis (C²S³); Green chemistry in sustainable development.

(Lectures:10)

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Lab- Green chemistry

Characterization by m. pt., U.V.-Visible spectroscopy, IR spectroscopy, and any other specific method should be done (wherever applicable).

Safer starting materials

1. Preparation and characterization of nanoparticles of gold using tea leaves/silver nanoparticles using plant extracts.

Using renewable resources

2. Preparation of biodiesel from waste cooking oil and characterization (TLC, pH, Solubility, Combustion Test, Density, Viscosity, Gel Formation at Low Temperature and IR can be provided).

Use of enzymes as catalysts

3. Benzoin condensation using Thiamine Hydrochloride as a catalyst instead of cyanide.

Alternative green solvents

4. Extraction of D-limonene from orange peel using liquid CO₂ prepared from dry ice.
5. Mechanochemical solvent free, solid-solid synthesis of azomethine using p- toluidine and o-vanillin/p-vanillin (various other combinations of primary amine and aldehyde can also be tried).

Alternative sources of energy

6. Solvent free, microwave assisted one pot synthesis of phthalocyanine complex of copper(II).
7. Photoreduction of benzophenone to benzopinacol in the presence of sunlight.

Reducing waste

8. Designing and conducting an experiment by utilizing the products and by products obtained in above preparations which become waste otherwise if not used. This is done by critical thinking and literature survey.

Some representative examples:

- Use of nanoparticles as catalyst for a reaction
- Benzoin converted into Benzil and Benzil into Benzilic acid by a green method
- Use of azomethine for complex formation
- Rearrangement reaction from Benzopinacol to Benzopinacolone
- Conversion of byproduct of biodiesel to a useful product
- Students should be taught to do spot tests for qualitative inorganic analysis for cations and anions, and qualitative organic analysis for preliminary test and functional group analysis.

References:

Theory:

1. Anastas, P.T.; Warner, J.C.(1998),**Green Chemistry, Theory and Practice**, Oxford University Press.
2. Lancaster, M.(2016),**Green Chemistry An Introductory Text**.2nd Edition, RSC Publishing.
3. Cann , M. C. ;Connely,M. E.(2000), **Real-World cases in Green Chemistry**, American Chemical Society, Washington.
4. Matlack, A.S.(2001),**Introduction to Green Chemistry**, Marcel Dekker.
5. Alhuwalia,V. K.; Kidwai, M.R.(2005),**New Trends in Green chemistry**, Anamalaya Publishers.

Practical:

1. Kirchoff, M.; Ryan, M.A. (2002), **Greener approaches to undergraduate chemistry experiment**. American Chemical Society, Washington DC.
2. Sharma, R.K.; Sidhwani, I.T.; Chaudhari, M.K.(2013), **Green Chemistry Experiments: A monograph**, I.K. International Publishing House Pvt Ltd. New Delhi.
3. Pavia,D.L.; Lamponam, G.H.; Kriz, G.S.W. B.(2006),**Introduction to organic Laboratory Technique-A Microscale approach**,4th Edition, Brrooks-Cole Laboratory Series for Organic chemistry.
4. Wealth from Waste: A green method to produce biodiesel from waste cooking oil and generation of useful products from waste further generated. Indu Tucker Sidhwani et al. University of Delhi, Journal of Undergraduate Research and Innovation, Volume 1, Issue 1,February 2015, ISSN: 2395-2334.
5. Sidhwani, Tucker I.; Chowdhury, S. Greener alternatives to Qualitative Analysis for Cations without H₂S and other sulfur containing compounds, J. Chem. Educ. 2008, 85, 1099.
6. Sidhwani, Tucker I.; Chowdhury, S. et al., DU Journal of Undergraduate Research and Innovation, 2016, Volume 2, Issue 2, 70-79.
7. Dhingra, S., ;Angrish, C. Qualitative organic analysis: An efficient, safer, and economical approach to preliminary tests and functional group analysis. *Journal of Chemical Education*, 2011, 88(5), 649-651.

Additional References:

1. Cann , M. C.; Umile, T.P. (2008), **Real world cases in Green chemistry** Vol 11, American chemical Society,Washington.
2. Benyus,J. (1997),**Innovations Inspired by nature**,Harper collins.
3. Garay,A. L; Pichon, A.; James,S.L. Chem Soc Rev, 2007, 36,846-855.

Teaching Learning Process:

- Conventional chalk and board teaching
- Power point presentations
- Interactive sessions
- Literature survey and critical thinking to design to improve a traditional reaction and problem solving
- Visit to a green chemistry lab
- Some motivating short movies in green chemistry especially in bio mimicry

Assessment Methods:

- Presentation by students
- Class Test
- Written Assignment
- End Semester University Theory and Practical Exams

Keywords:

Green chemistry, Twelve principles of green chemistry, Atom economy, Waste minimization, Green metric, Green solvents, Solvent free, Catalyst, Bio-catalyst, Renewable energy sources, Hazardous, Renewable feedstock, Ionic liquids, Supercritical fluids, Inherent safer design, Green synthesis, Co-crystal controlled solid state synthesis, Sustainable development, Presidential green chemistry awards.

Course Code: CHEMISTRY –DSE-9

Course Title: Industrial Chemicals and Environment

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The objective of this course is to make students aware about the concepts of different gases and their industrial production, uses, storage and hazards. Manufacturing, applications, analysis and hazards of the Inorganic Chemicals, Preparation of Ultra-Pure metals for semiconducting technology, Air and Water pollution, control measures for Air and Water Pollutants, Catalyst and Biocatalyst, Energy and Environment.

Learning Outcomes:

By the end of this course students will be able to understand:

- The different toxic gases and their toxicity hazards
- Safe design systems for large scale production of industrial gases.
- Manufacturing processes, handling and storage of inorganic chemicals.
- Hazardous effects of the inorganic chemicals on human beings and vegetation.
- The requirement of ultra-pure metals for the semiconducting technologies
- Composition of air, various air pollutants, effects and control measures of air pollutants.
- Different sources of water, water quality parameters, impacts of water pollution, water treatment.
- Different industrial effluents and their treatment methods.
- Different sources of energy.
- Generation of nuclear waste and its disposal.
- Use of biocatalyst in chemical industries.

Unit 1:

Industrial Gases: Large scale production, uses storage and hazards in handling of the following gases: oxygen, nitrogen, argon, neon, helium, hydrogen, acetylene, carbon monoxide, chlorine, fluorine, and sulphur dioxide.

(Lectures: 6)

Unit 2:

Inorganic Chemicals: Manufacture, applications, analysis and hazards in handling the following chemicals: hydrochloric acid, nitric acid, sulphuric acid, caustic soda, borax, bleaching powder, sodium thiosulphate, hydrogen peroxide, potassium dichromate and potassium permanganate

(Lectures: 10)

Unit 3:

Industrial Metallurgy: Preparation of ultrapure metals for semiconductor technology.

(Lectures: 4)

Unit 4:

Environment and its segments:

Ecosystems. Biogeochemical cycles of carbon, nitrogen and sulphur.

Air Pollution: Major regions of atmosphere, chemical and photochemical reactions in atmosphere.

Air pollutants: types, sources, particle size and chemical nature; Photochemical smog: its constituents and photochemistry. Major sources of air pollution, Pollution by SO₂, CO₂, CO, NO_x, H₂S and other foul smelling gases, methods of estimation of CO, NO_x, SO_x and control procedures, Effects of air pollution on living organisms and vegetation

Greenhouse effect and Global warming, Environmental effects of ozone, Ozone depletion by oxides of nitrogen, chlorofluorocarbons and halogens, Air pollution control, Settling Chambers, Venturi Scrubbers, Cyclones, Electrostatic Precipitators (ESPs).

(Lectures:15)

Unit 5:

Water Pollution:

Hydrological cycle, water resources, aquatic ecosystems, Sources and nature of water pollutants, Techniques for measuring water pollution, Impacts of water pollution on hydrological cycle and ecosystems. Water purification methods. Effluent treatment plants (primary, secondary and tertiary treatment). Industrial effluents from the following industries and their treatment: electroplating, textile, tannery, dairy, petroleum and petrochemicals, agro fertilizer.

Sludge disposal. Industrial waste management, incineration of waste.

Water treatment and purification (reverse osmosis, electro dialysis, ion exchange).

Water quality parameters for wastewater, industrial water and domestic water.

(Lectures:15)

Unit 6:

Energy & Environment: Sources of energy: Coal, petrol and natural gas. Nuclear fusion / fission, solar, hydrogen, geothermal, tidal and hydel.

Nuclear Pollution: Disposal of nuclear waste, nuclear disaster and its management.

Biocatalysis: Introduction to biocatalysis: Importance in green chemistry and chemical industry.

(Lectures: 10)

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Lab: Industrial Chemicals & Environment

1. Determination of dissolved oxygen in water.
2. Determination of Chemical Oxygen Demand (COD).
3. Determination of Biological Oxygen Demand (BOD).
4. Percentage of available chlorine in bleaching powder.
5. Measurement of chloride, sulphate and salinity of water samples by simple titration method (AgNO_3 and potassium chromate).
6. Estimation of total alkalinity of water samples (CO_3^{2-} , HCO_3^-) using double titration method.
7. Measurement of dissolved CO_2
8. Determination of hexavalent Chromium Cr(VI) concentration in tannery wastes/waste water sample using UV-Vis spectrophotometry technique.
9. Preparation of borax/ boric acid

References:

Theory

1. Manahan, S.E. (2017), **Environmental Chemistry**, CRC Press
2. Buchel, K.H.; Moretto, H.H.; Woditsch, P. (2003), **Industrial Inorganic Chemistry**, Wiley-VCH.
3. De, A.K. (2012), **Environmental Chemistry**, New Age International Pvt., Ltd.
4. Khopkar, S.M. (2010), **Environmental Pollution Analysis**, New Age International Publisher.

Practical

1. Vowles, P.D.; Connell, D.W. (1980), **Experiments in Environmental Chemistry: A Laboratory Manual**, Vol.4, Pergamon Series in Environmental Science.
2. Gopalan, R.; Anand, A.; Sugumar R.W. (2008), **A Laboratory Manual for Environmental Chemistry**, I. K. International.

Teaching Learning Process:

- Conventional chalk and board teaching,
- Visit to chemical industries to get information about the technologies, methods to check pollutants and its treatment.
- ICT enabled classes.
- Power point presentations.
- Interactive sessions.
- To get recent information through the internet.

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Air pollution, Biocatalysis, Environment, Green chemistry, Industrial gases, Inorganic chemicals, Metals, Ultrapure metals, Sources of energy, Water pollution.

Course Code: CHEMISTRY –DSE-10

Course Title: Instrumental Methods of Chemical Analysis

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

This course aims to provide knowledge on various spectroscopic techniques for chemical analysis along with the basic principles of instrumentation.

Learning Outcomes:

By the end of the course, the students will be able to:

- Handle analytical data
- Understand basic components of IR, FTIR, UV-Visible and Mass spectrometer.
- Interpret of IR, FTIR, UV-visible spectra and their applications.
- Understand the use of single and double beam instruments.
- Learn separations techniques like Chromatography.
- Learn elemental analysis, NMR spectroscopy, Electroanalytical Methods, Radiochemical Methods, X-ray analysis and electron spectroscopy.

Unit 1:

Introduction to analytical methods of data analysis

Treatment of analytical data, including error analysis. Classification of analytical methods and the types of instrumental methods. Consideration of electromagnetic radiations.

(Lectures: 4)

Unit 2:

Molecular spectroscopy

Infrared spectroscopy: Interaction of radiations with molecules: absorption and scattering. Means of excitation (light sources), separation of spectrum (wavelength dispersion, time resolution), detection of the signal (heat, differential detection), interpretation of spectrum (qualitative, mixtures, resolution), advantages of Fourier-Transform Infrared (FTIR) spectroscopy.

Applications: Issues of quality assurance and quality control, special problems for portable instrumentation and rapid detection.

(Lectures: 8)

Unit 3:

UV-Visible/ Near IR Spectroscopy

Emission, absorption, fluorescence and photoacoustic. Excitation sources (lasers, time resolution), wavelength dispersion (gratings, prisms, interference filters, laser, placement of sample relative to dispersion, resolution), Detection of signal (photocells, photomultipliers, diode arrays, sensitivity and S/N), Single and double beam instruments, Interpretation (quantification, mixtures, absorption vs. fluorescence and the use of time, photoacoustic, fluorescent tags).

(Lectures: 8)

Unit 4:

Separation techniques

Chromatography: Gas chromatography, liquid chromatography, Importance of column technology (packing, capillaries), Separation based on increasing number of factors (volatility, solubility, interactions with stationary phase, size, electrical field), Detection: simple vs. specific (gas and liquid), Detection as a means of further analysis (use of tags and coupling to IR and MS), Electrophoresis (plates and capillary) and use with DNA analysis. Immunoassays and DNA techniques.

(Lectures: 8)

Unit 5:

Mass spectroscopy

Making the gaseous molecule into an ion (electron impact, chemical ionization), Making liquids and solids into ions (electrospray, electrical discharge, laser desorption, fast atom bombardment), Separation of ions on basis of mass to charge ratio, Magnetic, Time of flight, Electric quadrupole. Resolution, time and multiple separations, detection and interpretation.

(Lectures: 8)

Unit 6:

Elemental analysis

Mass spectrometry (electrical discharges).

Atomic spectroscopy: Atomic absorption, atomic emission, and atomic fluorescence. Excitation and getting sample into gas phase (flames, electrical discharges, plasmas), wavelength separation and resolution (dependence on technique), detection of radiation (simultaneous/scanning, signal noise), interpretation (errors due to molecular and ionic species, matrix effects, other interferences).

(Lectures: 8)

NMR spectroscopy: Principle, Instrumentation, Factors affecting chemical shift, Spin-coupling, Applications.

(Lectures: 4)

Electroanalytical Methods: Potentiometry & Voltammetry.**(Lectures: 4)**

Radiochemical Methods.**(Lectures: 4)**

X-ray analysis and electron spectroscopy (surface analysis).**(Lectures: 4)**

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Lab: Instrumental methods of chemical analysis

At least 10 experiments to be performed.

1. Determination of the isoelectric pH of a protein.
2. Titration curve of an amino acid.
3. Determination of the void volume of a gel filtration column.
4. Determination of a mixture of cobalt and nickel (UV-visible spectroscopy).
5. Study of electronic transitions in organic molecules (i.e., acetone in water).
6. IR absorption spectra (study of aldehydes and ketones).
7. Determination of calcium, iron, and copper in food by atomic absorption spectroscopy.
8. Quantitative analysis of mixtures by gas chromatography (i.e., chloroform and carbon tetrachloride).
9. Separation of carbohydrates by HPLC.
10. Determination of caffeine in beverages by HPLC.
11. Potentiometric titration of a chloride-iodide mixture.
12. Cyclic voltammetry of the ferrocyanide/ferricyanide couple.
13. Use of nuclear magnetic resonance instrument and to analyse the spectra of methanol and ethanol
14. Use of fluorescence to do "presumptive tests" to identify blood or other body fluids.

15. Use of “presumptive tests” for anthrax or cocaine.
16. Collection, preservation, and control of blood evidence being used for DNA testing.
17. Use of capillary electrophoresis with laser fluorescence detection for nuclear DNA (Y chromosome only or multiple chromosome).
18. Use of sequencing for the analysis of mitochondrial DNA.
19. Laboratory analysis to confirm anthrax or cocaine.
20. Detection in the field and confirmation in the laboratory of flammable accelerants or explosives.
21. Detection of illegal drugs or steroids in athletes.
22. Detection of pollutants or illegal dumping.
23. Fibre analysis.

References:

Theory:

1. Willard, H.H.; Merritt, L.L. Jr.; Dean, J.A.; Settle, F.A. Jr.(2004), **Instrumental methods of analysis**, 7th edition, CBS Publishers.
2. Christian, G.D.(2004), **Analytical Chemistry**, 6th Edition, John Wiley & Sons, New York.
3. Skoog, D.A.; Holler, F. J.; Crouch, S.(2006), **Principles of Instrumental Analysis**, Thomson Brooks/Cole.
4. Banwell, C.N. (2006), **Fundamentals of Molecular Spectroscopy**, Tata McGraw-Hill Education

Practical:

1. Skoog, D. A.; Holler, F. J.; Crouch, S.(2006), **Principles of Instrumental Analysis**, Cengage Learning.

Teaching Learning Process:

- Conventional chalk and board teaching,
- Class interactions and group discussions
- Power point presentation on important topics.

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Analytical methods of data analysis, Infrared spectroscopy, UV-Visible spectroscopy, Chromatographic techniques, Mass spectra, Elemental analysis methods, NMR spectroscopy, Electroanalytical methods, Radiochemical methods, X-ray analysis, Electronic spectroscopy.

Course Code: CHEMISTRY –DSE-11

Course Title: Nanoscale Materials and Their Applications

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The aim of this course is to introduce materials at nanoscale, their preparation, characterization and applications.

Learning Outcomes:

By the end of the course, the students will be able to:

- Understand the concept of nanodimensions.
- Know the various methods of preparation of nanomaterials.
- Know the different characterization techniques used for the analysis of nanomaterials and understand the basic principle behind these techniques.
- Understand the optical and conducting properties of nanostructures.
- Appreciate the real life applications of nanomaterials.

Unit 1:

Introduction to nanodimensions

0D, 1D, 2D nanomaterials, Quantum Dots, Nanoparticles, Nanostructures (nanowires, thin films, nanorods), carbon nanostructures (carbon nanotubes, carbon nanofibers, fullerenes), Size Effects in nano systems, Quantum confinement and its consequences, Semiconductors. Band structure and band gap.

(Lectures: 10)

Unit 2:

Preparation of nanomaterials

Top down and Bottom up approach, Photolithography. Ball milling. Vacuum deposition. Physical vapor deposition (PVD), Chemical vapor deposition (CVD), Thermal decomposition, Chemical reduction, Sol-Gel synthesis, Hydrothermal synthesis, Spray pyrolysis, Electrochemical deposition, Pulsed Laser deposition.

(Lectures: 8)

Unit 3:

Characterization techniques (*Basic working principles and interpretation of experimental data using these techniques need to be covered*)

UV-visible spectroscopy, X-ray diffraction (Powder and Single Crystal), Raman Spectroscopy, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Energy Dispersive X-ray Spectroscopy (EDX), X-ray Photoelectron Spectroscopy (XPS), Atomic Force Microscopy (AFM), Scanning Tunneling Microscopy (STM), Dynamic light scattering (DLS), Brunauer-Emmett-Teller (BET) Surface area measurement and Thermogravimetric analysis (TG).

(Lectures:14)

Unit 4:

Optical Properties

Surface plasmon resonance, Excitons in direct and indirect band gap semiconductor nanocrystals. Radiative processes: General absorption, emission and luminescence (fluorescence and photoluminescence).

(Lectures:8)

Unit 5:

Conducting properties

Carrier transport in nanostructures. Tunneling and hopping conductivity. Defects and impurities: Deep level and surface defects.

(Lectures:6)

Unit 6:

Applications

Nanomaterials as Catalysts, semiconductor nanomaterials as photocatalysts, Nanocomposites as catalysts.

Carbon nanostructures as catalytic nanoreactors, metal and metal oxides confined inside carbon nanostructures, Nanowires and thin films for photonic devices (LEDs, solar cells, transistors).

(Lectures:14)

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Lab: Nanoscale materials and their applications

At least 04 experiments from the following:

1. Synthesis of metal nanoparticles by chemical reduction method.
2. Synthesis of semiconductor nanoparticles.
3. Surface Plasmon study of metal nanoparticles by UV-Visible spectrophotometer.

4. XRD pattern of nanomaterials and estimation of particle size. (Students can be provided with XRD patterns of known materials and asked to interpret the data.)
5. To study the effect of size on color of nanomaterials.
6. To prepare composite of CNTs with other materials.
7. Growth of quantum dots by thermal evaporation.
8. Prepare a disc of ceramic of a compound using ball milling, pressing and sintering, and study its XRD.
9. Fabricate a thin film of nanoparticles by spin coating (or chemical route) and study transmittance spectra in UV-Visible region.

References:

1. West, A. R.(2014),**Solid State Chemistry and Its Application**, Wiley
2. Smart, L. E.; Moore, E. A.(2012),**Solid State Chemistry An Introduction**, CRC Press Taylor & Francis.
3. Rao, C. N. R.; Gopalakrishnan, J.(1997),**New Direction in Solid State Chemistry**, Cambridge University Press.
4. Poole, Jr.; Charles P.; Owens, Frank J.:(2003), **Introduction to Nanotechnology**, John Wiley and Sons.
5. Chattopadhyay, K.K.; Banerjee, A. N.(2009),**Introduction to Nanoscience and Technology**, PHI.

Teaching Learning Process:

Lectures, ICT enabled presentations and group discussions will be part of teaching learning process.

Assessment Methods:

Internal assessment will be through assignments, projects, presentation and class test. End semester examination will be for theory and practical.

Keywords:

Nanomaterials, Preparation, Characterization, Applications.

Course Code: CHEMISTRY –DSE-12

Course Title: Dissertation

Total Credits: 06

Objectives:

The Objective is to enable student to identify a problem in the field of chemistry and to carry out literature survey, design an experiment, perform experiment, analyse data and write a report.

Learning Outcomes:

By the end of the dissertation, the students will be able to;

- Do survey, study and cite published literature on a particular area of interest.
- Correlate the experimental observations with theoretical understanding.
- Interpret results, write a report and submit to the supervisor.
- Use laboratory resources judiciously.
- Work in a team under the supervision of a teacher.
- Develop scientific writing skills.

Content:

Unit 1: Identification of research problem

Unit 2: Survey of literature

Unit 3: Formulation of hypothesis, experimental design and methodology

Unit 4: Analysis of data and interpretation of results

Unit 5: Discussion and conclusion

Unit 6: Writing a project report

Assessment Methods:

The assessment will be through evaluation of the dissertation, presentation and viva voce involving external and internal examiners.

SKILL-ENHANCEMENT COURSES (SEC)

Course Code: CHEMISTRY –SEC-1

Course Title: IT Skills For Chemists

Total Credits: 04

(Credits: Theory-02, Practical-02)

(Total Lectures: Theory- 30, Practical-60)

Objectives:

The objective of this course is to introduce the students to fundamental mathematical techniques and basic computer skills that will help them in solving chemistry problems. It aims to make the students understand the concept of uncertainty and error in experimental data. It acquaints the students with different software for data tabulation, calculation, graph plotting, data analysis and document preparation.

Learning Outcomes:

By the end of the course, the students will be able to:

- Become familiar with the use of computers
- Use software for tabulating data, plotting graphs and charts, carry out statistical analysis of the data.
- Solve chemistry problems and simulate graphs.
- Prepare documents that will incorporate chemical structure, chemical equations, mathematical expressions from chemistry.

Unit 1:

Mathematics

Fundamentals, mathematical functions, polynomial expressions, logarithms, the exponential function, units of a measurement, interconversion of units, constants and variables, equation of a straight line, plotting graphs.

Uncertainty in experimental techniques: Displaying uncertainties, measurements in chemistry, decimal places, significant figures, combining quantities.

Uncertainty in measurement: types of uncertainties, combining uncertainties. Statistical treatment. Mean, standard deviation, relative error. Data reduction and the propagation of errors. Graphical and numerical data reduction. Numerical curve fitting: the method of least squares (regression).

Algebraic operations on real scalar variables (e.g. manipulation of van der Waals equation in different forms). Roots of quadratic equations analytically and iteratively (e.g. pH of a weak acid). Numerical methods of finding roots (Newton-Raphson, binary –bisection, e.g. pH of a weak acid not ignoring the ionization of water, volume of a van der Waals gas, equilibrium constant expressions).

Differential calculus: The tangent line and the derivative of a function, numerical differentiation (e.g., change in pressure for small change in volume of a van der Waals gas, potentiometric titrations).

Numerical integration (Trapezoidal and Simpson's rule, e.g. entropy/enthalpy change from heat capacity data).

(Lectures: 10)

Unit 2:

Introductory writing activities: Introduction to word processor and structure drawing (ChemSketch) software. Incorporating chemical structures, chemical equations, expressions from chemistry (e.g. Maxwell-Boltzmann distribution law, Bragg's law, van der Waals equation, etc.) into word processing documents.

(Lectures: 4)

Unit 3:

Handling numeric data: Spreadsheet software (Excel/ LibreOffice Calc), creating a spreadsheet, entering and formatting information, basic functions and formulae, creating charts, tables and graphs Incorporating tables and graphs into word processing documents. Simple calculations, plotting graphs using a spreadsheet (Planck's distribution law, radial distribution curves for hydrogenic orbitals, gas kinetic theory- Maxwell-Boltzmann distribution curves as function of temperature and molecular weight), spectral data, pressure-volume curves of van der Waals gas (van der Waals isotherms), data from phase equilibria studies. Graphical solution of equations

(Lectures: 6)

Unit 4:

Numeric modelling: Simulation of pH metric titration curves. Excel functions LINEST and Least Squares. Numerical curve fitting, linear regression (rate constants from concentration- time data, molar extinction coefficients from absorbance data), numerical differentiation (e.g. handling data from potentiometric and pH metric titrations, pKa of weak acid), integration (e.g. entropy/enthalpy change from heat capacity data)

(Lectures: 6)

Unit 5:

Statistical analysis: Gaussian distribution and Errors in measurements and their effect on data sets. Descriptive statistics using Excel. Statistical significance testing: The t test. The F test. Presentation graphics.

(Lectures: 4)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Plotting graphs using a spreadsheet

- i. Planck's distribution law
- ii. Radial distribution curves for hydrogenic orbitals,
- iii. Maxwell-Boltzmann distribution curves as function of temperature and molecular weight
- iv. van der Waals isotherms
- v. Data from phase equilibria studies

2. Calculations using spreadsheet

- vi. Rate constants from concentration- time data
- vii. Molar extinction coefficients from absorbance data
- viii. Numerical differentiation (e.g. handling data from potentiometric and pH metric titrations)
- ix. pKa of weak acid

3. Preparing a word processing document having tables, chemical structures and chemical equations

References:

1. McQuarrie, D.A. (2008), **Mathematics for Physical Chemistry** University Science Books.
2. Steiner, E.(2008),**The Chemical Maths Book** Oxford University Press.
3. Yates, P.(2007),**Chemical calculations**, CRC Press.
4. Harris,D.C.(2007),**Quantitative Chemical Analysis**. Freeman, Chapters 3-5.
5. Levie, R. de. (2001), **How to use Excel in analytical chemistry and in general scientific data analysis**, Cambridge Univ. Press.
6. Venit, S.M. (1996),**Programming in BASIC: Problem solving with structure and style**. Jaico Publishing House.

Teaching Learning Process:

This course has major components of hands on exercises. The teaching learning process will require conventional teaching along with hands on exercise on computers.

Assessment Methods:

Assessment on solving chemistry related problems using spreadsheet.

Presentation on documentation preparation on any chemistry topic involving tables and graphs

Semester end practical and theory examination

Keywords:

Uncertainty in measurements, roots of quadratic and polynomial equations, Newton Raphson's method, binary bisection, numerical integration, trapezoidal rule, Simpson's rule, differential calculus, least square curve fitting method, Spreadsheet, charts, tables, graphs, LINEST, t-test, F-test.

Course Code: CHEMISTRY –SEC-2

Course Title: Basic Analytical Chemistry

Total Credits: 04

(Credits: Theory-02, Practical-02)

(Total Lectures: Theory- 30, Practical-60)

Objectives:

The objective of this course is to make students aware about the importance and the concepts of chemical analysis of water and soil, using separation techniques like chromatography and instrumentation techniques like flame photometry and spectrophotometry.

Learning Outcomes:

By the end of this course, students will be able to:

- Handle analytical data
- Determine composition and pH of soil, which can be useful in agriculture
- Do quantitative analysis of metal ions in water
- Separate mixtures using separation techniques
- Estimate macro nutrients using Flame photometry

Unit 1:

Introduction

Introduction to analytical chemistry and its interdisciplinary nature, Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements. Significant figures. Presentation of experimental data and results.

(Lectures: 6)

Unit 2:

Analysis of soil

Composition of soil, concept of pH and its measurement, complexometric titrations, chelation, chelating agents, use of indicators.

(Lectures: 8)

Unit 3:

Analysis of water:

Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods.

(Lectures:8)

Unit 4:

Chromatography

Definition and general introduction on principles of chromatography. Paper chromatography, thin layer chromatography, Column chromatography and ion-exchange chromatography.

(Lectures: 8)

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Lab-Basic analytical chemistry

1. Determination of pH of soil samples.
2. Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration.
3. Determination of pH, acidity and alkalinity of a water sample.
4. Determination of dissolved oxygen (DO) of a water sample.
5. Paper chromatographic separation of mixture of metal ion (Ni^{2+} and Co^{2+}).
6. To study the use of phenolphthalein in trap cases.
7. To analyze arson accelerants.
8. To carry out analysis of gasoline.
9. Estimation of macro-nutrients: Potassium, calcium and magnesium in soil samples by flame photometry.
10. Spectrophotometric determination of Iron in vitamin / dietary tablets.
11. Spectrophotometric identification and determination of caffeine and benzoic acid in soft drink.
12. Determination of ion exchange capacity of anion / cation exchange resin (using batch procedure if use of column is not feasible).

References:

1. Christian, G.D. (2004), **Analytical Chemistry**, John Wiley & Sons.
2. Harris, D. C. (2007), **Exploring Chemical Analysis**, W.H. Freeman and Co.

3. Skoog, D.A.; Holler F.J.; Nieman, T.A. (2005), **Principles of Instrumental Analysis**, Thomson Asia Pvt. Ltd.
4. Svehla, G. (1996), **Vogel's Qualitative Inorganic Analysis**, Prentice Hall.
5. Mendham, J.; Denney, R.C.; Barnes, J.D.; Thomas, M.J.K. (2007), **Vogel's Quantitative Chemical Analysis**, 6th Edition, Prentice Hall.

Teaching Learning Process:

- Conventional chalk and board teaching,
- Class room interactions and group discussions
- Lab demonstrations and experiments after completion of theory part
- ICT enabled classes

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Analytical chemistry, Sampling, Accuracy, Precision, Significant figures, Soil analysis, Analysis of water, Chromatography, Ion exchange chromatography, Flame photometry.

Course Code: CHEMISTRY –SEC-3

Course Title: Chemical Technology and Society

Total Credits: 04

(Credits: Theory-04)

(Total Lectures: Theory- 60)

Objectives:

This course will help students to connect chemical technology for societal benefits. It would fulfil the gap between academia and industries.

Learning Outcomes:

By the end of the course, the students will be able to:

- Understand the use of basic chemistry to chemical engineering
- Learn and use various chemical technology used in industries
- Develop scientific solutions for societal needs

Chemical Technology

Basic principles of distillation, solvent extraction, solid-liquid leaching and liquid-liquid extraction, separation by absorption and adsorption. An introduction into the scope of different types of equipment needed in chemical technology, including reactors, distillation columns, extruders, pumps, mills, emulgators. Scaling up operations in chemical industry. Introduction to clean technology.

Society

Exploration of societal and technological issues from a chemical perspective. Chemical and scientific literacy as a means to better understand topics like air and water (and the trace materials found in them that are referred to as pollutants).

Sources of energy

Coal, petrol and natural gas. Nuclear fusion / fission, solar, hydrogen, geothermal, tidal and hydel.

Properties of Polymers (Physical, thermal, Flow & Mechanical Properties)

Brief introduction to preparation, structure, properties and application of the following polymers: polyolefins, polystyrene and styrene copolymers, poly(vinyl chloride) and related polymers, poly(vinyl acetate) and related polymers, acrylic polymers, fluoro polymers, polyamides and related polymers. Phenol formaldehyde resins (Bakelite, Novolac), polyurethanes, silicone polymers, polydienes, Polycarbonates, Conducting Polymers, [polyacetylene, polyaniline, poly(p-phenylene sulphide), polypyrrole, polythiophene].

Natural Polymers

Structure, properties and applications of shellac, lignin, starch, nucleic acids and proteins.

Basics of drug synthesis

Application of genetic engineering

References:

1. Hill, J.W.; McCreary, T.W.; Kolb, D.K. (2013), **Chemistry for changing times**, Pearson.

Teaching Learning Process:

- Lectures using teaching aid (chalk/power point/videos)
- Group discussion
- Presentations
- Advise to students to prepare a report on technological applications
- Visit to nearby industries
- Invite people of industries for interaction with students

Assessment Methods:

- Graded assignments
- Conventional class tests
- Class seminars by students on course topics with a view to strengthening the content through width and depth

- Quizzes
- End semester university examination.

Keywords:

Chemical Technology; Society; Energy; Polymer; Pollutants.

Course Code: CHEMISTRY –SEC-4

Course Title: Chemoinformatics

Total Credits: 04

(Credits: Theory-02, Practicals-02)

(Total Lectures: Theory- 30, Practicals-60)

Objectives:

The aim of the course is to introduce the students to computational drug design through structure-activity relationship, QSAR and combinatorial chemistry. The students will learn about the target analysis, virtual screening for lead discovery, structure based and ligand based design method and the use of computational techniques, library preparation and data handling.

Learning Outcomes:

By the end of the course, the students will be able to:

- Have a comprehensive understanding of drug discovery process and techniques including structure-activity relationship, quantitative structure activity relationship and the use of chemoinformatics in this, including molecular modelling and docking studies.
- Appreciate role of modern computation techniques in the drug discovery process and perform their own modelling studies.

Unit 1:

Introduction to Chemoinformatics: History and evolution of chemoinformatics, Use of chemoinformatics, Prospects of chemoinformatics, Molecular modelling and structure elucidation.

(Lectures: 2)

Unit 2:

Representation of molecules and chemical reactions: Nomenclature, Different types of notations, SMILES coding, Matrix representations, Structure of Molfiles and Sdfiles, Libraries and toolkits, Different electronic effects, Reaction classification.

(Lectures: 2)

Unit 3:

Searching chemical structures: Full structure search, sub-structure search, basic ideas, similarity search, three dimensional search methods, basics of computation of physical and chemical data and structure descriptors, data visualization.

(Lectures: 6)

Unit 4:

Applications: Prediction of Properties of Compounds; Linear Free Energy Relations; Quantitative Structure-Property Relations; Descriptor Analysis; Model Building; Modeling Toxicity.

(Lectures: 6)

Unit 5:

Structure-Spectra correlations; Prediction of NMR, IR and Mass spectra; Computer Assisted Structure elucidations; Computer Assisted Synthesis Design

(Lectures: 6)

Unit 6:

Introduction to drug design; Target Identification and Validation; Lead Finding and Optimization; Analysis of HTS data; Virtual Screening; Design of Combinatorial Libraries; Ligand-Based and Structure Based Drug design; Application of Chemoinformatics in Drug Design.

(Lectures: 8)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Overview of Rational Drug Design, Ligands and Targets

2. In silico representation of chemical information

- i. CIF IUCr Crystallographic Information Framework
- ii. CML Chemical Markup Language
- iii. SMILES -- Simplified Molecular Input Line Entry Specification
- iv. InChi -- IUPAC International Chemical Identifier
- v. Other representations

3. Chemical Databases and Data Mining

- i. Cambridge Structural Database CCDC CSD
- ii. Crystallographic Open Database COD
- iii. Protein Data Bank PDB Ligand Explorer
- iv. Chempider
- v. Other Data Bases

4. Molecular Drawing and Interactive Visualization

- i. ChemDraw
- ii. MarvinSketch
- iii. ORTEP
- iv. Chimera, RasMol, PyMol

5. Computer-Aided Drug Design Tools

- i. Molecular Modeling Tools
- ii. Structural Homology Modeling Tools
- iii. Docking Tools and Screening Tools
- iv. Other tools

6. Building a Ligand

- i. Building ab initio
- ii. Building from similar ligands
- iii. Building with a known macromolecular target
- iv. Building without a known macromolecular target
- v. Computational assessment of activity and toxicity and drugability.

References:

1. Leach, A. R.; Gillet, V. J. (2007), **An introduction to Chemoinformatics**, Springer.
2. Gasteiger, J.; Engel, T. (2003), **Chemoinformatics: A text-book**. Wiley-VCH.
3. Gupta, S. P. (2011), **QSAR & Molecular Modeling**. Anamaya Pub.
4. Gasteiger, J. **Handbook of cheminformatics: from data to knowledge in 4 volumes**, Wiley.

Additional Resources:

1. Jürgen, B. (2004), **Chemoinformatics Concepts, Methods, and Tools for Drug Discovery**, Springer

Teaching Learning Process:

The course aims to introduce students to different cheminformatics methods and its use in drug research through practicals. It is a rather new discipline of science. It concerns with the applications of computer to solving the chemistry problems related to drug designing and drug discovery.

The course will give emphasis on active learning in students through a combination of lectures, tutorials and practical sessions. The underlying principles will be explained in lectures and the practicals will establish the understanding of these principles through applications to drug research.

Assessment Methods:

- Formative assessment supporting student learning in Cheminformatics practicals
- Summative assessment
- Review of a case study
- Exercise based on SAR and QSAR-Report
- Practical exam of five hours

Keywords:

Cheminformatics, Virtual Chemical Library, Virtual Screening, SAR-QSAR, Drug Design lead discovery.

Course Code: CHEMISTRY –SEC-5

Course Title: Business Skills for Chemists

Total Credits: 04

(Credits: Theory-04)

(Total Lecture: Theory-60)

Objectives:

The objective of this course is to enhance the business and entrepreneurial skills of undergraduate chemistry students and improve their employment prospects. The course will orient the students to understand the Industry linkage with chemistry, challenges and business opportunities. It will expose the students to the concepts of intellectual property rights, patents and commercialisation of innovations.

Learning Outcomes:

By the end of this course, students will be able to:

1. Learn basics skills of of business and project management.
2. Understand the process of product development and business planning that includes environmental compliancy.
3. Learn the process by which technical innovations are conceived and converted into successful business ventures.
4. Understand the intellectual property rights and patents which drive business viability and commercialization of innovation.
5. Relate to the importance of chemistry in daily life, along with the employment and business opportunities. They will effectively use the skills to contribute towards the well-being of the society and derive commercial value.

Unit 1:

Chemistry in industry

Current challenges and opportunities for the chemistry based industries.

Role of chemistry in India and global economies.

Chemistry based products in the market.

(Lectures: 10)

Unit 2:

Business Basics

Key business concepts, Business plans, Market need, Project management, Routes to market, Concept of entrepreneurship

(Lectures: 12)

Unit 3:

Project Management

Different stages of a project:

- Ideation
- Bench work
- Pilot trial
- Production
- Promotion/ Marketing

(Lectures: 10)

Unit 4:

Commercial Realisation and Case Studies

- Commercialisation
- Case study of Successful business ideas in chemistry
- Case study of Innovations in chemistry
- Financial aspects of business with case studies

(Lectures: 10)

Unit 5:

Intellectual Property Rights

Introduction to IPR & Patents

(Lectures: 6)

Unit 6:

Environmental Hazards

Industries involving hazardous chemicals. Importance of development of cost-effective alternative technology. Environmental ethics.

(Lectures: 12)

Students can be taken for industrial visits for practical knowledge and experience.

Group of 4-5 students may be asked to prepare business plan based on some innovative ideas and submit as a project / presentation discussing its complete execution.

References:

1. www.rsc.org
2. Nwaeke, L.I.(2002), **Business Concepts and Perspectives**, Springfield Publishers.
3. Silva, T. D. (2013), **Essential Management Skills for Pharmacy and Business Managers**, CRC Press.

Teaching Learning Process:

- Class room teaching board method or power point presentations
- Class room interactions and group discussions
- Through videos and online sources
- Visit to chemical industries for real understanding of whole process

Assessment Methods:

- Written examination and class tests
- Oral presentation of project proposal along with written assignment.

Keywords:

Business skills, Chemical industry, Entrepreneurship, Project management, Intellectual property rights, Environmental ethics.

Course Code: CHEMISTRY –SEC-6

Course Title: Intellectual Property Rights

Total Credits: 04

(Total Lectures: Theory-60)

Objectives:

The course aims to give insights into the basics of the Intellectual Property (IP) and in its wider purview it encompasses intricacies relating to IP. This course is designed to introduce a learning platform to those who may be involved in the making and creation of various forms of IP, besides the effective management of IPR of other creators. The course may also provide cursory understanding of the overall IP ecosystem in the country.

Learning Outcomes:

At the end of this course, students will be able to:

- Learn theoretical concepts of evolution of Intellectual Property Laws, and to differentiate between the different kinds of IP.

- Know the existing legal framework relating to IP in India.
- Comprehend the value of IP and its importance in their respective domains.
- This course may motivate the students to make their career in multifaceted field of intellectual property rights.

Unit 1:

Introduction

Basic concept of Intellectual Property, Rationale behind Intellectual Property, Justifications for protection of IP, IPR and Economic Development, Major International Instruments relating to the protection of IP. The World Intellectual Property Organization (WIPO), WTO and TRIPS Agreement.

(Lectures: 8)

Unit 2:

Copyright and Related rights

Introduction to copyright and its relevance, subject matter and conditions of protection, ownership and term of copyright, rights under copyright law, infringement of copyright and remedies, exceptions to infringement/ public rights.

(Lectures: 10)

Unit 3:

Patents

Introduction, Criteria for obtaining patents, Patentable subject matter, Non patentable inventions, Procedure for registration, Term of patent and Rights of patentee, Patent Cooperation Treaty & International registration, Basic concept of Compulsory license and Government use of patent, Infringement of patents and remedies, Software patents and importance for India, Utility model & patent, Trade secrets and know-how agreement, Traditional Knowledge and efforts of Indian Govt. for its protection.

(Lectures: 15)

Unit 4:

Trade Marks

Meaning of mark and Trademark, Categories of Trademark: Service Mark, Certification Mark, Collective Mark, Well known Mark and Non-conventional Mark, Criteria for registrability of trademark: Distinctiveness & non- deceptiveness, A good Trade Mark & its functions, Procedure for registration and Term of protection, Grounds for refusal of trademark registration, Assignment and licensing of marks (Character merchandising), Infringement and Passing Off, Salient Features of Indian Trade Mark Act, 1999.

(Lectures: 8)

Unit 5:

Designs, GI and Plant Varieties Protection

Designs: Meaning of design protection, Concept of original design, Registration & Term of protection, Copyright in Designs.

Geographical Indication: Meaning of GI, Difference between GI and Trade Marks, Registration of GI, Term & implications of registration, Concept of Authorized user, Homonymous GI

Plant Variety Protection and Farmer's Right: Meaning, Criteria of protection, Procedure for registration, effect of registration and term of Protection, Benefit Sharing and Farmer's rights

(Lectures: 12)

Unit 6:

Enforcement and Protection

Enforcement of Intellectual Property Rights: Counterfeiting and Piracy, Understanding Enforcement of IPR and Enforcing IPRs, Enforcement under TRIPS Agreement, Role of Customs and Police in IPR Protection

(Lectures: 7)

Practical:

No Practical as such. However, students may be asked to prepare a project on different topics of IPR and present them before the class.

References:

1. Pandey, N.; Dharmi, K. (2014), **Intellectual Property Rights**, PHI Learning Pvt. Ltd.
2. Acharya, N.K. (2001), **Text Book of Intellectual Property Rights**, Asia Law House.
3. Ganguli, P. (2001), **Intellectual Property Rights: unleashing the knowledge economy**. Tata McGraw Hill.

Additional Resources:

1. <https://www.wipo.int>
2. Ahuja, V.K. (2017), **Law Relating to Intellectual Property Rights**, Lexis Nexis.
3. Wadehra, B.L. (2000), **Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications**. Universal law Publishing Pvt. Ltd..
4. Journal of Intellectual Property Rights (JIPR); NISCAIR (CSIR).

Teaching Learning Process:

This course must be taught through lecture in class and by invited talks of experts. The students must visit the nearby intellectual property office or some law firm to have an idea of the way the work is being done there.

Assessment Methods:

The course is designed to be completed in 60 periods. The internal assessment shall be 25% (Class Test 10%, Assignment/project presentation 10% and attendance 5%) and the semester exam at the end of semester shall be 75%.

Keywords:

Intellectual Property, IP Laws, Patents, Copyright, Trademark, WIPO.

Course Code: CHEMISTRY –SEC-7

Course Title: Analytical Clinical Biochemistry

Total Credits: 04

(Credits: Theory-02, Practical-02)

(Total Lectures: Theory- 30, Practical-60)

Objectives:

The objective of this course is to deliver information about biochemically significant features of the proteins, enzymes, nucleic acids and lipids, using suitable examples. This includes classification, properties and biological importance of biomolecules. The course provides an overview of drug receptor interaction and Structure Activity Relation (SAR) studies. It will introduce the students to the concept of genetic code and concept of heredity. Key emphasis is placed on understanding the basic principles that govern the biological functions of biomolecules.

Learning Outcomes:

By the end of the course, the students will be able to:

- Understand and establish how the structure of biomolecules determines their reactivity and biological uses.
- Understand the basic principles of drug-receptor interaction and structure activity relation (SAR).
- Gain an insight into concept of heredity through biological processes like replication, transcription and translation.
- Demonstrate an understanding of the biochemistry of diseases.
- Understand the application of chemistry in biological systems.

Unit 1:

Metabolism

Biological importance of carbohydrates and proteins, Introduction to metabolism (catabolism, anabolism), ATP: the universal currency of cellular energy, outline of catabolic pathways of fats, proteins and carbohydrate-glycolysis, alcoholic and lactic acid fermentation, Krebs cycle.

(Lectures: 4)

Unit 2:

Enzymes

Nomenclature, classification, Characterisation, Mechanism of enzyme action, factors affecting enzyme action, Coenzymes and cofactors and their role in biological reactions, Specificity of enzyme action (Including stereospecificity), Enzyme inhibitors and their importance, Introduction to biocatalysis: Importance in —green chemistry and chemical industry. Drug action-receptor theory. Structure – activity relationships of drug molecules, binding role of –OH group, –NH₂ group, double bond and aromatic ring.

(Lectures: 8)

Unit 3:

Lipids

Classification. Biological importance of triglycerides and phosphoglycerides and cholesterol; Liposomes and their biological functions and underlying applications, Lipoproteins. Properties, functions and biochemical functions of steroid hormones and peptide hormones

(Lectures: 6)

Unit 4:

Nucleic Acids

Components of nucleic acids: adenine, guanine, thymine and cytosine (structure only), other components of nucleic acids, nucleosides and nucleotides (numbering), structure of DNA (Watson-Crick model) and RNA (types of RNA), genetic code, biological roles of DNA and RNA: replication, transcription and translation.

(Lectures: 6)

Unit 5:

Biochemistry of disease

A diagnostic approach by blood/ urine analysis, Blood: composition and functions of blood, blood coagulation. Blood collection and preservation of samples, Anaemia, Urine: Collection and preservation of samples. Formation of urine. Composition and estimation of constituents of normal and pathological urine. Regulation, estimation and interpretation of data for blood sugar, urea, creatinine, cholesterol and bilirubin.

(Lectures: 6)

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Lab: Analytical clinical biochemistry

1. Proteins-Qualitative tests
2. Lipids – qualitative Tests.
3. Determination of the iodine number of oil.
4. Determination of the saponification number of oil.
5. Determination of acid value of fats and oils.
6. Determination of cholesterol using Liebermann- Burchard reaction.
7. Estimation of DNA by diphenylamine reaction
8. Determination of amount of protein using Lowry's method.
9. Determination of enzyme activity

References:

Theory:

1. Devlin, T.M. (2010), **Textbook of Biochemistry with Clinical Correlation**, Wiley.
2. Berg, J. M.; Tymoczko, J. L.; Stryer, L. (2002), **Biochemistry**, W. H. Freeman.
3. Satyanarayana, U.; Chakrapani, U. (2017), **Fundamentals of Biochemistry**, Books and Allied (P) Ltd.
4. Lehninger, A.L; Nelson, D.L; Cox, M.M. (2009), **Principles of Biochemistry**, W. H. Freeman.
5. Finar, I. L. **Organic Chemistry** (Volume 1 & 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Practical:

1. Dean, J.R.; Jones, A.M.; Holmes, D.; Reed, R.; Jones, A.Weyers, J. (2011), **Practical skills in chemistry**, Prentice-Hall.
2. Wilson, K.; Walker, J. (2000), **Principles and techniques of practical biochemistry**, Cambridge University Press.
3. Gowenlock. A.H. (1988), **Varley's Practical Clinical Biochemistry**, CRC Press.

Teaching Learning Process:

- The teaching learning process will involve the traditional chalk and black board method.
- Certain topics like Mechanism of enzyme action, drug receptor theory, transcription and translation, SAR etc. where traditional chalk and talk method may not be able to convey the concept, are taught through audio-visual aids.
- Students are encouraged to participate actively in the classroom through regular presentations on curriculum based topics.
- As the best way to learn something is to do it yourself, practicals are planned in such a way so as to reinforce the topics covered in theory.

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Metabolism, Enzymes, Mechanism of enzyme action and Inhibition, Structure activity relation (SAR), Drug Receptor Theory, Biocatalysis, Lipids and their biological functions, Nucleic acids and concept of heredity, Biochemistry of diseases.

Course Code: CHEMISTRY –SEC-8

Course Title: Green Methods in Chemistry

Total Credits: 04

(Credits: Theory-02, Practicals-02)

(Total Lectures: Theory- 30, Practicals-60)

Objectives:

- To inspire the students about the chemistry which is good for human health and environment.
- To evaluate suitable technologies for the remediation of hazardous substances.
- To make students aware of how chemical processes can be designed, developed and run in a sustainable way.
- To acquire the knowledge of the twelve principles of green chemistry and how to apply in green synthesis.
- To make students aware about the benefits of using green chemistry.
- To have the idea of Biocatalytic Process—Conversion of Biomass into chemicals.

Learning Outcomes:

By the end of this course, students will be able to:

- Get idea of toxicology, environmental law, energy and the environment
- Think to design and develop materials and processes that reduce the use and generation of hazardous substances in industry.
- Think of chemical methods for recovering metals from used electronics materials.
- Get ideas of innovative approaches to environmental and societal challenges.
- Know how chemicals can have an adverse/potentially damaging effect on human and vegetation.
- Critically analyse the existing traditional chemical pathways and processes and creatively think about bringing environmentally benign reformations in these protocols.
- Convert biomass into valuable chemicals through green technologies.

Unit 1:

Introduction

- Definition of green chemistry and how it is different from conventional chemistry and environmental chemistry.
- Need of green chemistry
- Importance of green chemistry in- daily life, Industries and solving human health problems (four examples each).
- A brief study of Green Chemistry Challenge Awards (Introduction, award categories and study about five last recent awards).

(Lectures:8)

Unit 2:

Twelve Principles of Green Chemistry

The twelve principles of the Green Chemistry with their explanations

Special emphasis on the following:

- Prevention of waste / byproducts, pollution prevention hierarchy.
- Green metrics to assess greenness of a reaction: environmental impact factor, atom economy and calculation of atom economy.
- Green solvents-supercritical fluids, water as a solvent for organic reactions, ionic liquids, solvent less reactions, solvents obtained from renewable sources.
- Catalysis and green chemistry- comparison of heterogeneous and homogeneous catalysis, biocatalysis, asymmetric catalysis and photocatalysis.
- Green energy and sustainability.
- Real-time analysis for pollution prevention.
- Prevention of chemical accidents, designing greener processes, inherent safer design, principle of ISD "What you don't have cannot harm you", greener alternative to Bhopal Gas Tragedy (safer route to carcarbaryl) and Flixiborough accident (safer route to cyclohexanol) subdivision of ISD, minimization, simplification, substitution, moderation and limitation.

(Lectures:14)

Unit 3:

The following Real-world Cases in green chemistry should be discussed:

Surfactants for carbon dioxide – replacing smog producing and ozone depleting solvents with CO₂ for precision cleaning and dry cleaning of garments.

Designing of environmentally safe marine antifoulant.

Rightfit pigment: Synthetic azo pigments to replace toxic organic and inorganic pigments.

An efficient, green synthesis of a compostable and widely applicable plastic (polylactic acid) made from corn. (Lectures:8)

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Lab- Green methods in chemistry

Characterization by m. pt.; U.V.-Visible spectroscopy, IR spectroscopy, and any other specific method should be done (wherever applicable).

1. Preparation and characterization of nanoparticles of gold using tea leaves/ silver nanoparticles using plant extracts.
2. Preparation and characterization of biodiesel from vegetable oil preferably waste cooking oil.
3. Extraction of D-limonene from orange peel using liquid CO₂ prepared from dry ice.
4. Mechanochemical solvent free, solid-solid synthesis of azomethine using p-toluidine and o-vanillin (various other combinations of primary amine and aldehyde can also be tried).
5. Solvent free, microwave assisted one pot synthesis of phthalocyanine complex of copper(II).
6. Designing and conducting an experiment by utilizing the products and by-products obtained in above preparations which become waste otherwise if not used. This is done by critical thinking and literature survey.

Some representative examples:

7. Use of nanoparticles as catalyst for a reaction.
8. Use of azomethine for complex formation.
9. Conversion of byproduct of biodiesel to a useful product.

References:

Theory:

1. Anastas, P.T.; Warner, J.C.(1998), **Green Chemistry, Theory and Practice**, Oxford University Press.
2. Lancaster, M.(2016),**Green Chemistry An Introductory Text**.2nd Edition, RSC Publishing.
3. Cann , M. C.; Umile, T.P. (2008), **Real world cases in Green chemistry** Vol 11, American chemical Society,Washington.
4. Matlack, A.S.(2001),**Introduction to Green Chemistry**, Marcel Dekker.
5. Ryan, M.A.; Tinneland, M. (2002), **Introduction to Green Chemistry** (Ed), American Chemical Society, Washington DC.

Practical:

1. Kirchoff, M.; Ryan, M.A. (2002), **Greener approaches to undergraduate chemistry experiment**. American Chemical Society, Washington DC.
2. Sharma, R.K.; Sidhwani, I.T.; Chaudhari, M.K.(2013), **Green Chemistry Experiments: A monograph**, I.K. International Publishing House Pvt Ltd. New Delhi.
3. Pavia,D.L.; Lamponam, G.H.; Kriz, G.S.W. B.(2006),**Introduction to organic Laboratory Technique- A Microscale approach**,4th Edition, Brooks-Cole Laboratory Series for Organic chemistry.
4. Sharma R. K., Sharma, C., & Sidhwani, I.T. Solventless and one-pot synthesis of Cu(II) phthalocyanine complex: a green chemistry experiment. Journal of Chemical Education, 2010, 88(1), 86-88.
5. Sharma, R. K., Gulati, S., & Mehta, S. Preparation of gold nanoparticles using tea: a green chemistry experiment. Journal of Chemical Education, 2012, 89(10), 1316-1318.
6. Wealth from waste: A green method to produce biodiesel from waste cooking oil and generation of useful products from waste further generated "A social Awareness Project" Indu Tucker Sidhwani, Geeta Saini, Sushmita Chowdhury, Dimple Garg, Malovika, Nidhi Garg, Delhi University Journal of Undergraduate Research and Innovation, Vol 1, Issue 1, Feb 2015. ISSN: 2395-2334.

Teaching Learning Process:

- ICT enabled classes
- Power point presentations
- visit to pharmaceutical industry
- Through videos classes
- Interactive classes

Assessment Methods:

- Graded assignments
- Conventional class tests
- Class seminars by students on course topics with a view to strengthening the content through width and depth
- Quizzes
- End semester university examination.

Keywords:

Green Chemistry, Twelve principles, Sustainable chemistry, Green energy, Marine antifoulant, Non toxic pigments.

Course Code: CHEMISTRY –SEC-9

Course Title: Pharmaceutical Chemistry

Total Credits: 04

(Credits: Theory-02, Practical-02)

(Total Lectures: Theory- 30, Practical-60)

Objectives:

The objective of this paper is to develop basic understanding of drugs discovery, design, development and their side effects. The course will cover synthesis of major drug classes including-analgesics, antipyretics, anti- inflammatory agents, antibacterial and antifungal agents, antiviral agents, central nervous system agents and drugs for HIV--AIDS. An overview of fermentation process and production of certain dietary supplements and certain common antibiotics will be discussed.

Learning Outcomes:

By the end of this course, students will be able to:

- Gain insight into retro-synthesis approach in relation to drug design and drug discovery.
- Learn synthetic pathways of major drug classes.
- Understand the fermentation process and production of ethanol, citric acids, antibiotics and some classes of vitamins.

Unit 1:

Introduction

Drug discovery, design and development: Sources of drugs: biological, marine, minerals and plant tissue culture, physio-chemical aspects (optical, geometric and bioisosterism) of drug molecules and biological action, drug receptor interaction, basic retro-synthetic approach for development of drug. Cause of side effect of drugs like ibuprofen, cetirizine, thalidomide. Difference between drug and poison.

(Lectures: 7)

Unit 2:

Drugs and Pharmaceuticals

Study of pharmaceutical aids like talc, diatomite, kaolin, bentonite, gelatin and natural colours

Synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents, anti-inflammatory agents (Aspirin); antibacterial and antifungal agents (Sulphonamides; Sulphanethoxazole, Sulphacetamide, Trimethoprim); antiviral agents (Acyclovir), central nervous system agents (Phenobarbital, Diazepam), Cardiovascular (Glycerol trinitrate), antileprosy (Dapsone), HIV-AIDS related drugs (AZT- Zidovudine).

(Lectures:15)

Unit 3:

Fermentation

Aerobic and anaerobic fermentation. Production of (i) Ethyl alcohol and citric acid, (ii) Antibiotics; Penicillin, Cephalosporin, Chloramphenicol and Streptomycin, (iii) Lysine, Glutamic acid, Vitamin B2, Vitamin B12 and Vitamin C.

(Lectures: 8)

Practical:

(Credits: 2, Laboratory periods: 60)

Chemistry Lab: Pharmaceutical chemistry

1. Preparation of aspirin and its analysis.
2. Preparation of paracetamol and its analysis.
3. Preparation of sulphacetamide of sulphonamide and its analysis.
4. Determination of alcohol contents in liquid drugs/galenical.
5. Determination of ascorbic acid in vitamin C tablets by iodometric or coulometric titrations.
6. Synthesis of ibuprofen.
7. Analysis of commercial vitamin C tablets by iodometric and coulometric titrimetry.

References:

Theory:

1. Patrick, G. (2017), **Introduction to Medicinal Chemistry**, Oxford University Press.
2. Singh H.; Kapoor V.K. (1996), **Medicinal and Pharmaceutical Chemistry**, Vallabh Prakashan.
3. Foye, W.O.; Lemke, T. L.; Williams, D.A. (1995), **Principles of Medicinal Chemistry**, B.I. Waverly Pvt. Ltd.

Practical:

1. Kjonaas, R.A.; Williams, P.E.; Counce, D.A.; Crawley, L.R. **Synthesis of Ibuprofen**. J. Chem. Educ., 2011, 88 (6), pp 825–828 DOI: 10.1021/ed100892p.
2. Marsh, D.G.; Jacobs, D.L.; Veening, H. **Analysis of commercial vitamin C tablets by iodometric and coulometric titrimetry**. J. Chem. Educ., 1973, 50 (9), p 626. DOI: 10.1021/ed050p626

Teaching Learning Process:

The teaching learning process will involve the traditional chalk and black board method. Certain topics like retro-synthetic approach and fermentation processes are taught through audio-visual aids. Students are encouraged to participate actively in the classroom through regular presentations on curriculum based topics.

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Retro-synthesis, Drug discovery, Design and synthesis, Side effects, Fermentation.

Course Code: CHEMISTRY –SEC-10

Course Title: Chemistry of Cosmetics and Perfumes

Total Credits: 04

(Credits: Theory-02, Practical-02)

(Total Lectures: Theory- 30, Practical-60)

Objectives:

Cosmetic plays an important role in our everyday lives as they make an individual's appearance more attractive and boost one's self-esteem and confidence. Keeping in view the tremendous potential which the cosmetic industry has today around the globe, this course will be useful for introducing students of Chemistry honours to the world of cosmetic chemistry. This has been designed to impart the theoretical and practical knowledge on basic principles of cosmetic chemistry, manufacture, formulation of various cosmetic products.

Learning outcomes:

By the end of this course, the students will be able to:

- Learn basic of cosmetics, various cosmetic formulation, ingredients and their roles in cosmetic products.
- Learn the use of safe, economic and body-friendly cosmetics
- Prepare new innovative formulations.

Unit 1:

Cosmetics- Definition, History, Classification, Ingredients, Nomenclature, Regulations.

(Lectures: 4)

Unit 2:

Face Preparation: Structure of skin, Face powder, Compact powder, Talcum powder.

(Lectures: 6)

Unit 3:

Skin Preparation: Face cream, vanishing cream, cold cream, suntan cream, lather shaving cream

(Lectures: 5)

Unit 4:

Hair preparation: Structure of hair, classification of hair, Hair dye- classification – temporary, semi-permanent, demi permanent, permanent, formulation, hair sprays, shampoo- types of shampoo, conditioners

(Lectures: 6)

Unit 5:

Colored preparation: Nail preparation Structure of nail, Nail lacquers, Nail polish remover Lipsticks

(Lectures: 4)

Unit 6:

Personal hygiene products: Antiperspirants and deodorants, oral hygiene products, flavours and essential oils

(Lectures: 5)

Practical:

(Credits: 02, Laboratory periods: 60)

Preparation of:

1. Talcum powder.
2. Shampoo.

3. Enamels.
4. Face cream.
5. Nail polish and nail polish remover.
6. Hand wash
7. Hand sanitizer
8. Body lotion
9. Soap
10. Tooth powder
11. Tooth paste

References:

1. Barel, A.O.; Paye, M.; Maibach, H.I.(2014),**Handbook of Cosmetic Science and Technology**, CRC Press.
2. Garud, A.; Sharma, P.K.; Garud, N. (2012),**Text Book of Cosmetics**, Pragati Prakashan.
3. Gupta, P.K.; Gupta, S.K.(2011),**Pharmaceutics and Cosmetics**, Pragati Prakashan
4. Butler, H. (2000),**Poucher's Perfumes, Cosmetic and Soap**, Springer
5. Kumari, R.(2018),**Chemistry of Cosmetics**, Prestige Publisher.

Additional Resources:

1. Flick,E.W.(1990),**Cosmetic and toiletry formulations**, Noyes Publications / William Andrew Publishing.
2. Natural Ingredients for Cosmetics; EU Survey 2005
3. Formulation Guide for cosmetics; The Nisshin OilliO Group, Ltd.
4. Functional Ingredients & Formulated Products for Cosmetics & Pharmaceuticals; NOF Corporation

Teaching Learning Process:

- Conventional chalk and board teaching with power point presentation, you tube videos. and presentations from students on relevant topics.
- Theory coupled with preparation of cosmetic products in lab.

Assessment Methods:

Internal assessment through assignments and class test. End semester written and practical examination.

Keywords:

Cosmetic Products, Ingredients, Formulations, Raw materials, Lab. preparation, Ideal characteristics

Course Code: CHEMISTRY –SEC-11

Course Title: Pesticide Chemistry

Total Credits: 04

(Credits: Theory-02, Practical-02)

(Total Lectures: Theory- 30, Practical-60)

Objectives:

Pesticide plays an important role in controlling quantity as well quality of the economic crops by protecting them from the various pests. They are used for prevention of much spoilage of stored foods and also used for prevention of certain diseases, which conserves health and has saved the lives of millions of people and domestic animals. Keeping the importance of pesticides in mind this course is aimed to introduce synthesis and application of pesticides.

Learning Outcomes:

Students will be able to learn about the basic role of pesticide in everyday life, various ingredients and their role in controlling the pest. Students can also educate the farmers/gardeners to choose the appropriate pesticides for their crop production.

Unit 1:

Introduction: Classification, synthesis, structure activity relationship (SAR), mode of action, uses and adverse effects of representative pesticides in the following classes: Organochlorines (DDT, Gammaxene); Organophosphates (Malathion, Parathion); Carbamates (Carbofuran and Carbaryl); Quinones (Chloranil), Anilides (Alachlor and Butachlor).

(Lectures:12)

Unit 2:

Botanical insecticides [No structure elucidation or synthesis is required for the following compounds:] Alkaloids (Nicotine); Pyrethrum (natural and synthetic pyrethroids); Azadirachtin; Rotenone and Limonene.

(Lectures:8)

Unit 3:

Pesticide formulations: Wettable powders, Surfactants, Emulsifiable concentrates, Aerosols, Dust and Granules, Controlled Release Formulations.

(Lectures:6)

Unit 4:

New Tools in Biological Pest Control: Repellants, Chemosterilants, Antifeedants, Sex attractants.

(Lectures:4)

Practical:

(Credits: 2, Laboratory periods: 60)

1. To carryout market survey of potent pesticides with details as follows:
 - a) Name of pesticide b) Chemical name, class and structure of pesticide c) Type of formulation available and Manufacturer's name d) Useful information on label of packaging regarding: Toxicity, LD₅₀ ("Lethal Dose, 50%"), Side effects and Antidotes.
2. To carryout market survey of potent botanical pesticides with details as follows:
 - a) Botanical name and family; b) Chemical name (active ingredient) and structure of active ingredient; c) Type of formulation available and Manufacturer's name; d) Useful information on label of packaging regarding: Toxicity, LD₅₀ ("Lethal Dose, 50%"), Side effects and Antidotes.
3. Preparation of simple Organochlorine pesticides.
4. To calculate acidity/alkalinity in given sample of pesticide formulations as per BIS specifications.
5. To calculate active ingredient in given sample of pesticide formulations as per BIS specifications.
6. Preparation of Neem based botanical pesticides.

References:

1. Perry, A.S.; Yamamoto, I.; Ishaaya, I.; Perry, R.Y.(1998),**Insecticides in Agriculture and Environment**, Springer-Verlag Berlin Heidelberg.
2. Kuhr, R.J. ; Derough, H.W.(1976),**Carbamate Insecticides: Chemistry, Biochemistry and Toxicology**, CRC Press,USA.

Teaching Learning Process:

Conventional chalk and board teaching with power point presentation, you tube videos and presentations from students on relevant topics.

Assessment Methods:

Internal assessment through assignments and class test. End semester written and practical examination.

Keywords:

Structure Activity Relationship (SAR), Organochlorines, Organophosphates, Carbamates, Quinones, Anilides, Botanical, Alkaloids, Pyrethrum, Azadirachtin, Rotenone, Limonene, Pesticide formulations, Repellants, Chemosterilants, Antifeedants, Sex attractants, Controlled release pesticide formulation.

Course Code: CHEMISTRY –SEC-12

Course Title: Fuel Chemistry

Total Credits: 04

(Credits: Theory-02, Practical-02)

(Total Lectures: Theory- 30, Practical-60)

Objectives:

The course aims to provide students with a basic scientific and technical understanding of the production, behaviour and handling of hydrocarbon fuels and lubricants, including emerging alternative & renewable fuels. This will enable them to be industry ready to contribute effectively in the field of petroleum chemistry and technology.

Learning Outcomes:

- The course covers both conventional petroleum-based fuels, and alternative & renewable fuels, including gaseous fuels.
- The students will learn the chemistry that underpins petroleum fuel technology, will understand the refining processes used to produce fuels and lubricants and will know how differences in chemical composition affect properties of fuels and their usage in different applications.
- The course will also cover origin of petroleum, crude oil, composition, different refining processes employed industrially to obtain different fractions of petroleum. Further, course will cover various alternative and renewable fuels like Biofuels (Different generations), Gaseous Fuels (e.g. CNG, LNG, CBG, Hydrogen etc.).
- The course will also cover fuel product specifications, various test methods used to qualify different types of fuels as well characterization methods.
- Review of energy scenario (Global & India), Energy sources (renewable and non-renewable). Types of Crude Oils, Composition and Properties. Crude oil assay

Unit 1:

Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value. Determination of calorific value by Bomb calorimeter and Junker's calorimeter.

(Lectures:4)

Unit 2:

Coal: Analysis of coal, Proximate and ultimate Analysis, Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas and water gas composition and uses. Fractionation of coal tar, uses of coal tar based chemicals, requisites of a good metallurgical coke, Coal gasification (Hydrogasification and Catalytic gasification), Coal liquefaction and Solvent Refining.

(Lectures:7)

Unit 3:

Petroleum and Petrochemical Industry: Composition of crude petroleum, Refining and different types of petroleum products and their applications.

(Lectures:4)

Unit 4:

Fractional Distillation (Principle and process), Cracking (Thermal and catalytic cracking),

Reforming Petroleum and non-petroleum fuels (LPG, CNG, LNG, bio-gas, fuels derived from biomass), fuel from waste, synthetic fuels (gaseous and liquids), clean fuels.

(Lectures:6)

Unit 5:

Petrochemicals: Vinyl acetate, Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives Xylene.

(Lectures:4)

Unit 6:

Lubricants: Classification of lubricants, lubricating oils (conducting and non-conducting) Solid and semi-solid lubricants, synthetic lubricants.

Properties of lubricants (viscosity index, cloud point, pour point and aniline Point) and their determination.

(Lectures:5)

Practical:

(Credits: 2, Laboratory periods: 60)

1. Test Methods for Petroleum products
2. To prepare biodiesel from vegetable oil
3. Calorific value of a fuel
4. Characterization of different petroleum products using UV and IR
5. To determine pour point and cloud point of fuel
6. To determine the viscosity of biodiesel at various temperature using biodiesel.
7. To determine free fatty acid content in given sample.
8. To determine the density of the given fuel sample.

Reference:

Stocchi, E.(1990),**Industrial Chemistry**, Vol -I, Ellis Horwood Ltd. UK.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Lectures by Industry Experts
- Visit to Industry

Assessment Methods:

- Written exams-both objective and subjective questions.
- Dissertation work on a given topic - Preparation of literature report followed by presentation.
- Internal Assessment.
- End semester university examination for theory and practical.

Keywords:

Energy; Fuels; Petroleum; Biofuels; Synthetic Lubricants

GENERIC ELECTIVE (GE) for other Departments/Disciplines

Course Code: CHEMISTRY –GE-1

Course Title: Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The course reviews the structure of the atom, which is a necessary pre-requisite in understanding the nature of chemical bonding in compounds. It provides basic knowledge about ionic, covalent and metallic bonding and explains that chemical bonding is best regarded as a continuum between the three cases. It discusses the Periodicity in properties with reference to the *s* and *p* block, which is necessary in understanding their group chemistry. The course is also infused with the recapitulation of fundamentals of organic chemistry and the introduction of a new concept of visualizing the organic molecules in a three-dimensional space. To establish the applications of these concepts, the classes of alkanes, alkenes, alkynes and aromatic hydrocarbons are introduced. The constitution of the course strongly aids in the paramount learning of the concepts and their applications.

Learning Outcomes:

By the end of the course, the students will be able to:

- Solve the conceptual questions using the knowledge gained by studying the quantum mechanical model of the atom, quantum numbers, electronic configuration, radial and angular distribution curves, shapes of *s*, *p*, and *d* orbitals, and periodicity in atomic radii, ionic radii, ionization energy and electron affinity of elements.
- Draw the plausible structures and geometries of molecules using radius ratio rules, VSEPR theory and MO diagrams (homo- & hetero-nuclear diatomic molecules).
- Understand and explain the differential behavior of organic compounds based on fundamental concepts learnt.
- Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved.
- Learn and identify many organic reaction mechanisms including free radical substitution, electrophilic addition and electrophilic aromatic substitution.

Section A: Inorganic Chemistry (Lectures:30)

Unit 1:

Atomic Structure

Review of: Bohr's theory and its limitations, Heisenberg uncertainty principle, Dual behaviour of matter and radiation, De-Broglie's relation, Hydrogen atom spectra, need of a new approach to atomic structure.

What is Quantum mechanics? Time independent Schrodinger equation and meaning of various terms in it. Significance of ψ and ψ^2 , Schrödinger equation for hydrogen atom, radial and angular parts of the hydrogenic wave functions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation), radial and angular nodes and their significance, radial distribution functions and the concept of the most probable distance with special reference to 1s and 2s atomic orbitals. Significance of quantum numbers, orbital angular momentum and quantum numbers m_l and m_s . Shapes of s, p and d atomic orbitals, nodal planes, discovery of spin, spin quantum number (s) and magnetic spin quantum number (m_s).

Rules for filling electrons in various orbitals, electronic configurations of the atoms, stability of half-filled and completely filled orbitals, concept of exchange energy, relative energies of atomic orbitals, anomalous electronic configurations.

(Lectures: 14)

Unit 2:

Chemical Bonding and Molecular Structure

Ionic Bonding: General characteristics of ionic bonding, energy considerations in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds, statement of Born-Landé equation for calculation of lattice energy (no derivation), Born-Haber cycle and its applications, covalent character in ionic compounds, polarizing power and polarizability, Fajan's rules. Ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character.

Covalent bonding: VB Approach: Shapes of some inorganic molecules and ions on the basis of VSEPR (H_2O , NH_3 , PCl_5 , SF_6 , ClF_3 , SF_4) and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements.

Concept of resonance and resonating structures in various inorganic and organic compounds.

MO Approach: Rules for the LCAO method, bonding and antibonding MOs and their characteristics for s-s, s-p and p-p combinations of atomic orbitals, nonbonding combination of orbitals, MO treatment of homonuclear diatomic molecules of 1st and 2nd periods (including idea of s-p mixing) and heteronuclear diatomic molecules such as CO, NO and NO^+ .

(Lectures: 16)

Section B: Organic Chemistry (Lectures:30)

Unit 3:

Fundamentals of Organic Chemistry

Electronic displacements: Inductive effect, electromeric effect, resonance, hyperconjugation. Cleavage of bonds: homolysis and heterolysis. Reaction intermediates: carbocations, carbanions and free radicals. Electrophiles and nucleophiles, Aromaticity: benzenoids and Hückel's rule.

(Lectures: 08)

Unit 4:

Stereochemistry

Conformations with respect to ethane, butane and cyclohexane, interconversion of Wedge Formula, Newmann, Sawhorse and Fischer representations, concept of chirality (upto two carbon atoms). configuration: geometrical and optical isomerism; enantiomerism, diastereomerism and meso compounds). Threo and erythro; D and L; *cis* - *trans* nomenclature; CIP Rules: R/ S (for upto 2 chiral carbon atoms) and E / Z nomenclature (for upto two C=C systems).

(Lectures: 10)

Unit 5:

Aliphatic Hydrocarbons

Functional group approach for the following reactions: preparations, physical property & chemical reactions to be studied with mechanism in context to their structure.

Alkanes:

Preparation: catalytic hydrogenation, Wurtz reaction, Kolbe's synthesis, Grignard reagent.

Reactions: Free radical substitution: Halogenation.

Alkenes:

Preparation: Elimination reactions: Dehydration of alcohols and dehydrohalogenation of alkyl halides (Saytzeff's rule); *cis* alkenes (Partial catalytic hydrogenation) and *trans* alkenes (Birch reduction).

Reactions: *cis*-addition (alk. KMnO_4) and *trans*-addition (bromine), addition of HX (Markownikoff's and anti-Markownikoff's addition), Hydration, Ozonolysis, oxymercuration-demercuration, Hydroboration-oxidation.

Alkynes:

Preparation: Acetylene from CaC_2 and conversion into higher alkynes; by dehalogenation of tetrahalides and dehydrohalogenation of vicinal-dihalides.

Reactions: formation of metal acetylides and acidity of alkynes, addition of bromine and alkaline KMnO_4 , ozonolysis and oxidation with hot alk. KMnO_4 . Hydration to form carbonyl compounds

(Lectures: 12)

Practical:

(Credits: 2, Laboratory periods: 60)

Section A: Inorganic Chemistry - Volumetric Analysis

1. Estimation of oxalic acid by titrating it with KMnO_4 .
2. Estimation of Mohr's salt by titrating it with KMnO_4 .

3. Estimation of water of crystallization in Mohr's salt by titrating with KMnO_4 .
4. Estimation of Fe (II) ions by titrating it with $\text{K}_2\text{Cr}_2\text{O}_7$ using internal indicator.
5. Estimation of Cu (II) ions iodometrically using $\text{Na}_2\text{S}_2\text{O}_3$.

Section B: Organic Chemistry

1. Purification of organic compound by crystallisation (from water and alcohol) and distillation.
2. Criteria of purity: Determination of M.P./B.P.
3. Separation of mixtures by chromatography: Measure the R_f value in each case (combination of two compounds to be given)
 - a) Identify and separate the components of a given mixture of 2 amino acids (glycine, aspartic acid, glutamic acid, tyrosine or any other amino acid) by radial/ascending paper chromatography.
 - b) Identify and separate the sugars present in the given mixture by radial/ascending paper chromatography.

References:

Theory:

1. Lee., J. D.(2010), **A new Concise Inorganic Chemistry**, Pearson Education.
2. Huheey, J.E.; Keiter, E.; Keiter, R. (2009), **Inorganic Chemistry: Principles of Structure and Reactivity**, Pearson Publication.
3. Atkins, P.W.; Overton, T.L.; Rourke, J.P.; Weller, M.T.; Armstrong, F.A.(2010), **Shriver and Atkin's Inorganic Chemistry**, Oxford
4. Sykes, P.(2005), **A Guide Book to Mechanism in Organic Chemistry**, Orient Longman.
5. Eliel, E. L. (2000), **Stereochemistry of Carbon Compounds**, Tata McGraw Hill.
6. Morrison, R. N.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
7. Bahl, A; Bahl, B. S. (2012), **Advanced Organic Chemistry**, S. Chand.

Practical:

1. Jeffery, G.H.; Bassett, J.; Mendham, J.; Denney, R.C.(1989), **Vogel's Textbook of Quantitative Chemical Analysis**, 5th Edn., John Wiley and Sons Inc.,
2. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. (2012), **Vogel's Textbook of Practical Organic Chemistry**, Pearson.
3. Mann, F.G.; Saunders, B.C.(2009), **Practical Organic Chemistry**, Pearson Education.

Teaching Learning Process:

- Lectures in class rooms
- Peer assisted learning.
- Hands-on learning using 3-D models, videos, presentations, seminars
- Technology driven learning.
- Industry visits

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords

Atomic structures, Quantum numbers, Lattice energy, Electronic effects, Stereochemistry, Chemistry of aliphatic hydrocarbons.

Course Code: CHEMISTRY –GE-2

Course Title: Chemical Energetics, Equilibria and Functional Group Organic Chemistry-I

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The objective of this paper is to develop basic understanding of the chemical energetics, laws of thermodynamics, chemical and ionic equilibrium. It provides basic understanding of the behaviour of electrolytes and their solutions. It acquaints the students with the functional group approach to study organic chemistry. To establish applications of this concept structure, methods of preparation and reactions for the following classes of compounds: Aromatic hydrocarbons, alkyl and aryl halides, alcohols, phenols and ethers, aldehydes and ketones are described. This course helps the students to relate the structure of an organic compound to its physical and chemical properties.

Learning Outcomes:

By the end of this course, students will be able to:

- Understand the laws of thermodynamics, thermochemistry and equilibria.
- Understand concept of pH and its effect on the various physical and chemical properties of the compounds.
- Use the concepts learnt to predict feasibility of chemical reactions and to study the behaviour of reactions in equilibrium.
- Understand the fundamentals of functional group chemistry through the study of methods of preparation, properties and chemical reactions with underlying mechanism.
- Use concepts learnt to understand stereochemistry of a reaction and predict the reaction outcome
- Design newer synthetic routes for various organic compounds.

Section A: Physical Chemistry (Lectures:30)

Unit 1:

Chemical Energetics

Review of thermodynamics and the laws of thermodynamics, important principles and definitions of thermochemistry, concept of standard state and standard enthalpies of formations, integral and differential enthalpies of solution and dilution, calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, variation of enthalpy of a reaction with temperature – Kirchhoff's equation., statement of third law of thermodynamics and calculation of absolute entropies of substances.

(Lectures: 8)

Unit 2:

Chemical Equilibrium

Free energy change in a chemical reaction, Thermodynamic derivation of the law of chemical equilibrium, distinction between G and G° , Le Chatelier's principle, relationships between K_p , K_c and K_x for reactions involving ideal gases.

(Lectures: 8)

Unit 3:

Ionic Equilibria

Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, Ostwald's dilution law, ionization constant and ionic product of water, ionization of weak acids and bases, pH scale, common ion effect, salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions, Henderson-Hasselbach equation. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle

(Lectures: 14)

Section B: Organic Chemistry (Lectures: 30)

Unit 4:

Aromatic Hydrocarbons

Structure and aromatic character of benzene.

Preparation: methods of preparation of benzene from phenol, benzoic acid, acetylene and benzene sulphonic acid.

Reactions: electrophilic substitution reactions in benzene citing examples of nitration, halogenation, sulphonation and Friedel-Craft's alkylation and acylation with emphasis on carbocationic rearrangement, side chain oxidation of alkyl benzenes.

(Lectures: 5)

Unit 5:

Alkyl and Aryl Halides

A) Alkyl halides (upto 5 carbons):

Structure of haloalkanes and their classification as 1°, 2° & 3°.

Preparation: starting from alcohols (1°, 2° & 3°) and alkenes with mechanisms.

Reactions: Nucleophilic substitution reactions with mechanism and their types (S_N1 , S_N2 and S_Ni), competition with elimination reactions (elimination vs substitution), nucleophilic substitution reactions with specific examples from: hydrolysis, nitrite & nitro formation, nitrile & isonitrile formation and Williamson's ether synthesis.

B) Haloarenes:

Structure and resonance

Preparation: Methods of preparation of chloro, bromo & iodobenzene from benzene (electrophilic substitution), from phenols (nucleophilic substitution reaction) and from aniline (Sandmeyer and Gattermann reactions).

Reaction: Nucleophilic aromatic substitution by OH group (Bimolecular Displacement Mechanism), Effect of nitro substituent on reactivity of haloarenes, Reaction with strong bases $NaNH_2/NH_3$ (elimination-addition mechanism involving benzyne intermediate), relative reactivity and strength of C-X bond in alkyl, allyl, benzyl, vinyl and aryl halides.

(Lectures:11)

Unit 6:

Alcohols, Phenols, Ethers, Aldehydes and Ketones (Aliphatic and Aromatic)

A) Alcohols (upto 5 Carbon):

Structure and classification of alcohols as 1°, 2° & 3°.

Preparation: Methods of preparation of 1°, 2° & 3° by using Grignard reagent, ester hydrolysis and reduction of aldehydes, ketones, carboxylic acids and esters.

Reactions: Acidic character of alcohols and reaction with sodium, with HX (Lucas Test), esterification, oxidation (with PCC, alkaline $KMnO_4$, acidic $K_2Cr_2O_7$ and conc. HNO_3), Oppeneauer Oxidation.

B) Diols (upto 6 Carbons): Oxidation and Pinacol-Pinacolone rearrangement.

C) Phenols: acidity of phenols and factors affecting their acidity.

Preparation: Methods of preparation from cumene, diazonium salts and benzene sulphonic acid.

Reactions: Directive influence of OH group and Electrophilic substitution reactions, viz. nitration, halogenation, sulphonation, Reimer-Tiemann reaction, Gattermann-Koch reaction, Houben-Hoesch condensation, reaction due to OH group: Schotten-Baumann reaction

D) Ethers (Aliphatic & Aromatic):

Williamson's ether synthesis, Cleavage of ethers with HI

E) Aldehydes and ketones (Aliphatic and Aromatic):

Preparation: from acid chlorides and from nitriles.

Reactions: Nucleophilic addition, nucleophilic addition – elimination reaction including reaction with HCN, ROH, NaHSO₃, NH₂-G derivatives. Iodoform test, Aldol Condensation, Cannizzaro's reaction, Wittig reaction, Benzoin condensation. Clemmensen reduction, Wolff Kishner reduction, Meerwein-Ponndorf Verley reduction.

(Lectures:14)

Practical:

(Credits: 2, Laboratory periods: 60)

Section A: Physical Chemistry

Energetics:

1. Determination of heat capacity of calorimeter.
2. Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
3. Determination of integral enthalpy of solution of salts (KNO₃, NH₄Cl).
4. Determination of enthalpy of hydration of copper sulphate.

Ionic equilibria:

1. Preparation of buffer solutions: (i) Sodium acetate-acetic acid or (ii) Ammonium chloride-ammonium acetate. Measurement of the pH of buffer solutions and comparison of the values with theoretical values.

Section B: Organic Chemistry

Preparations: (Mechanism of various reactions involved to be discussed)

(Recrystallization, determination of melting point and calculation of quantitative yields to be done in all cases)

1. Bromination of phenol/aniline
2. Benzoylation of amines/phenols
3. Oxime of aldehydes and ketones
4. 2,4-dinitrophenylhydrazone of aldehydes and ketones

5. Semicarbazone of aldehydes and ketones

References:

Theory:

1. Castellan, G. W. (2004), **Physical Chemistry**, Narosa.
2. Kapoor, K.L. (2015), **A Textbook of Physical Chemistry**, Vol 1, 6th Edition, McGraw Hill Education.
3. Kapoor, K.L.(2015), **A Textbook of Physical Chemistry**, Vol 2, 6th Edition, McGraw Hill Education.
4. B.R.Puri, L.R.Sharma, M.S.Pathania, (2017), **Principles of Physical Chemistry**, Vishal Publishing Co.
5. Finar, I. L. **Organic Chemistry** (Volume 1 & 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
6. Morrison, R. N.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
7. Bahl, A; Bahl, B. S. (2012), **Advanced Organic Chemistry**, S. Chand.

Practical:

1. Khosla, B.D.; Garg, V.C.; Gulati, A.(2015), **Senior Practical Physical Chemistry**, R. Chand & Co.
2. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. (2012), **Vogel's Textbook of Practical Organic Chemistry**, Pearson.
3. Mann, F.G.; Saunders, B.C. (2009), **Practical Organic Chemistry**, Pearson Education.

Additional Resources:

1. Mahan, B. H.(2013), **University Chemistry**, Narosa.
2. Barrow, G.M. (2006). **Physical Chemistry**, 5th Edition, McGraw Hill.

Teaching Learning Process:

- The teaching learning process will involve the blended learning technique along with traditional chalk and black board method wherever required.
- Certain topics like stereochemistry of nucleophilic substitution, elimination reactions and their underlying stereochemistry, where traditional chalk and talk method may not be able to convey the concept, are especially taught through audio-visual aids.
- Students are encouraged to participate actively in the classroom through regular presentations on curriculum based topics.

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Chemical energetics, Feasibility of reaction, Hydrocarbons, Haloalkanes and haloarenes, Alcohols, Phenols and Ethers, Aldehydes and Ketones.

Course Code: CHEMISTRY –GE-3

Course Title: Solutions, Phase Equilibrium, Conductance, Electrochemistry and Functional Group Organic Chemistry-II

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The students will learn about ideal and non-ideal solutions, Raoult's law, partially miscible and immiscible solutions and their applications. The student will also learn about equilibrium between phases with emphasis on one component and simple eutectic systems. In electrochemical cells the students will learn about electrolytic and galvanic cells, measurement of conductance and its applications, measurement of emf and its applications. The topics of carbohydrates, amino acids, peptides and proteins are introduced through some specific examples. A relationship between structure, reactivity and biological properties of biomolecules is established through the study of these representative biomolecules.

Learning Outcomes:

By the end of the course, the students will be able to:

- Explain the concepts of different types of binary solutions-miscible, partially miscible and immiscible along with their applications.
- Explain the thermodynamic aspects of equilibria between phases and draw phase diagrams of simple one component and two component systems.
- Explain the factors that effect conductance, migration of ions and application of conductance measurement.
- Understand different types of galvanic cells, their Nernst equations, measurement of emf, calculations of thermodynamic properties and other parameters from the emf measurements.
- Understand and demonstrate how the structure of biomolecules determines their chemical properties, reactivity and biological uses.
- Design newer synthetic routes for various organic compounds.

Section A: Physical Chemistry (Lectures:30)

Unit 1:

Solutions

Thermodynamics of ideal solutions: Ideal solutions and Raoult's law, deviations from Raoult's law- non-ideal solutions. Vapour pressure, composition and temperature-composition curves of ideal and non-ideal solutions. Distillation of solutions, Lever rule, Azeotropes. Partial miscibility of liquids: Critical solution temperature; effect of impurity on partial miscibility of liquids. Immiscibility of liquids: principle of steam distillation, Nernst distribution law and its applications, solvent extraction.

(Lectures: 6)

Unit 2:

Phase Equilibrium

Phases, components and degrees of freedom of a system, criteria of phase equilibrium, Gibbs phase rule and its thermodynamic derivation, derivation of Clausius- Clapeyron equation and its importance in phase equilibria, phase diagrams of one component systems (water and sulphur) and two component systems involving eutectics, congruent and incongruent melting points (lead-silver, $\text{FeCl}_3\text{-H}_2\text{O}$ and Na-K only).

(Lectures: 6)

Unit 3:

Conductance

Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes, Kohlrausch Law of independent migration of ions, transference number and its experimental determination using Hittorf and moving boundary methods, Ionic mobility, applications of conductance measurements: determination of degree of ionization of weak electrolytes, solubility and solubility products of sparingly soluble salts, ionic product of water, hydrolysis constant of a salt. Conductometric titrations (only acid-base).

(Lectures: 8)

Unit 4:

Electrochemistry

Reversible and irreversible cells, concept of EMF of a cell, measurement of EMF of a cell, Nernst equation and its importance, types of electrodes, standard electrode potential, electrochemical series. thermodynamics of a reversible cell, calculation of thermodynamic properties: G, H and S from EMF data. Calculation of equilibrium constant from EMF data, concentration cells with transference and without transference, liquid junction potential and salt bridge, pH determination using hydrogen electrode and quinhydrone electrode, Potentiometric titrations-qualitative treatment (acid-base and oxidation-reduction only).

(Lectures: 10)

Section B: Organic Chemistry (Lectures:30)

Unit 5:

Functional group approach for the following reactions: Preparations, physical & chemical properties to be studied in context to their structure with mechanism.

A) Carboxylic acids and their derivatives (aliphatic and aromatic)

Preparation: Acidic and alkaline hydrolysis of esters.

Reactions: Hell-Volhard Zelinsky reaction, acidity of carboxylic acids, effect of substitution on acid strength.

Carboxylic acid derivatives (aliphatic):

Preparation: Acid chlorides, anhydrides, esters and amides from acids and their interconversion, Claisen condensation.

Reactions: Relative reactivities of acid derivatives towards nucleophiles, Reformatsky reaction, Perkin condensation.

B) Amines (aliphatic & aromatic) and Diazonium Salts

Amines

Preparation: from alkyl halides, Gabriel's Phthalimide synthesis, Hofmann Bromamide reaction.

Reactions: Hofmann vs Saytzeff elimination, carbylamine test, Hinsberg test, reaction with HNO_2 , Schotten-Baumann reaction. Electrophilic substitution (case aniline): nitration, bromination, sulphonation, basicity of amines.

Diazonium salt

Preparation: from aromatic amines

Reactions: conversion to benzene, phenol and dyes.

(Lectures: 13)

Unit 6:

Amino Acids, Peptides and Proteins

Zwitterion, isoelectric point and electrophoresis

Preparation of amino acids: Strecker synthesis and using Gabriel's phthalimide synthesis.

Reactions of amino acids: ester of $-\text{COOH}$ group, acetylation of $-\text{NH}_2$ group, complexation with Cu^{2+} ions, ninhydrin test.

Overview of Primary, Secondary, Tertiary and Quaternary Structure of proteins.

Determination of primary structure of peptides by degradation Edmann degradation (N- terminal) and C-terminal (thiohydantoin and with carboxypeptidase enzyme). Synthesis of simple peptides (upto dipeptides) by N-protection (t-butyloxycarbonyl and phthaloyl) & C- activating groups and Merrifield solid-phase synthesis.

(Lectures: 9)

B) Carbohydrates

Classification, and general properties, glucose and fructose (open chain and cyclic structure), determination of configuration of monosaccharides, absolute configuration of glucose and fructose,

mutarotation, ascending and descending in monosaccharides. Structure of disaccharides (sucrose, cellobiose, maltose, lactose) and polysaccharides (starch and cellulose) excluding their structure elucidation.

(Lectures:8)

Practical:

(Credits: 2, Laboratory periods: 60)

Section A: Physical Chemistry

Phase Equilibria

1. Construction of the phase diagram of a binary system (simple eutectic) using cooling curves.
2. Determination of critical solution temperature and composition of phenol water system and study the effect of impurities on it.

Conductance

1. Determination of cell constant.
2. Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid.
3. Perform the following conductometric titrations:
 - a) Strong acid vs strong base
 - b) Weak acid vs strong base.

Potentiometry

Perform the potentiometric titrations of (i) Strong acid vs strong base and (ii) Weak acid vs strong base.

Section B: Organic Chemistry

Systematic qualitative analysis of organic compounds possessing monofunctional groups (Alcohols, Phenols, Carbonyl, -COOH). (Including Derivative Preparation).

References:

Theory:

1. Castellan, G.W. (2004), **Physical Chemistry**, Narosa.
2. Kapoor, K.L. (2015), **A Textbook of Physical Chemistry**, Vol 1, 6th Edition, McGraw Hill Education.
3. Kapoor, K.L. (2013), **A Textbook of Physical Chemistry**, Vol 3, 3rd Edition, McGraw Hill Education.
4. B.R.Puri, L.R.Sharma, M.S.Pathania, (2017), **Principles of Physical Chemistry**, Vishal

Publishing Co.

5. Morrison, R. N.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
6. Finar, I. L. **Organic Chemistry** (Volume 1 & 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Practical:

1. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), **Senior Practical Physical Chemistry**, R. Chand & Co.
2. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. (2012), **Vogel's Textbook of Practical Organic Chemistry**, Pearson.
3. Mann, F.G.; Saunders, B.C. (2009), **Practical Organic Chemistry**, Pearson Education.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

Raoult's law, Lever rule, azeotropes, critical solution temperature, transference number, EMF, Carboxylic acids and derivatives, Amines and diazonium salts, Polynuclear and heterocyclic compounds.

Course Code: CHEMISTRY –GE-4

Course Title: Chemistry of s- and p-Block Elements, States of Matter and Chemical Kinetics

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The objective of this paper is to provide basic understanding of the fundamental principles of metallurgy through study of the methods of extraction of metals, recovery of the by-products during extraction, applications of metals, alloy behaviour and their manufacturing processes. The course illustrates the diversity and fascination of inorganic chemistry through the study of properties and utilities of s- and p-block elements and their compounds. The students will learn about the properties of ideal and real gases

and deviation from ideal behaviour, properties of liquid, types of solids with details about crystal structure. The student will also learn about the reaction rate, order, activation energy and theories of reaction rates.

Learning Outcomes:

By the end of the course, the students will be able to:

- Understand the chemistry and applications of s- and p-block elements.
- Derive ideal gas law from kinetic theory of gases and explain why the real gases deviate from ideal behaviour.
- Explain Maxwell-Boltzmann distribution, critical constants and viscosity of gases.
- Explain the properties of liquids especially surface tension and viscosity.
- Explain symmetry elements, crystal structure specially NaCl, KCl and CsCl
- Define rate of reactions and the factors that affect the rates of reaction.
- Understand the concept of rate laws e.g., order, molecularity, half-life and their determination
- Learn about various theories of reaction rates and how these account for experimental observations.

Section A: Inorganic Chemistry (Lectures:30)

Unit 1:

General Principles of Metallurgy

Chief modes of occurrence of metals based on standard electrode potentials. Ellingham diagrams for reduction of metal oxides using carbon as reducing agent.

Hydrometallurgy with reference to cyanide process for silver and gold, Methods of purification of metals (Al, Pb, Ti, Fe, Cu, Ni, Zn): electrolytic, oxidative refining, Van Arkel-De Boer process, Mond's process and Zone Refining.

(Lectures: 4)

Unit 2:

s- and p- block elements

Periodicity in s- and p-block elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy, electronegativity (Pauling, Mulliken, and Allred-Rochow scales). Allotropy in C, S, and P. Oxidation states with reference to elements in unusual and rare oxidation states like carbides and nitrides), inert pair effect, diagonal relationship and anomalous behaviour of first member of each group. ,compounds of s- and p-block elements , diborane and concept of multicentre bonding. Structure, bonding and their important properties like oxidation/reduction, acidic/basic nature of the following compounds and their applications in industrial and environmental chemistry. Hydrides of nitrogen (NH₃, N₂H₄, N₃H, NH₂OH) Oxoacids of P, S and Cl, Halides and oxohalides: PCl₃, PCl₅, SOCl₂ and SO₂Cl₂.

(Lectures: 26)

Section B: Physical Chemistry (Lectures:30)

Unit 3:

Kinetic Theory of Gases

Postulates of kinetic theory of gases and derivation of the kinetic gas equation, deviation of real gases from ideal behaviour, compressibility factor, causes of deviation, van der Waals equation of state for real gases. Boyle temperature (derivation not required), critical phenomena, critical constants and their calculation from van der Waals equation, Andrews isotherms of CO_2 , Maxwell Boltzmann distribution laws of molecular velocities and molecular energies (graphic representation – derivation not required) and their importance. Temperature dependence of these distributions, most probable, average and root mean square velocities (no derivation), collision cross section, collision number, collision frequency, collision diameter and mean free path of molecules, viscosity of gases and effect of temperature and pressure on coefficient of viscosity (qualitative treatment only).

(Lectures: 10)

Unit 4:

Liquids

Surface tension and its determination using stalagmometer, Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer, effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only).

(Lectures: 3)

Unit 5:

Solids

Forms of solids, symmetry elements, unit cells, crystal systems, Bravais lattice types and identification of lattice planes. Laws of crystallography - law of constancy of interfacial angles.

Law of rational indices, Miller indices. X-ray diffraction by crystals, Bragg's law, structures of NaCl, KCl and CsCl (qualitative treatment only), defects in crystals. Glasses and liquid crystals.

(Lectures: 6)

Unit 6:

Chemical Kinetics

The concept of reaction rates, effect of temperature, pressure, catalyst and other factors on reaction rates. Order and molecularity of a reaction, derivation of integrated rate equations for zero, first and second order reactions (both for equal and unequal concentrations of reactants), half-life of a reaction, general methods for determination of order of a reaction, Concept of activation energy and its calculation from Arrhenius equation.

Theories of reaction rates: Collision theory and activated complex theory of bi-molecular reactions. Comparison of the two theories (qualitative treatment only)

Practical:

(Credits: 2, Laboratory periods: 60)

Section A: Inorganic Chemistry

Semi-micro qualitative analysis of mixtures using H_2S or any other scheme- not more than four ionic species (two anions and two cations and excluding insoluble salts) out of the following:

Cations: NH_4^+ , Pb^{2+} , Bi^{3+} , Cu^{2+} , Cd^{2+} , Fe^{3+} , Al^{3+} , Co^{2+} , Ni^{2+} , Mn^{2+} , Zn^{2+} , Ba^{2+} , Sr^{2+} , Ca^{2+} , K^+

Anions: CO_3^{2-} , S^{2-} , SO_3^{2-} , NO_2^- , CH_3COO^- , Cl^- , Br^- , I^- , NO_3^- , SO_4^{2-} , PO_4^{3-} , BO_3^{3-} , $\text{C}_2\text{O}_4^{2-}$, F^- .

(Spot tests should be carried out wherever feasible)

Section B: Physical Chemistry

1. Surface tension measurement (use of organic solvents excluded):

Determination of the surface tension of a liquid or a dilute solution using a stalagmometer.

2. Viscosity measurement (use of organic solvents excluded):

- a) Determination of the relative and absolute viscosity of a liquid or dilute solution using an Ostwald viscometer.
- b) Study of the variation of viscosity of an aqueous solution with concentration of solute.

3. Chemical Kinetics

Study the kinetics of the following reactions by integrated rate method:

- a) Acid hydrolysis of methyl acetate with hydrochloric acid.
- b) Compare the strength of HCl and H_2SO_4 by studying the kinetics of hydrolysis methyl acetate.

References:

Theory:

1. Lee., J. D.(2010),**A new Concise Inorganic Chemistry**, Pearson Education.
2. Atkins, P.W.; Overton, T.L.; Rourke, J.P.; Weller, M.T.; Armstrong, F.A. (2010),**Shriver and Atkin's Inorganic Chemistry**, Oxford.
3. Miessler, G. L.; Tarr, D.A.(2014), **Inorganic Chemistry**, Pearson.
4. Castellan, G. W.(2004),**Physical Chemistry**, Narosa.
5. Kapoor, K.L. (2015),**A Textbook of Physical Chemistry**, Vol.1, 6th Edition, McGraw Hill Education.
6. Kapoor, K.L. (2015),**A Textbook of Physical Chemistry**, Vol.5, 3rd Edition, McGraw Hill Education.
7. B.R.Puri, L.R.Sharma, M.S.Pathania, (2017),**Principles of Physical Chemistry**, Vishal Publishing Co.

Practical:

1. Svehla, G. (1996), **Vogel's Qualitative Inorganic Analysis**, Prentice Hall.
2. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), **Senior Practical Physical Chemistry**, R. Chand & Co.

Teaching Learning Process:

- Through chalk and talk method.
- Revising and asking questions from students at the end of class
- Motivating students to do some activity related to the topic
- Power point presentation
- Correlating the topic with real life cases.
- Quiz contest among students on important topic.

Assessment Methods:

1. Graded assignments
2. Conventional class tests
3. Class seminars by students on course topics with a view to strengthening the content through width and depth
4. Quizzes
5. End semester university examination.

Keywords:

Metallurgy, Periodicity, Anomalous behaviour, Ellingham diagrams, Hydrometallurgy, Allotropy, Diagonal relationship, Multicentre bonding, Ideal/real gases, Surface tension, Viscosity, Crystal systems, Rate Law, Rate constant.

Course Code: CHEMISTRY –GE-5

Course Title: Chemistry of d-Block Elements, Quantum Chemistry and Spectroscopy

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The objective of this course is to introduce the students to d and f block elements and highlights the concept of horizontal similarity in a period and stresses on their unique properties. It familiarizes them with coordination compounds which find manifold applications in diverse fields. This course also disseminates the concepts and methodology of quantum mechanics, its applications to spectroscopy and establishes relation between structure determination and spectra.

Learning Outcomes:

By the end of the course, the students will be able to:

- Understand chemistry of d and f block elements, Latimer diagrams, properties of coordination compounds and VBT and CFT for bonding in coordination compounds
- Understand basic principles of quantum mechanics: operators, eigen values, averages, probability distributions.
- Understand and use basic concepts of microwave, IR and UV-VIS spectroscopy for interpretation of spectra.
- Explain Lambert-Beer's law, quantum efficiency and photochemical processes.

Section A: Inorganic Chemistry (Lectures:30)

Unit 1:

Transition Elements (3d series)

General properties of elements of 3d series with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties and ability to form complexes. A brief introduction to Latimer diagrams (Mn, Fe and Cu) and their use to identify oxidizing, reducing species and species which disproportionate. Calculation of skip step potentials.

Lanthanoids and actinoids: Electronic configurations, oxidation states displayed. A very brief discussion of colour and magnetic properties. Lanthanoid contraction(causes and consequences), separation of lanthanoids by ion exchange method.

(Lectures: 10)

Unit 2:

Coordination Chemistry

Brief discussion with examples of types of ligands, denticity and concept of chelate. IUPAC system of nomenclature of coordination compounds (mononuclear and binuclear) involving simple monodentate and bidentate ligands. Structural and stereoisomerism in complexes with coordination numbers 4 and 6.

(Lectures: 6)

Unit 3:

Bonding in coordination compounds

Valence Bond Theory (VBT): Salient features of theory, concept of inner and outer orbital complexes of Cr, Fe, Co and Ni. Drawbacks of VBT.

Crystal Field Theory

Splitting of d orbitals in octahedral symmetry. Crystal field effects for weak and strong fields. Crystal field stabilization energy (CFSE), concept of pairing energy. Factors affecting the magnitude of Δ . Spectrochemical series. Splitting of d orbitals in tetrahedral symmetry. Comparison of CFSE for octahedral and tetrahedral fields, tetragonal distortion of octahedral geometry. Jahn-Teller distortion, square planar coordination.

(Lectures: 14)

Section B: Physical Chemistry (Lectures:30)

Unit 4:

Quantum Chemistry

Postulates of quantum mechanics, quantum mechanical operators.

Free particle. Particle in a 1-D box (complete solution), quantization, normalization of wave functions, concept of zero-point energy.

Rotational Motion: Schrödinger equation of a rigid rotator and brief discussion of its results (solution not required). Quantization of rotational energy levels.

Vibrational Motion: Schrödinger equation of a linear harmonic oscillator and brief discussion of its results (solution not required). Quantization of vibrational energy levels.

(Lectures: 12)

Unit 5:

Spectroscopy

Spectroscopy and its importance in chemistry. Wave-particle duality. Link between spectroscopy and quantum chemistry. Electromagnetic radiation and its interaction with matter.

Types of spectroscopy. Difference between atomic and molecular spectra. Born- Oppenheimer approximation: Separation of molecular energies into translational, rotational, vibrational and electronic components.

Microwave (pure rotational) spectra of diatomic molecules. Selection rules. Structural information derived from rotational spectroscopy.

IR Spectroscopy: Selection rules, IR spectra of diatomic molecules. Structural information derived from vibrational spectra. Vibrations of polyatomic molecules. Group frequencies. Effect of hydrogen bonding (inter- and intramolecular) and substitution on vibrational frequencies.

Electronic Spectroscopy: Electronic excited states. Free electron model and its application to electronic spectra of polyenes. Colour and constitution, chromophores, auxochromes, bathochromic and hypsochromic shifts.

(Lectures: 12)

Unit 6:

Photochemistry

Laws of photochemistry. Lambert-Beer's law. Fluorescence and phosphorescence. Quantum efficiency and reasons for high and low quantum yields. Primary and secondary processes in photochemical reactions. Photochemical and thermal reactions. Photoelectric cells.

(Lectures: 6)

Practical:

(Credits: 2, Laboratory periods: 60)

Section A: Inorganic Chemistry

1. Estimation of the amount of nickel present in a given solution as bis - (dimethylglyoximate) nickel(II) or aluminium as oxinate in a given solution gravimetrically.
2. Estimation of (i) Mg^{2+} or (ii) Zn^{2+} by complexometric titrations using EDTA.
3. Estimation of total hardness of a given sample of water by complexometric titration.
4. Determination of the composition of the Fe^{3+} - salicylic acid complex / Fe^{2+} - phenanthroline complex in solution by Job's method.

Section B: Physical Chemistry

UV/Visible spectroscopy

1. Study the 200-500 nm absorbance spectra of $KMnO_4$ and $K_2Cr_2O_7$ (in 0.1 M H_2SO_4) and determine the λ_{max} values. Calculate the energies of the two transitions in different units ($J\ molecule^{-1}$, $kJ\ mol^{-1}$, cm^{-1} , eV).
2. Study the pH-dependence of the UV-Vis spectrum (200-500 nm) of $K_2Cr_2O_7$
3. Record the 200-350 nm UV spectra of the given compounds (acetone, acetaldehyde, 2-propanol, acetic acid) in water. Comment on the effect of structure on the UV spectra of organic compounds.

Colorimetry

1. Verify Lambert-Beer's law and determine the concentration of $CuSO_4/KMnO_4/K_2Cr_2O_7/CoSO_4$ in a solution of unknown concentration

Chemical Kinetics; Study the kinetics of the following reactions.

1. Initial rate method: Iodide-persulphate reaction
2. Integrated rate method: Saponification of ethyl acetate.

References:

Theory:

1. Atkins, P.W.; Overton, T.L.; Rourke, J.P.; Weller, M.T.; Armstrong, F.A.(2010),**Shriver and Atkins Inorganic Chemistry**, W. H. Freeman and Company.
2. Miessler, G. L.; Fischer P.J.; Tarr, D.A.(2014),**Inorganic Chemistry**, Pearson.
3. Huheey, J.E.; Keiter, E.A., Keiter; R.L., Medhi, O.K. (2009),**Inorganic Chemistry- Principles of Structure and Reactivity**, Pearson Education.
4. Pfennig, B. W.(2015), **Principles of Inorganic Chemistry**. John Wiley & Sons.
5. Kapoor, K.L. (2015),**A Textbook of Physical Chemistry**, Vol.4, 5th Edition, McGraw Hill Education.
6. Kapoor, K.L. (2015),**A Textbook of Physical Chemistry**, Vol.5, 3rd Edition, McGraw Hill Education.
7. B.R.Puri, L.R.Sharma, M.S.Pathania, (2017),**Principles of Physical Chemistry**, Vishal Publishing Co.

Practical:

1. Jeffery, G.H.; Bassett, J.; Mendham, J.; Denney, R.C.(1989),**Vogel's Textbook of Quantitative Chemical Analysis**, John Wiley and Sons.
2. Marr, G.; Rockett, B.W. (1972),**Practical Inorganic Chemistry**, Van Nostrand Reinhold.
3. Khosla, B.D.; Garg, V.C.; Gulati, A.(2015),**Senior Practical Physical Chemistry**, R. Chand & Co.

Additional Resources:

1. Castellan, G. W.(2004),**Physical Chemistry**, Narosa.

Teaching Learning Process:

- Lectures to introduce a topic and give its details.
- Discussions so that the student can internalize the concepts.
- Problem solving to make the student understand the working and application of the concepts.

Assessment Methods:

- Graded assignments
- Conventional class tests
- Class seminars by students on course topics with a view to strengthening the content through width and depth
- Quizzes
- End semester university examination.

Keywords:

d-block elements, Actinoids, Lanthinoids, VBT, Crystal field theory, Splitting of d levels, Coordination compounds, Quantisation, Selection rules, Schrodinger equation, Operator, Spectrum, Quantum efficiency, Fluorescence.

Course Code: CHEMISTRY –GE-6

Course Title: Organometallics, Bioinorganic Chemistry, Polynuclear Hydrocarbons and UV, IR Spectroscopy

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The purpose of the course is to introduce students to some important 3d metals and their compounds which they are likely to come across. Students learn about organometallic compounds and bioinorganic chemistry which are currently frontier areas of chemistry providing an interface between organic chemistry, inorganic Chemistry and biology. The functional group approach to organic chemistry introduced in the previous courses is reinforced through the study of the chemistry of carboxylic acids and their derivatives, Amines and diazonium salts, active methylene compounds. The students will also be introduced to the chemistry and applications of polynuclear hydrocarbons and heterocyclic compounds. The learners are introduced to spectroscopy, an important analytical tool which allows identification of organic compounds by correlating their spectra to structure.

Learning Outcomes:

By the end of the course, the students will be able to:

- Understand the chemistry and applications of 3d elements including their oxidation states and important properties of the familiar compounds potassium dichromate, potassium permanganate and potassium ferrocyanide
- Use IR data to explain the extent of back bonding in carbonyl complexes
- Get a general idea of toxicity of metal ions through the study of Hg^{2+} and Cd^{2+} in the physiological system
- Understand the fundamentals of functional group chemistry, polynuclear hydrocarbons and heterocyclic compounds through the study of methods of preparation, properties and chemical reactions with underlying mechanism.
- Gain insight into the basic fundamental principles of IR and UV-Vis spectroscopic techniques.
- Use basic theoretical principles underlying UV-visible and IR spectroscopy as a tool for functional group identification in organic molecules.

Section A: Inorganic Chemistry (Lectures:30)

Unit 1:

Chemistry of 3d metals

General discussion of 3d metals. Oxidation states displayed by Cr, Fe, Co, Ni and Cu.

A study of the following compounds (including preparation and important properties):

$\text{K}_2\text{Cr}_2\text{O}_7$, KMnO_4 , $\text{K}_4[\text{Fe}(\text{CN})_6]$.

(Lectures: 6)

Unit 2:

Organometallic Compounds

Definition and classification with appropriate examples based on nature of metal-carbon bond (ionic, s, p and multicentre bonds). Structure and bonding of methyl lithium and Zeise's salt. Structure and physical properties of ferrocene. 18-electron rule as applied to carbonyls. Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d metals. π -acceptor behaviour of carbon monoxide (MO diagram of CO to be discussed), synergic effect and use of IR data to explain extent of back bonding.

(Lectures: 12)

Unit 3:

Bio-Inorganic Chemistry

A brief introduction to bio-inorganic chemistry. Role of metal ions present in biological systems with special reference to Na^+ , K^+ and Mg^{2+} ions: Na/K pump; Role of Mg^{2+} ions in energy production and chlorophyll. Brief introduction to oxygen transport and storage (haemoglobin-myoglobin system). Brief introduction about toxicity of metal ions (Hg^{2+} and Cd^{2+}).

(Lectures: 12)

Section B: Organic Chemistry (Lectures:30)

Unit 4:

Polynuclear and heteronuclear aromatic compounds:

Structure elucidation of naphthalene, preparation and properties of naphthalene and anthracene.

Preparation and Properties of the following compounds with reference to electrophilic and nucleophilic substitution: furan, pyrrole, thiophene, and pyridine.

(Lectures: 13)

Unit 5:

Active methylene compounds

Preparation: Claisen ester condensation, Keto-enol tautomerism.

Reactions: Synthetic uses of ethylacetoacetate (preparation of non-heteromolecules having up to 6 carbons).

(Lectures: 5)

Unit 6:

UV-Visible and infrared spectroscopy and their application to simple organic molecules.

Electromagnetic radiations and their properties; double bond equivalence and hydrogen deficiency.

UV-Visible spectroscopy (electronic spectroscopy): General electronic transitions, λ_{\max} & ϵ_{\max} , chromophores & auxochromes, bathochromic & hypsochromic shifts. Application of Woodward rules for calculation of λ_{\max} for the following systems: conjugated dienes - alicyclic, homoannular and heteroannular; α,β -unsaturated aldehydes and ketones, charge transfer complex.

Infrared (IR) Spectroscopy: Infrared radiation and types of molecular vibrations, significance of functional group & fingerprint region. IR spectra of alkanes, alkenes, aromatic hydrocarbons (effect of conjugation and resonance on IR absorptions), simple alcohols (inter and intramolecular hydrogen bonding and IR absorptions), phenol, carbonyl compounds, carboxylic acids and their derivatives (effect of substitution on $>C=O$ stretching absorptions).

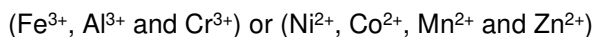
(Lectures: 12)

Practical:

(Credits: 2, Laboratory periods: 60)

Section A: Inorganic Chemistry

1. Separation of mixtures of two ions by paper chromatography and measurement of R_f value in each case:



2. Preparation of any two of the following complexes and measurement of their conductivity:

(i) tetraamminecopper (II) sulphate (ii) potassium trioxalatoferrate (III) trihydrate.

Compare the conductance of the complexes with that of M/1000 solution of NaCl, $MgCl_2$ and $LiCl_3$.

Section B: Organic Chemistry

1. Detection of extra elements

2. Systematic qualitative analysis of organic compounds possessing monofunctional groups: amide, amines, halo-hydrocarbons and carbohydrates (Including Derivative preparation)

3. Identification of simple organic compounds containing the above functional groups by IR spectroscopy through examination of spectra (spectra to be provided).

References:

Theory:

1. Huheey, J.E.; Keiter, E.A.; Keiter, R. L.; Medhi, O.K. (2009), **Inorganic Chemistry- Principles of Structure and Reactivity**, Pearson Education.
2. Lee., J. D.(2010), **A new Concise Inorganic Chemistry**, Pearson Education.

3. Douglas, B.E.; McDaniel, D.H.; Alexander, J.J. (1994), **Concepts and Models of Inorganic Chemistry**, John Wiley & Sons.
4. Atkins, P.W.; Overton, T.L.; Rourke, J.P.; Weller, M.T.; Armstrong, F.A. (2010), **Shriver and Atkins Inorganic Chemistry**, 5th Edn, W. H. Freeman and Company, 41 Madison Avenue, New York, NY.
5. Finar, I. L. **Organic Chemistry** (Volume 1 & 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
6. Morrison, R. N.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
7. Bahl, A; Bahl, B. S. (2012), **Advanced Organic Chemistry**, S. Chand.

Practical:

1. Ahluwalia, V.K.; Dhingra, S.; Gulati, A.(2005), **College Practical Chemistry**, University Press (India) Ltd.
2. Ahluwalia, V.K.; Dhingra, S.(2004), **Comprehensive Practical Organic Chemistry: Qualitative Analysis**, University Press.
3. Vogel, A.I.(1972), **Textbook of Practical Organic Chemistry**, Prentice Hall.
4. Svehla, G. (1996), **Vogel's Qualitative Inorganic Analysis**, Prentice Hall.

Additional Resources:

1. Cotton, F. A.; Wilkinson, G.; Gaus, P.L. (1995), **Basic Inorganic Chemistry**, 3rd Edition, John Wiley.
2. Sharpe, A.G.(2005), **Inorganic Chemistry**, Pearson Education.
3. Greenwood, N.N.; Earnshaw, A.(1997), **Chemistry of the Elements**, Elsevier.
4. Silverstein, R.M.; Bassler, G.C.; Morrill, T.C. (1991), **Spectroscopic Identification of Organic Compounds**, John Wiley & Sons.
5. Dyer, J.R.(1978), **Applications of Absorption Spectroscopy of Organic Compounds**, Prentice Hall.

Teaching Learning Process:

- Teaching Learning Process for the course is visualized as largely student-focused.
- Transaction through an intelligent mix of conventional and modern methods.
- Engaging students in cooperative learning.
- Learning through quiz design.
- Problem solving to enhance comprehension.

Assessment Methods:

Assessment will be done on the basis of regular class test, presentations and assignments as a part of internal assessment during the course as per the curriculum. End semester university examination will be held for both theory and practical. In practical, assessment will be done based on continuous evaluation, performance in the experiment on the date of examination and viva voce.

Keywords:

3d metals; Organometallic Chemistry; Metal Carbonyl; Ferrocene; 18-electron rule; Synergic bonding; Bioinorganic chemistry; Sodium potassium pump; Haemoglobin-myoglobin system; Biomolecules, UV-visible spectroscopy; IR spectroscopy; Charge transfer spectra.

Course Code: CHEMISTRY –GE-7

Course Title: Molecules of Life

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

The objective of this course is to deliver information about biochemically significant features of the chemistry of carbohydrates, proteins, enzymes, nucleic acids and lipids, using suitable examples. This includes classification, reaction chemistry and biological importance of these biomolecules. This course extends the knowledge gained from synthetic organic chemistry to chemistry of biomolecules. Key emphasis is placed on understanding the structural principles that govern reactivity/physical /biological properties of biomolecules as opposed to learning structural detail.

Learning Outcomes:

By the end of the course, the students will be able to:

- Learn and demonstrate how the structure of biomolecules determines their chemical properties, reactivity and biological uses.
- Gain an insight into mechanism of enzyme action and inhibition.
- Understand the basic principles of drug-receptor interaction and SAR.
- Understand biological processes like replication, transcription and translation.
- Demonstrate an understanding of metabolic pathways, their inter-relationship, regulation and energy production from biochemical processes.

Unit 1:

Carbohydrates

Classification of carbohydrates, reducing and non-reducing sugars, biological functions, general properties and reactions of glucose and fructose, their open chain structure, epimers, mutarotation and anomers, reactions of monosaccharides, determination of configuration of glucose (Fischer proof), cyclic structure of glucose. Haworth projections. Cyclic structure of fructose. Linkage between monosaccharides: structure of disaccharides (sucrose, maltose, lactose) and polysaccharides (starch and cellulose) excluding their structure elucidation.

(Lectures: 10)

Unit 2:

Amino Acids, Peptides and Proteins

Classification of amino acids and biological uses of amino Acids, peptides and proteins. Zwitterion structure, isoelectric point and correlation to acidity and basicity of amino acids. Determination of primary structure of peptides, determination of N-terminal amino acid (by DNFB and Edman method) and C-terminal amino acid (by thiohydantoin and with carboxypeptidase enzyme). Synthesis of simple peptides

Page **159** of **167**

(up to dipeptides) by N-protection (t-butyloxycarbonyl and phthaloyl) & C-activating groups and Merrifield solid phase synthesis, Overview of primary, secondary, tertiary and quaternary structure of proteins, denaturation of proteins.

(Lectures: 12)

Unit 3:

Enzymes and correlation with drug action

Classification of enzymes and their uses(mention Ribozymes). Mechanism of enzyme action, factors affecting enzyme action, Coenzymes and cofactors and their role in biological reactions, specificity of enzyme action(including stereospecificity), enzyme inhibitors and their importance, phenomenon of inhibition(Competitive and non-competitive inhibition including allosteric inhibition). Drug action-receptor theory. Structure – activity relationships of drug molecules, binding role of –OH group,-NH₂ group, double bond and aromatic ring.

(Lectures: 10)

Unit 4:

Nucleic Acids

Components of Nucleic acids: Adenine, guanine, thymine ,cytosine and uracil (structure only), other components of nucleic acids, nucleosides and nucleotides (nomenclature), structure of polynucleotides; structure of DNA (Watson-Crick model) and RNA(types of RNA),difference between DNA and RNA, genetic code, biological roles of DNA and RNA: replication, transcription and translation.

(Lectures: 10)

Unit 5:

Lipids

Introduction to lipids, classification. Oils and fats: Common fatty acids present in oils and fats, Omega-3&6 fatty acids, trans fats, hydrogenation, hydrolysis, acid value, saponification value, iodine number. Biological importance of triglycerides, phospholipids, glycolipids, and steroids (cholesterol).

(Lectures: 8)

Unit 6:

Concept of Energy in Biosystems

Calorific value of food. Standard caloric content of carbohydrates, proteins and fats. Oxidation of foodstuff (organic molecules) as a source of energy for cells. Introduction to metabolism (catabolism, anabolism), ATP: the universal currency of cellular energy, ATP hydrolysis and free energy change. Conversion of food into energy. Outline of catabolic pathways of carbohydrate- glycolysis, fermentation and Krebs cycle. Overview of catabolic pathways of fats and proteins. Interrelationships in the metabolic pathways of proteins, fats and carbohydrates.

Practical:

(Credits: 2, Laboratory periods: 60)

1. Separation of amino acids by paper chromatography
2. Study of titration curve of glycine and determination of its isoelectric point.
3. Estimation of proteins by Lowry's method
4. Action of salivary amylase on starch
5. Effect of temperature on the action of salivary amylase on starch.
6. To determine the saponification value of an oil/fat.
7. To determine the iodine value of an oil/fat
8. Qualitative tests for carbohydrates- Molisch test Barfoed's reagent test, rapid furfural test, Tollen's test and Fehling solution test(Only these tests are to be done in class)
9. Qualitative tests for proteins
10. Extraction of DNA from onion/cauliflower

References:

Theory:

1. Finar, I. L. **Organic Chemistry** (Volume 1 & 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Morrison, R. N.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Berg, J. M.; Tymoczko, J. L.; Stryer, L.(2002), **Biochemistry**, W. H. Freeman.

Practical:

1. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. (2012), **Vogel's Textbook of Practical Organic Chemistry**, Pearson.
2. **Manual of Biochemistry Workshop**, 2012, Department of Chemistry, University of Delhi.

Teaching Learning Process:

- The teaching learning process will involve the traditional chalk and black board method. Along with pedagogy of flipped classroom
- Certain topics like mechanism of enzyme action and enzyme inhibition, transcription and translation etc. where traditional chalk and talk method may not be able to convey the concept, are taught through audio-visual aids.
- Students are encouraged to participate actively in the classroom through regular presentations on curriculum based topics, peer assessment, designing games based on specific topics etc.

- As the best way to learn something is to do it yourself, practicals are planned in such a way so as to reinforce the topics covered in theory.

Assessment Methods:

- Graded assignments
- Conventional class tests
- Class seminars by students on course topics with a view to strengthening the content through width and depth
- Quizzes
- End semester university examination.

Keywords:

Biomolecules, Enzymes, Mechanism of enzyme action and inhibition, SAR, Drug Receptor Theory, Energy concept in biological system, Catabolic pathways and their inter-relationship.

Course Code: CHEMISTRY –GE-8

Course Title: Green Chemistry: Designing Chemistry for Human Health and Environment

Total Credits: 06

(Credits: Theory-04, Practical-02)

(Total Lectures: Theory- 60, Practical-60)

Objectives:

Brief Background and significance of introducing this course (*This description is provided because this course is being floated for the first time*).

Undeniably, chemical products and processes are central to global economy as they have been playing an indispensable role in not only meeting our fundamental needs for food, shelter and clothing and but also benefiting us in numerous other ways through various technological advancements. However, these benefits have come at an enormous price. Most of the chemical processes have led to the generation of toxic waste materials that have migrated to various environmental matrices and caused a detrimental impact on human health. Therefore, this grave situation has made us re-think of ways in which we have been practising chemistry and raised crucial questions:

1. ***How can we strengthen the economy, protect the environment and ensure a high quality of life?***
2. ***How can we educate succeeding generations of chemists so that they will have the skills and knowledge to practice chemistry in ways that are benign to human health and environment?***

It is here where green chemistry comes into picture. But the successful outcomes of practising green chemistry cannot be realized only with chemists; intervention of engineers, economists, ecologists, toxicologists, policy makers is also essential. For instance: a chemical engineer can design a production line to recycle certain reagents and minimize energy consumption. Toxicologists and ecologists provide

information about the toxic characteristics and effect of molecules so that the chemists can work to design new molecules that avoid structures linked to toxicity.

This course reflects the power that a green chemist not only holds over the disposition of the chemistry that is created, from its creation, to its use, until its destruction and beyond. Beyond, because a chemist can not only design a substance to have certain characteristics during its useful life, but can also design what substance will become (or break down) after its useful life is over.

Students at all levels can benefit from an introduction to Green Chemistry. This course aims at:

1. Raising an awareness on the potential toxic effects of different chemicals and problems related to waste generation.
2. Inculcating the need to practice green chemistry as it is the only way to meet the global challenges the world is facing today. Green Chemistry possesses the potential to reduce waste generation and enhances our quality of life while conferring simultaneous benefits of protecting our environment and human health.
3. Providing a basis and framework for pursuing science in the most creative, innovative and responsible manner possible.
4. Familiarizing students with the new emerging green technologies (new catalysts, solvents and energy sources) that would help them gain new insights on how pollution can be prevented through thoughtful design of chemical products and processes.
5. Enabling students to learn about the green trends being practiced by industries as well as academicians through demonstration of some real world case studies.
6. Enabling the next generation to learn from the concepts reflected in this course that perhaps one day green chemistry will not be an additional consideration when designing a synthetic route or industrial process.

Learning Outcomes:

After studying this course, students will be able to:

- Understand what is waste and how waste generation can cause serious repercussions on our environment while simultaneously causing enormous damage to human health.
- Recognize and acknowledge the role of green chemistry in reducing waste, learn about new strategies (emerging green technologies-green catalysts, solvents, energy, plastics etc.) that possess tremendous potential in reducing waste
- Creatively redesign traditional experiments with a green focus (using the various principles of green chemistry)
- Learn about the green trends being practiced in pharmaceutical industries through depiction of some interesting industrial case studies
- Learn about academic-industrial collaborations and the potential these relationships hold in furtherance of green chemistry and rendering our planet earth greener
- Eliminate “Do as I Said attitude” of students as this course will enhance the creative practical skills of students
- Motivate students to choose discipline and career related to this field. Eventually a student practising green chemistry can either become an industrialist or engineer or policy maker.

Unit 1:

Waste: Production & Problems

Green Chemistry: The perfect toolbox to prevent waste

- Twelve Principles of Green Chemistry
- UN sustainable development goals: How can Green Chemistry Contribute?
- Special Emphasis on Prevention of Waste

(Lectures:8)

Unit 2:

Accelerating Innovations through Emerging Green Technologies

2.1 Green Energy

- 2.1.1 Global Warming (Climate Change)*
- 2.1.2 Renewable energy*
- 2.1.3 Microwave Assisted Synthesis*
- 2.1.4 Ultrasound Assisted Synthesis*

2.2 Green Solvents

- 2.2.1 Problems associated with traditional solvents*
- 2.2.2 Water as a green solvent*
- 2.2.3 Ionic Liquids*
- 2.2.4 Bio-based Solvents*
- 2.2.5 Supercritical CO₂*

2.3 Green Catalysts

- 2.3.1 General Introduction to Catalysis*
- 2.3.2 Types of Catalysts*
- 2.3.3 Green Catalyst*
- 2.3.4 Nanocatalyst*

(Lectures:17)

Unit 3:

Green Chemistry solutions for water pollution (*Current Green Technologies employed in Water Treatment*)

3.1 Water Pollution and root causes

3.2 Catalytic Degradation of organic water pollutants

3.3 Photo-oxidation technologies

3.4 Removal of heavy metals (inorganic pollutants) via new adsorption technology

(Lectures:10)

Unit 4:

Green Chemistry in Pharmaceutical Industry

- Green Trends being followed in pharma
- Industrial Case Studies
 - Ranitidine*
 - Celecoxib*

Ibuprofen
Sertraline

- Special Recognition: US Presidential Green Challenge Awards

(Lectures:10)

Unit 5:

New Directions from Academia

- Innovations stemming from academia
- Academia Being Recognized: US Presidential Green Challenge Awards

(Lectures:5)

Unit 6:

Green chemistry and resource efficiency: towards a green circular economy

- Resource efficiency, atom economy and the *E* factor
- Concept of Circular Economy: Renewable resources, the bio-based economy and waste valorisation
- Creating an Effective Regulatory System
- New Technological Developments: New Avenues for the Green Economy and Sustainable Future of Science and Technology

Future Prospectives

(Lectures:10)

Practical:

(Credits: 2, Laboratory periods: 60)

Green Chemistry experiments need to be designed with the help of the three magic R's- Reduce, Reuse and Recycle.

While designing and practising green chemistry experiments, special emphasis should be made on utilizing the maximum tenets (principles) of Green Chemistry:

- **GETTING OFF TO A SAFE START:** Using Safer Starting Materials for Chemical Reactions
- **AIM AT DESIGNING GREEN SYNTHETIC PATHWAYS:** Involves safe solvents (for instance: liquid CO₂, ionic liquids, water) and green reaction conditions.
- **AVOIDING WASTE:** Maximizing Atom Economy
- **CONSERVING ENERGY:** Using Lower Amounts of energy for chemical processes
- **GREENING WASTES:** Returning safe substances to the environment

Practical applications (Experiments to be performed):

(I) Converting Waste to Wealth:

- Synthesis of biodiesel from waste cooking oil

(II) Using Renewable resources for deriving valuable products:

- Making green plastics from corn starch
- (III) **Greener approach to the synthesis of Gold/Silver Nanoparticles:**
- Green synthesis of gold/silver nanoparticles
- (IV) **Degradation of toxic pollutants (dyes):**
- Catalytic degradation of dyes using nanoparticles (can be any)
- (V) **Green Synthesis**
- Microwave assisted synthesis of copper phthalocyanine complex
 - Preparation of Fe(III)AcAc Complex using a greener approach

References:

Theory:

1. Anastas, P.T.; Warner, J.C.(1998), **Green Chemistry, Theory and Practice**, Oxford University Press.
2. Lancaster, M.(2016),**Green Chemistry An Introductory Text**.2nd Edition, RSC Publishing.
3. Cann , M. C.; Umile, T.P. (2008), **Real world cases in Green chemistry** Vol 11, American chemical Society,Washington.
4. Sharma, R.K.; Bandichhor, R. (2018),**Hazardous Reagent Substitution**, Royal Society of Chemistry.
5. Parent, K.; Kirchhoff,M. (2004),**Going Green: Integrating Green Chemistry into the Curriculum**, American Chemical Society.

Practical:

1. Sharma, R.K.; Sidhwani, I.T.; Chaudhuri, M.K. (2007),**Green Chemistry Experiments: A Monograph**, Tucker Prakashan.
2. Monograph on Green Chemistry Laboratory Experiments, Green Chemistry Task Force Committee, Department of Science and Technology, Government of India. <http://dst.gov.in/green-chem.pdf>.
3. Kirchhoff, M.; Ryan, M.A. (2002),**Greener Approaches to Undergraduate Chemistry Experiments**, American Chemical Society.
4. Ryan, M.A.; Tinneland, M. (2002), **Introduction to Green Chemistry** (Ed), American Chemical Society, Washington DC.

Teaching Learning Process:

- Interactive Classes
- Experiential Learning
- Power point presentations
- Visit to pharmaceutical industries and green chemistry laboratories
- Interesting and inspiring short videos and movies in green chemistry
- Activities related to green chemistry would be conducted in classrooms that would enhance the critical thinking of students and help them redesign experiments in a greener way

Assessment Methods:

Following **assessment methods** can be adopted to evaluate the students:

- Conventional Class tests
- Open Book tests
- Assignments
- Online tests --objective or subjective
- Quizzes
- Presentation on a topic in front of the classmates
- Performing a new experiment based on the concepts learned in the course.

Keywords:

Waste production, Problem and prevention; Emerging green technologies, Green Catalysts, Green Solvents, Green Energy, Photo-oxidation technologies, Industry-academia collaboration, Circular economy.

ACKNOWLEDGEMENTS

Contributions received from all the coordinators, working group members, members of Committee of Courses, stakeholders who have given their valuable inputs are gratefully acknowledged.

UNIVERSITY OF DELHI

Bachelor of Arts (Honours) Economics

(Effective from Academic Year 2019-20)



Revised Syllabus as approved by

Academic Council

Date:

No:

Executive Council

Date:

No:

CONTENTS

Preamble

1. Course Structure	
1.1 Alignment with CBCS.....	1
1.2 Types of Courses	1
1.3 Number of Courses and Credits	2
1.4 Semester-wise Courses	3
2. Learning Outcome-based Approach.....	5
3. Graduate Attributes	5
4. Qualification Description	5
5. Programme Objectives	5
6. Programme Learning Outcomes.....	6
7. Teaching Learning Process.....	6
8. Assessment Methods / Evaluation Scheme	6

Core Courses

Mathematical Methods for Economics I (HC11)	8
Introductory Microeconomics (HC12)	9
Mathematical Methods for Economics II (HC21).....	11
Introductory Macroeconomics (HC22)	12
Intermediate Microeconomics I (HC31)	13
Intermediate Macroeconomics I (HC32)	14
Statistical Methods for Economics (HC33).....	15
Intermediate Microeconomics II (HC41)	17
Intermediate Macroeconomics II (HC42)	18
Introductory Econometrics (HC43)	19
Indian Economy I (HC51).....	20
Development Economics I (HC52)	21
Indian Economy II (HC61).....	23
Development Economics II (HC62).....	25

Discipline Specific Elective Courses

Game Theory (HE51)	27
International Trade (HE52)	28
Public Economics (HE53)	29
Financial Economics (HE54)	30
Applied Econometrics (HE55)	32
Economic History of India 1857-1947 (HE56)	33
Political Economy I (HE57)	35
Economics of Health and Education (HE62)	37
Environmental Economics (HE63).....	38
Open Economy Macroeconomics (HE64).....	39
Money and Financial Markets (HE65).....	41
Comparative Economic Development: 1850-1950 (HE66)	42
Law and Economics (HE67)	44
Political Economy II (HE68).....	45

Generic Elective Courses

Introductory Microeconomics (GE11)	48
Introductory Macroeconomics (GE21).....	49
Data Analysis (GE31).....	50
Money and Banking (GE32)	51
Indian Economy I (GE33)	52
Economic History of India (GE34)	54
Public Finance (GE41)	55
Indian Economy II (GE42).....	57
Global Political Economy (GE43).....	58
Game Theory (GE44)	60

Skill Enhancement Elective Courses

Data Analysis (HS31).....	62
Research Methodology (HS41)	63
Contemporary Economic Issues (HS42)	64

Preamble

The endeavour of any university programme is to prepare its students to be upright and productive citizens. Accordingly, the University of Delhi is moulding its undergraduate programmes to a Learning Outcome-based Curriculum Framework (LOCF).

The LOCF approach is envisioned to provide a focussed, outcome-based syllabus at the undergraduate level with an agenda to structure the teaching-learning experiences in a more student-centric manner. The LOCF approach has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice. The undergraduate Programmes will prepare the students for both, academia and employability.

Each programme vividly elaborates its nature and promises the outcomes that are to be accomplished by studying the courses. The programmes also state the attributes that it aims to inculcate at the point of graduation. These attributes encompass values related to wellbeing, emotional stability, critical thinking, social justice and skills for employability. In short, each programme prepares students for sustainability and life-long learning.

The new curriculum of B.A. (Hons) Economics offers a rigorous basis for much of the advanced thinking in the Economics discipline. It provides the student with a logical paradigm for conceptualising and interpreting the behaviour and interactions of households, firms, and government institutions. The curriculum allows students to choose elective courses from a set of courses with contemporary relevance, thereby offering students the flexibility to prepare for careers in academia, law, management, journalism, government, and many other fields. The programme is consistent with global standards in the Economics discipline. It offers training that is comparable to that of an undergraduate student at the world's best universities.

The University of Delhi hopes that the LOCF approach of the B.A. (Hons) Economics programme will help students in making an informed decision regarding the goals that they wish to pursue in further education and life.

1. Course Structure

1.1 Alignment with CBCS

The B.A. (Hons) Economics programme is aligned with Choice Based Credit System (CBCS) adopted by the University of Delhi.

1.2 Types of Courses

The following types of courses are offered under CBCS:

1. **Core Courses (CC).** A core course is a compulsory course. A student of Economics (Hons) has to take fourteen such Economics courses over six semesters.
2. **Elective Courses (EC).** An elective course is a course that is to be chosen from a specified set of courses. These courses are of two types.

Discipline Specific Electives (DSE). These are elective courses that provide advanced undergraduate training in specialised areas of Economics. A set of seven, semester-specific, courses of this kind are offered in the fifth and sixth semesters of the Honours programme. In each of these semesters, a student has to take two such courses from the relevant semester's set of seven courses.

Generic Electives (GE). These courses, in disciplines other than Economics, are intended to broaden the training of a student in the Economics (Hons) programme. A student of Economics will take one such course, offered by another department, in each of Semesters I to IV.

3. **Ability Enhancement Compulsory Course (AECC).** Two such courses are to be taken, one in Semester I (Art of Communication, equivalent to MIL) and one in Semester II (Environmental Science).
4. **Skill Enhancement Course (SEC).** A student is to take one such course in Semester III and one in Semester IV.

1.3 Number of Courses and Credits

1. Core Courses (CC): 14 (6 credits each)
2. Discipline Specific Electives (DSE): 4 (6 credits each)
3. Generic Electives (GE): 4 (6 credits each)
4. Skill Enhancement Courses (SEC): 2 (4 credits each)
5. Ability Enhancement Compulsory Courses (AECC): 2 (4 credits each)

Total number of courses (credits) taken by a student: 26 (148)

Table 1. Semester-wise Distribution of Credits

Year	Semester	Courses	Credits
First	I	2 CC (x6) 1 AECC (x4) 1 GE (x6)	22
	II	2 CC (x6) 1 AECC (x4) 1 GE (x6)	22
Second	III	3 CC (x6) 1 SEC (x4)	28

		1 GE (x6)	
	IV	3 CC (x6) 1 SEC (x4) 1 GE (x6)	28
Third	V	2 CC (x6) 2 DSE (x6)	24
	VI	2 CC (x6) 2 DSE (x6)	24
Total		26	148

1.4 Semester-wise Courses

Table 2. Courses for B.A. (Hons) Economics

Semester	Course title	Course code						
I	CC		AECC	SEC	DSE	GE		
	Mathematical Methods for Economics I	HC11	Art of Communi- cation			GE 1		
	Introductory Micro-economics	HC12						
II	Mathematical Methods for Economics II	HC21	Environ- mental Science					GE 2
	Introductory Macro-economics	HC22						
III	Intermediate Micro-economics I	HC31						GE 3
	Intermediate Macro-economics I	HC32						
	Statistical Methods for Economics	HC33						
		HS31		Data Analysis				
IV	Intermediate Micro-economics II	HC41						

						GE 4
	Intermediate Macro- economics II	HC42				
	Introductory Econometrics	HC43				
				<i>Pick one from</i>		
		HS41		Research Method- ology		
		HS42		Contem- porary Economic Issues		
V	Indian Economy I	HC51				
	Development Economics I	HC52				
						<i>Pick two from</i>
		HE51				Game Theory
		HE52				International Trade
		HE53				Public Economics
		HE54				Financial Economics
		HE55				Applied Econometrics
		HE56				Economic History of India (1857-1947)
		HE57				Political Economy I
VI	Indian Economy II	HC61				
	Development Economics II	HC62				
						<i>Pick two from</i>
		HE62				Economics of Health and Education
		HE63				Environmental Economics
		HE64				Open Economy Macroeconomics
		HE65				Money and Financial Markets
		HE66				Comparative Economic Development (1850- 1950)

		HE67			Law and Economics	
		HE68			Political Economy II	

Key: CC = Core Course; AECC = Ability Enhancement Compulsory Course; SEC = Skill Enhancement Course; DSE = Discipline Specific Elective; GE = Generic Elective

2. Learning Outcome-based Approach

The B.A. (Hons) Economics programme provides a firm basis for much of the advanced thinking in the Economics discipline. It provides the student with a logical paradigm for modelling and interpreting the behaviour and interactions of households, firms, and government institutions.

The programme is consistent with global standards in the Economics discipline. It offers training that is comparable to that of an undergraduate student at the world's best universities.

The curriculum allows students to choose elective courses from a set of courses with contemporary relevance, thereby offering students the flexibility to prepare for careers in academia, law, management, journalism, government, and many other fields.

3. Graduate Attributes

Upon completion of this programme, a student will have the necessary skills to understand and analyse in a logical manner all major economic phenomena.

A student will be able to analyse government policies and regulations, and demonstrate their significance. Knowing how an economy functions, and how decisions are made by consumers, producers, and regulators, the student will have the necessary skills to identify, analyse, and solve problems in a logical and efficient way. The programme provides the basic ingredients of economic theory and the opportunity to learn how to process and analyse economic data based on sound statistical principles, in order to arrive at economically meaningful conclusions.

4. Qualification Description

Upon successfully completing the programme, a student will be awarded the degree of B.A. Honours (Economics).

5. Programme Objectives

The programme aims to:

1. Train students in basic economic theory;

2. Equip students with the mathematical and statistical techniques necessary for a proper understanding of the discipline;
3. Discuss real world economic issues and problems facing the country and the world;
4. Enable students to understand proper policy responses to economic problems;
5. Train students to collect primary data and learn sampling techniques;
6. Train students to use statistical and econometric methods to arrive at conclusions about the validity of economic theories;
7. Train students to learn the art of economic modelling.

6. Programme Learning Outcomes

Students will:

1. Get an understanding of basic economic theory;
2. Learn the mathematical and statistical techniques necessary for a proper understanding of the discipline;
3. Get an introduction to real world economic issues and problems facing the country and the world;
4. Gain an understanding of proper policy responses to economic problems;
5. Get trained to collect primary data and learn sampling techniques;
6. Learn to use scientific empirical methods to arrive at conclusions about the validity of economic theories;
7. Get trained in the art of economic modelling.

7. Teaching Learning Process

Teaching and learning in this programme involves classroom lectures as well tutorials. The tutorials allow a closer interaction between the students and the teacher as each student gets individual attention. In tutorials, the teacher can keep track of each student's progress and address her/his individual difficulties. Written assignments and projects submitted by students as part of the course are also discussed in tutorials. Some courses also have a laboratory component and some require the students to undertake an independent research project and submit a written report at the end of the project. Research projects will encourage independent thinking among students and prepare them to carry out research on their own after completion of the degree. Students will be assigned regular home assignments and will be tested periodically through quizzes and class tests to ensure that they have properly learnt the course material.

8. Assessment Methods / Evaluation Scheme

Assessment methods and evaluation schemes will be as *per* University of Delhi norms. Maximum marks for each theory paper will be 100. The break-up of marks is as follows:

1. 25 marks for internal assessment to be assigned at the college level, which will be determined as follows:
 - a. 5 marks for attendance in lectures and tutorials,

- b. 10 marks for a written class test, and
 - c. 10 marks for a project/seminar/class test.
- 2. 75 marks for the final examination conducted by the University at the end of the semester.

Practical papers will also follow the evaluation scheme of University of Delhi.

Core Courses

Mathematical Methods for Economics I (HC11)

Core Course (CC) Credit: 6

Course Objective

This is the first of a compulsory two-course sequence. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

Course Learning Outcomes

The course hones and upgrades the mathematical skills acquired in school and paves the way for the second semester course Mathematical Methods in Economics II. Collectively, the two papers provide the mathematical foundations necessary for further study of a variety of disciplines including economics, statistics, computer science, finance and data analytics. The analytical tools introduced in this course have applications wherever optimisation techniques are used in business decision-making. These tools are necessary for anyone seeking employment as an analyst in the corporate world. The course additionally makes the student more logical in making or refuting arguments.

Unit 1

Preliminaries Logic and proof techniques; sets and set operations; relations; functions and their properties; number systems

Unit 2

Functions of one real variable Graphs; elementary types of functions: quadratic, polynomial, power, exponential, logarithmic; sequences and series: convergence, algebraic properties and applications;

Continuous functions: characterisations, properties with respect to various operations and applications;

Differentiable functions: characterisations, properties with respect to various operations and applications;

Second and higher order derivatives: properties and applications

Unit 3

Single-variable optimization Geometric properties of functions: convex functions, their characterisations and applications; local and global optima: geometric and calculus-based characterisations, and applications

Unit 4

Linear algebra Vector spaces: algebraic and geometric properties, scalar products, norms, orthogonality; linear transformations: properties, matrix representations and elementary operations; systems of linear equations: properties of their solution sets; determinants: characterization, properties and applications

References

1. Sydsaeter, K., Hammond, P. (2002). *Mathematics for economic analysis*. Pearson Educational.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Sets, functions, continuity, differentiability, vector space, linear mappings

Introductory Microeconomics (HC12)

Core Course (CC) Credit: 6

Course Objective

This course is designed to expose the students to the basic principles of microeconomic theory. The emphasis will be on thinking like an economist and the course will illustrate how microeconomic concepts can be applied to analyze real-life situations.

Course Learning Outcomes

The course introduces the students to the first course in economics from the perspective of individual decision making as consumers and producers. The students learn some basic principles of microeconomics, interactions of supply and demand, and characteristics of perfect and imperfect markets.

Unit 1

Introduction What is microeconomics? Scope and method of economics; the economic problem: scarcity and choice; the concept of opportunity cost; the question of what to produce, how to produce and how to distribute output; science of economics; institutions for allocating resources; the basic competitive model; prices, property rights and profits; incentives and information; rationing; positive versus normative analysis

The scientific method; the role of assumptions; models and mathematics; why economists sometimes disagree

Interdependence and gains from trade; specialization and trade; absolute advantage; comparative advantage and trade

Unit 2

Supply and demand: How markets work, markets and welfare Markets and competition; determinants of individual demand/supply; demand/supply schedule and demand/supply curve; market versus individual demand/supply; shifts in the demand/supply curve, demand and supply together; how prices allocate resources; elasticity and its application; controls on prices; taxes and the costs of taxation; consumer surplus; producer surplus and the efficiency of the markets

Application to international trade; comparison of equilibria with and without trade, the winners and losers from trade; effects of tariffs and quotas; benefits of international trade; some arguments for restricting trade

Unit 3

The Households The consumption decision - budget constraint, consumption and income/price changes, demand for all other goods and price changes; description of preferences (representing preferences with indifference curves); properties of indifference curves; consumer's optimum choice; income and substitution effects; labour supply and savings decision; choice between leisure and consumption

Unit 4

The firm and perfect market structure Behaviour of profit maximizing firms and the production process; short-run costs and output decisions; costs and output in the long-run

Unit 5

Imperfect Market Structure Monopoly and anti-trust policy; government policies towards competition; imperfect competition

Unit 6

Input Markets Labour and land markets: Basic concepts (derived demand, productivity of an input, marginal productivity of labour, marginal revenue product); demand for labour; input demand curves; shifts in input demand curves; competitive labour markets; labour markets and public policy

References

1. Bernheim, B., Whinston, M. (2009). *Microeconomics*. Tata McGraw-Hill.
2. Mankiw, N. (2007). *Economics: Principles and applications, 4th ed.* Cengage Learning.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Supply, demand, elasticity, consumer behaviour, firm behaviour, perfect and imperfect markets

Mathematical Methods for Economics II (HC21)

Core Course (CC) Credit: 6

Course Objective

This course is the second part of a compulsory two-course sequence. This part is to be taught in Semester II following the first part in Semester I. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

Course Learning Outcomes

The course provides the mathematical foundations necessary for further study of a variety of disciplines including postgraduate economics, statistics, computer science, finance and data analytics. The analytical tools introduced in this course have applications wherever optimization techniques are used in business decision-making for managers and entrepreneurs alike. These tools are necessary for anyone seeking employment as an analyst in the corporate world.

Unit 1

Functions of several real variables Geometric representations: graphs and level curves; differentiable functions: characterisations, properties with respect to various operations and applications; second order derivatives: properties and applications; the implicit function theorem, and application to comparative statics problems; homogeneous and homothetic functions: characterisations and applications

Unit 2

Multivariate optimization Convex sets; geometric properties of functions: convex functions, their characterisations, properties and applications; further geometric properties of functions: quasiconvex functions, their characterisations, properties and applications; unconstrained optimisation: geometric characterisations, characterisations using calculus and applications; constrained optimisation with equality constraints: geometric characterisations, Lagrange characterisation using calculus and applications; properties of value function: envelope theorem and applications

Unit 3

Linear programming Introduction, graphical solution, matrix formulation, duality, economic interpretation

Unit 4

Integration, differential equations, and difference equations Definite integrals, indefinite integrals and economic applications; first order difference equations, equilibrium and its stability; first order differential equations, phase diagrams and stability

References

1. Sydsaeter, K., Hammond, P. (2002). *Mathematics for economic analysis*. Pearson Educational.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Functions of several real variables, multivariate optimisation, linear programming, integration, differential equations, and difference equations

Introductory Macroeconomics (HC22)

Core Course (CC) Credit: 6

Course Objective

This is the first module in a three-module sequence that introduces students to the basic concepts of Macroeconomics. Macroeconomics deals with the aggregate economy. This course discusses the preliminary concepts associated with the determination and measurement of aggregate macroeconomic variable like GDP, savings, investment, money, inflation, and the balance of payments. It also introduces students to simple analytical frameworks (e.g., the IS-LM model) for determination of equilibrium output.

Course Learning Outcomes

This course aims to develop the broad conceptual frameworks which will enable students to understand and comment upon real economic issues like inflation, money supply, GDP and their interlinkages. It will also allow them to critically evaluate various macroeconomic policies in terms of a coherent logical structure.

Unit 1

Introduction to macroeconomics and national income accounting Basic issues studied in macroeconomics: Measurement of gross domestic product; income, expenditure and the circular flow; real versus nominal GDP; price indices; national income accounting for an open economy; balance of payments: current and capital accounts

Unit 2

Money Functions of money; quantity theory of money; determination of money supply and demand; credit creation; tools of monetary policy

Unit 3

Inflation Inflation and its social costs; hyperinflation

Unit 4

The closed economy in the short run Classical and Keynesian systems; simple Keynesian model of income determination; IS-LM model; fiscal and monetary multipliers

References

1. Abel, A., Bernanke, B. (2016). *Macroeconomics, 9th ed.* Pearson Education.
2. Blanchard, O. (2018). *Macroeconomics, 7th ed.* Pearson Education.
3. Dornbusch, R., Fischer, S., Startz, R. (2018). *Macroeconomics, 12th ed.* McGraw-Hill.
4. Jones, C. (2016). *Macroeconomics, 4th ed.* W. W. Norton.
5. Mankiw, N. (2016). *Macroeconomics, 9th ed.* Worth Publishers.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

National income accounting, money, inflation, classical model, Keynesian model

Intermediate Microeconomics I (HC31)

Core Course (CC) Credit: 6

Course Objective

The course is designed to provide a sound training in microeconomic theory to formally analyze the behaviour of individual agents. Since students are already familiar with the quantitative techniques in the previous semesters, mathematical tools are used to facilitate understanding of the basic concepts. This course looks at the behaviour of the consumer and the producer and also covers the behaviour of a competitive firm.

Course Learning Outcomes

The course trains the students of Economics about the basic elements of consumer theory and production theory and the functioning of perfectly competitive market. This course aims to give students a solid grasp of microeconomic analysis at the intermediate-level using mathematical techniques where appropriate.

Unit 1

Consumer theory. Preference; utility; budget constraint; choice; demand; Slutsky equation; buying and selling; choice under risk and intertemporal choice; revealed preference

Unit 2

Production, costs and perfect competition Technology; isoquants; production with one and more variable inputs; returns to scale; short run and long run costs; cost curves in the short run and long run; review of perfect competition

References

1. Bernheim, B., Whinston, M. (2009). *Microeconomics*. Tata McGraw- Hill.
2. Snyder, C., Nicholson, W. (2010). *Fundamentals of microeconomics*. Cengage Learning.
3. Varian, H. (2010). *Intermediate microeconomics: A modern approach, 8th ed.* W. W. Norton.

Additional Resources

1. Bergstrom, T., Varian, H. (2014). *Workouts in intermediate microeconomics*. W. W. Norton.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Consumer theory, producer theory, perfect competition

Intermediate Macroeconomics I (HC32)

Core Course (CC) Credit: 6

Course Objective

This is the second module of a three-module sequence on Macroeconomics. This course introduces students to formal modeling of the macroeconomy in terms of analytical tools. It discusses various alternative theories of output and employment determination in a closed economy in the short run as well as medium run, and the role of policy in this context. It also introduces students to various micro-founded theories of macro behaviour, e.g., consumption and investment behaviour of households and the demand for money generated in the household sector.

Course Learning Outcomes

This course enables students to analyse the macroeconomic performance of various countries using formal analytical tools. It also allows them to evaluate important macroeconomic policies and their implications.

Unit 1

The labour market Wage determination; wages, prices and employment; natural rate of unemployment; from employment to output

Unit 2

Aggregate demand and aggregate supply curves Derivation of aggregate demand and aggregate and supply curves; interaction of aggregate demand and supply to determine equilibrium output, price level and employment

Unit 3

Inflation, unemployment and expectations Phillips curve; adaptive and rational expectations; policy ineffectiveness debate

Unit 4

Microeconomic foundations Consumption: Keynesian consumption function; Fisher's theory of optimal intertemporal choice; lifecycle and permanent income hypotheses; rational expectations and random walk of consumption expenditure

Investment: determinants of business fixed investment; residential investment and inventory investment

Demand for money

References

1. Abel, A., Bernanke, B. (2016). *Macroeconomics, 9th ed.* Pearson Education.
2. Blanchard, O. (2018). *Macroeconomics, 7th ed.* Pearson Education.
3. Branson, W. (2013). *Macroeconomics: Theory and policy, 3rd ed.* East West Press.
4. Dornbusch, R., Fischer, S., Startz, R. (2018). *Macroeconomics, 12th ed.* McGraw-Hill.
5. Jones, C. (2016). *Macroeconomics, 4th ed.* W. W. Norton.
6. Mankiw, N. (2016). *Macroeconomics, 9th ed.* Worth Publishers.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Aggregate demand, aggregate supply, inflation, unemployment, expectations

Statistical Methods for Economics (HC33)

Core Course (CC) Credit: 6

Course Objective

The course teaches students the basics of probability theory and statistical inference. It sets a necessary foundation for the econometrics courses within the Honours programme. The familiarity with probability theory will also be valuable for courses in advanced microeconomic theory.

Course Learning Outcomes

At the end of the course, the student should understand the concept of random variables and be familiar with some commonly used discrete and continuous distributions of random variables. They will be able to estimate population parameters based on random samples and test hypotheses about these parameters. An important learning outcome of the course will be the capacity to analyse statistics in everyday

life to distinguish systematic differences among populations from those that result from random sampling.

Unit 1

Introduction and overview The distinction between populations and samples and between population parameters and sample statistics

Unit 2

Elementary probability theory Sample spaces and events; probability axioms and properties; counting techniques; conditional probability and Bayes' rule; independence

Unit 3

Random variables and probability distributions Defining random variables; probability distributions; expected values and functions of random variables; properties of commonly used discrete and continuous distributions (uniform, binomial, exponential, Poisson, hypergeometric and Normal random variables)

Unit 4

Random sampling and jointly distributed random variables Density and distribution functions for jointly distributed random variables; computing expected values of jointly distributed random variables; covariance and correlation coefficients

Unit 5

Point and interval estimation Estimation of population parameters using methods of moments and maximum likelihood procedures; properties of estimators; confidence intervals for population parameters

Unit 6

Hypothesis testing Defining statistical hypotheses; distributions of test statistics; testing hypotheses related to population parameters; Type I and Type II errors; power of a test; tests for comparing parameters from two samples

References

1. Devore, J. (2012). *Probability and statistics for engineers, 8th ed.* Cengage Learning.
2. Larsen, R., Marx, M. (2011). *An introduction to mathematical statistics and its applications.* Prentice Hall.
3. Miller, I., Miller, M. (2017). *J. Freund's mathematical statistics with applications, 8th ed.* Pearson.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Population parameters, sample statistics, probability, statistical inference

Intermediate Microeconomics II (HC41)

Core Course (CC) Credit: 6

Course Objective

This course is a sequel to Intermediate Microeconomics I. The emphasis will be on giving conceptual clarity to the student coupled with the use of mathematical tools and reasoning. It covers general equilibrium and welfare, imperfect markets and topics under information economics.

Course Learning Outcomes

This course helps the students to understand efficiency of markets and the environment where the standard market mechanism fails to generate the desirable outcomes. The issues of market imperfection and market failures are important building blocks of this course.

Unit 1

General equilibrium, efficiency and welfare Equilibrium and efficiency under pure exchange and production; overall efficiency and welfare economics

Unit 2

Market structure and game theory Monopoly; pricing with market power; price discrimination; peak-load pricing; two-part tariff; monopolistic competition and oligopoly; game theory and competitive strategy

Unit 3

Market failure Externalities; public goods and markets with asymmetric information

References

1. Osborne, M. (2004). *An introduction to game theory*. Oxford University Press.
2. Snyder, C., Nicholson, W. (2010). *Fundamentals of microeconomics*. Cengage Learning.
3. Varian, H. (2010). *Intermediate microeconomics: A modern approach, 8th ed.* W. W. Norton.

Additional Resources

1. Bergstrom, T., Varian, H. (2014). *Workouts in intermediate microeconomics*. W. W. Norton.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

General equilibrium, efficiency, welfare, market structure, imperfect competition, externalities, public goods

Intermediate Macroeconomics II (HC42)

Core Course (CC) Credit: 6

Course Objective

This course is a sequel to Intermediate Macroeconomics I. In this course, students are introduced to long run issues like growth, technical progress, economics of ideas, R&D, innovation and knowledge creation. This course also provides insights into modern business cycle analysis. Finally it introduces students to open economy macro issues. At the end, it provides a long run perspective to policy-making by framing policies in a dynamic context.

Course Learning Outcomes

This course will enable students to combine their knowledge of the working of the macroeconomy with long run economic phenomena like economic growth, technological progress, R&D and innovation. It will also enable students to understand business cycles and the concomitant role of policies.

Unit 1

Economic growth Harrod-Domar model; Solow model; Golden rule, technological progress, economics of ideas, engines of growth, modern theories of endogenous growth

Unit 2

Business cycles Real business cycle theory; new Keynesian models of sticky prices

Unit 3

Open economy models Short-run open economy models; Mundell-Fleming model; exchange rate determination; purchasing power parity; asset market approach; Dornbusch's overshooting model; monetary approach to balance of payments; international financial markets

Unit 4

Fiscal and monetary policy Active or passive; monetary policy objectives and targets; rules versus discretion: time consistency; the government budget constraint; government debt and Ricardian equivalence

References

1. Abel, A., Bernanke, B. (2016). *Macroeconomics, 9th ed.* Pearson Education.
2. Blanchard, O. (2018). *Macroeconomics, 7th ed.* Pearson Education.
3. Branson, W. (2013). *Macroeconomics: Theory and policy, 3rd ed.* East West Press.
4. Dornbusch, R., Fischer, S., Startz, R. (2018). *Macroeconomics, 12th ed.* McGraw-Hill.
5. Jones, C. (2013). *Introduction to economic growth, 2nd ed.* W. W. Norton.
6. Jones, C. (2016). *Macroeconomics, 4th ed.* W. W. Norton.
7. Mankiw, N. (2016). *Macroeconomics, 9th ed.* Worth Publishers.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Economic growth, business cycles, open economy models, fiscal and monetary policy

Introductory Econometrics (HC43)

Core Course (CC) Credit: 6

Course Objective

This course introduces students to the econometric methods used to conduct empirical analysis in Economics. The course is designed to provide the students with the basic quantitative techniques needed to undertake applied research projects. It also provides the base for more advanced optional courses in econometrics.

Course Learning Outcomes

Students will learn to estimate linear models using ordinary least squares and make inferences about population parameters. They will also understand the biases created through mis-specified models, such as those that occur when variables are omitted.

Unit 1

Nature and scope of econometrics

Unit 2

Simple linear regression model: Two variable case Ordinary least squares estimation of a linear model; properties of estimators; goodness of fit; testing of hypotheses; scaling and units of measurement; confidence intervals; the Gauss-Markov theorem; forecasting and prediction

Unit 3

Multiple linear regression model Extension of the single explanatory variable case to a multivariate setting; introducing non-linearities through functions of explanatory variables

Unit 4

Violations of classical assumptions: Consequences, detection and remedies
Multicollinearity; heteroscedasticity; serial correlation

Unit 5

Specification Analysis Omission of a relevant variable; inclusion of irrelevant variable; specification tests

References

1. Dougherty, C. (2011). *Introduction to econometrics, 4th ed.* Oxford University Press.

2. Gujarati, D. (2014). *Econometrics by example, 2nd ed.* Palgrave Macmillan.
3. Gujarati, D., Porter, D. (2010). *Essentials of econometrics, 4th ed.* McGraw-Hill.
4. Kmenta, J. (2008). *Elements of econometrics.* Khosla Publishing House.
5. Maddala, G., Lahiri, K. (2009). *Introduction to econometrics, 4th ed.* Wiley.
6. Wooldridge, J. (2014). *Introduction to econometrics: A modern approach, 5th ed.* Cengage Learning.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Regression, least squares, linear models

Indian Economy I (HC51)

Core Course (CC) Credit: 6

Course Objective

Using appropriate analytical frameworks, this course reviews major trends in economic indicators and policy debates in India in the post-Independence period, with particular emphasis on paradigm shifts and turning points.

Course Learning Outcomes

At the end of the course, a student should be able to understand the development paradigm adopted in India since independence and evaluate its impact on economic as well as social indicators of progress and well being.

Unit 1

Economic development since independence

Unit 2

Human Capital: Demography, health and education

Unit 3

Growth and Distribution: Poverty, inequality, unemployment and policy interventions

Unit 4

International comparisons

References

Given the topical nature of this course, some readings will change from year to year.

1. Balakrishnan, P. (2007). The recovery of India: Economic growth in the Nehru era. *Economic and Political Weekly*, 42(45-46), 52-66.

2. Bardhan, P. (2012). *Awakening giants, feet of clay: Assessing the economic rise of China and India*. Princeton University Press.
3. Basu, K., Maertens, A. (2007). The pattern and causes of economic growth in India. *Oxford Review of Economic Policy*, 23, 143-167.
4. Bhagwati, J., Panagariya, A. (2012). *India's tryst with destiny*, Collins Business.
5. Centre for Sustainable Employment. (2018). *State of working India 2018*. Azim Premji University.
6. Desai, S. (2015). Demographic deposit, dividend and debt. *The Indian Journal of Labour Economics*, 58, 217-232.
7. Dreze, J., Khera, R. (2017). Recent social security initiatives in India, *World Development*, 98, 555-572.
8. Dreze, J., Sen, A. (2013). *India: An uncertain glory*. Allen Lane.
9. Joshi, V. (2016). *India's long road: The search for prosperity*. Allen Lane.
10. Meenakshi, J. (2016). Trends and patterns in the triple burden of malnutrition in India. *Agricultural Economics*, 47, 115-134.
11. Ministry of Finance. (2016). Universal basic income: A conversation with and within the mahatma. Chapter 9 in *Economic Survey*, 172-212.
12. Panagariya, A., Mukim, M. (2014). A comprehensive analysis of poverty in India. *Asian Development Review*, 31, 1-52.
13. Rangarajan Committee. (2014). *Report of the expert group to review the methodology for measurement of poverty*. Government of India.
14. Rawal, V., Bansal, V., Bansal, P. (2019). Prevalence of undernourishment in Indian states: Explorations based on NSS 68th round data. *Economic and Political Weekly*, 54(15), 35-45.
15. Rodgers, G. (2018). Inequality in the Indian growth regime. *Indian Journal of Human Development*, 12, 134-148.
16. Thomas, J. (2014). India's labour market during the 2000s: An overview. In K. Ramaswamy (ed.): *Labour, employment and economic growth in India*. Cambridge University Press, 21-56.
17. Verick, S. (2018). Female labor force participation and development. *IZA World of Labor*, 2, 1-11.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Indian economic development, government policy

Development Economics I (HC52)

Core Course (CC) Credit: 6

Course Objective

This is the first part of a two-part course on economic development. The course begins with a discussion of alternative conceptions of development and their justification. It then proceeds to aggregate models of growth and cross-national

comparisons of the growth experience that can help evaluate these models. The axiomatic basis for inequality measurement is used to develop measures of inequality and connections between growth and inequality are explored. The course ends by linking political institutions to growth and inequality by discussing the role of the state in economic development and the informational and incentive problems that affect state governance.

Course Learning Outcomes

This course introduces students to the basics of development economics, with in-depth discussions of the concepts of development, growth, poverty, inequality, as well as the underlying political institutions.

Unit 1

Conceptions of Development Alternative measures of development, documenting the international variations in these measures, comparing development trajectories across nations and within them

Unit 2

Growth Models and Empirics The Harrod-Domar model, the Solow model and its variants, endogenous growth models, and evidence on the determinants of growth

Unit 3

Poverty and Inequality: Definitions, Measures and Mechanisms Inequality axioms; comparison of commonly used inequality measures; connections between inequality and development; poverty measurement; characteristics of the poor; mechanisms that generate poverty traps, and path dependence of growth processes

Unit 4

Political Institutions and the Functioning of the State The determinants of democracy; alternative institutional trajectories and their relationship with economic performance; within-country differences in the functioning of state institutions; state ownership and regulation; government failures and corruption

References

1. Banerjee, A., Benabou, R., Mookerjee, D. (eds.) (2006). *Understanding poverty*. Oxford University Press.
2. Bardhan, P. (2010). *Awakening giants, feet of clay: Assessing the economic rise of China and India*. Oxford University Press.
3. Basu, K. (2007). *The Oxford companion to economics in India*. Oxford University Press.
4. Dasgupta, P. (2007). *Economics: A very short introduction*. Oxford University Press.
5. Deaton, A. (2013). *The great escape: Health, wealth and the origins of inequality*. Princeton University Press.
6. Hirschman, A. (1992). *Rival views of market society and other essays*. Ch. 3: "Linkages in Economic Development". Harvard University Press.
7. Human Development Report. Relevant years.
8. Olson, M. (1996). Big bills left on the sidewalk: Why some nations are rich, and others poor. *Journal of Economic Perspectives*, 10, 3-24.

9. Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press.
10. Piketty, T., Saez, E. (2014). Inequality in the long run, *Science*, 344.
11. Ray, D. (1998). *Development economics*. Princeton University Press.
12. Rodrik, D. (2009). *One economics, many recipes: Globalization, institutions and economic growth*. Ch. 1: "Fifty Years of Growth (and lack thereof): An Interpretation". Princeton University Press.
13. Sen, A. (2000). *Development as freedom*. Oxford University Press.
14. Shleifer, A., Vishny, R. (1993). Corruption. *Quarterly Journal of Economics*, 108, 599-617.
15. Todaro, M., Smith, S. (2015). *Economic Development*. Pearson.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Economic development, poverty, inequality

Indian Economy II (HC61)

Core Course (CC) Credit: 6

Course Objective

This course examines sector-specific policies and their impact in shaping trends in key economic indicators in India. It highlights major policy debates and evaluates the Indian empirical evidence.

Course Learning Outcomes

At the end of the course, a student should be able to understand the role of economic policies in shaping and improving economic performance in agriculture, manufacturing and services.

Unit 1

Macroeconomic policies and their impact

Unit 2

Policies and performance in agriculture

Unit 3

Policies and performance in industry and services

References

Given the topical nature of this course, readings will be updated from year to year.

1. Anand, R., Kochhar, K., Mishra, S. (2015). Make in India: Which exports can drive the next wave of growth? *IMF working paper*, WP/15/119.

2. Banga, R. (2014). Trade facilitation and 'hollowing-out' of Indian manufacturing. *Economic and Political Weekly*, 49(40), 57-63.
3. Basole, A., Basu, D., Bhattacharya, R. (2015). Determinants and impacts of subcontracting: Evidence from India's unorganised manufacturing sector. *International Review of Applied Economics*, 29, 374-402.
4. Bhagwati, J., Panagariya, A. (2012). A multitude of labor laws and their reforms. In *India's tryst with destiny*. Collins Business.
5. Centre for Sustainable Employment. (2018). State of working India 2018. *Azim Premji University*.
6. Chanda, R. (2017). Services for Indian manufacturing. In M. Dev (ed.) *India Development Report*.
7. Chatterjee, S., Kapur, D. (2017). Six puzzles in Indian agriculture. *India Policy Forum* 2016, Vol. 17.
8. Das, D., Singh, J., Choudhury, H. (2018). Judicial production of labour market flexibility: Contract labour employment in Indian organised manufacturing. In Hill and Patil (eds.): *Employment policy in emerging economies*. Routledge.
9. Deakin, S., Halder, A. (2015). How should India reform its labor laws? *Economic and Political Weekly*, 50(12), 48-55.
10. Gulati, A., Saini, S. (2017) 25 years of policy tinkering in agriculture. In R. Mohan (ed.): *India transformed: 25 years of economic reforms*. Penguin.
11. Kapoor, R., Krishnapriya, P. (2019). Explaining the contractualisation of India's workforce. *ICRIER Working Paper* 369.
12. Kumar, N. (2015). FDI and portfolio investment flows and development: A perspective on Indian experience. In U. Kapila (ed.): *Indian economy since independence, 26th ed.* Academic Foundation.
13. Ministry of Finance. (2017). Climate, climate change and agriculture. Ch. 6 in *Economic Survey*.
14. Mohan, R., Ray, P. (2017). Indian financial sector - structure, trends and turns. *IMF working paper*.
15. Panda, M. (2017). Macroeconomic development and challenges for growth. In M. Dev (ed.): *India Development Report*.
16. Rajesh, S., Sen, K. (2016). Some puzzles about firms. *Economic and Political Weekly*, 51(7), 43-51.
17. Roychowdhury, A. (2019). Application of job security laws, workers' bargaining power and employment outcomes in India. *The Economic and Labour Relations Review*, 30, 120-141.
18. Sen, K., Das, D. (2015). Where have all the workers gone? The puzzle of declining labour intensity in organised Indian manufacturing. *Economic and Political Weekly*, 50(23), 108-115.
19. Veeramani, C., Dhir, G. (2017). Make what in India? In M. Dev (ed.): *India Development Report*.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Economic development, sectoral performance, policy analysis

Development Economics II (HC62)

Core Course (CC) Credit: 6

Course Objective

This is the second course of the economic development sequence. It begins with basic demographic concepts and their evolution during the process of development. The structure of markets and contracts is linked to the particular problems of enforcement experienced in poor countries. The governance of communities and organizations is studied and this is then linked to questions of sustainable growth. The course ends with reflections on the role of globalization and increased international dependence on the process of development.

Course Learning Outcomes

This course teaches the student various aspects of the Indian economy, as well as important themes relating to the environment and sustainable development. It also introduces them to some issues of globalisation.

Unit 1

Demography and Development Demographic concepts; birth and death rates, age structure, fertility and mortality; demographic transitions during the process of development; gender bias in preferences and outcomes and evidence on unequal treatment within households; connections between income, mortality, fertility choices and human capital accumulation; migration

Unit 2

Land, Labour and Credit Markets The distribution of land ownership; land reform and its effects on productivity; contractual relationships between tenants and landlords; land acquisition; nutrition and labor productivity; informational problems and credit contracts; microfinance; inter- linkages between rural factor markets

Unit 3

Environment and Sustainable Development Defining sustainability for renewable resources; a brief history of environmental change; common-pool resources; environmental externalities and state regulation of the environment; economic activity and climate change

Unit 4

Globalisation Globalisation in historical perspective; the economics and politics of multilateral agreements; trade, production patterns and world inequality; financial instability in a globalised world

References

1. Banerjee, A., Benabou, R., Mookerjee, D. (eds.) (2006). *Understanding poverty*. Oxford University Press.
2. Dasgupta, P. (2007). *Economics: A very short introduction*. Oxford University Press.
3. Kolstad, C. (2012). *Intermediate environmental economics*. Oxford University Press.

4. Meier, G., Rauch, J. (2005). *Leading issues in economic development*. Oxford University Press.
5. Nordhaus, W. (2013). *The Climate Casino*. Yale University Press.
6. Rajan, R. (2011). *Fault lines: How hidden fractures still threaten the world economy*. Princeton University Press.
7. Ray, D. (1998). *Development economics*. Princeton University Press.
8. Rodrik, D. (2011). *The globalization paradox: Why global markets, states and democracy can't coexist*. Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Demography, development, land, labour, credit, environment, sustainable development

Discipline Specific Elective Courses

Game Theory (HE51)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

Game theory introduces the students to optimal decision making in interactive settings. This course will deal with the solution concepts for normal form and extensive form games, along with a variety of applications. Ideas related to asymmetric information among the interacting agents will also be analysed in this course. The course ends with the application of game theory to analyse moral hazard, adverse selection and signalling problems.

Course Learning Outcomes

The students will learn how to model multi-person decision making in an interactive setting. They will understand how to formulate different real life situations as games and learn to predict the optimal strategies of players and how the players can exploit strategic situations for their own benefit.

Unit 1

Normal form games The normal form; dominant and dominated strategies; dominance solvability; mixed strategies; Nash equilibrium; symmetric single population games; applications

Unit 2

Extensive form games with perfect information The game tree; strategies; subgame perfection; backward induction in finite games; commitment; bargaining; other applications

Unit 3

Simultaneous move games with incomplete information Strategies; Bayesian Nash equilibrium; applications

Unit 4

Extensive form games with imperfect information Strategies; beliefs and sequential equilibrium; applications

Unit 5

Information economics. Adverse selection; moral hazard; signalling games

References

1. Osborne, M. (2004). *An introduction to game theory*. Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Normal form games, extensive form games, complete information, Nash equilibrium, subgame perfect equilibrium, incomplete information, Bayesian Nash equilibrium, sequential equilibrium

International Trade (HE52)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

The purpose of this course is to inform the basics of international trade theory and to examine the effects of international economic policies on domestic and world welfare. This course develops a systematic exposition of models that try to explain the composition, direction, and consequences of international trade, and the determinants and effects of trade policy. Although the course is based on abstract theoretical models, students will also be exposed to real-world examples and case studies.

Course Learning Outcomes

The module aims to introduce students to the main theoretical and empirical concepts in international trade, equip students with a thorough analytical grasp of trade theory, ranging from Ricardian comparative advantage to modern theories of intra-industry trade, and familiarise students with the main issues in trade policy and with the basic features of the international trading regime. At the end of the course, the students should be able to demonstrate their understanding of the economic concepts of trade theory. In some models, the student will be required to deal with simple algebraic problems that will help them to better understand these concepts, use diagrammatic analysis to demonstrate and compare the economic welfare effects of free trade and protection, demonstrate their understanding of the usefulness and problems related to topics in international trade, and demonstrate their critical understanding of trade policies.

Unit 1

Introduction: What is international economics about? An overview of world trade. Stylized facts about international trade

Unit 2

Neoclassical trade theories: Ricardian trade theory (notion of comparative advantage and gains from trade due to specialisation); an introduction to the distributional effects of trade; the specific factor model; Heckscher-Ohlin theory: Rybczynski and Stolper-Samuelson theorems; Heckscher-Ohlin theorem; factor price equalisation

Unit 3

New trade theories: external economies of scale, internal economies of scale; the Krugman model; firm heterogeneity; international movement of factors; introduction to the theory of multinational firms

Unit 4

Trade policy: instruments of trade policy; tariffs, quotas, export subsidies, voluntary export restraints. The economics of trade policy; political economy of trade policy; controversies in trade policy

References

1. Feenstra, R., Taylor, A. (2014). *International economics*, 3rd ed. Worth Publishers.
2. Krugman, P., Obstfeld, M., Melitz, M. (2018). *International Economics - Theory and Policy*, 11th ed. Pearson Education.
3. Pugel, T. (2015). *International economics*, 16th ed. McGraw-Hill.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

International trade, theories and policy

Public Economics (HE53)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

Public economics is the study of government policy from the points of view of economic efficiency and equity. The paper deals with the nature of government intervention and its implications for allocation, distribution and stabilization. Inherently, this study involves a formal analysis of government taxation and expenditures. The subject encompasses a host of topics including public goods, market failures and externalities. The paper is divided into two sections, one dealing with the theory of public economics and the other with the Indian public finances.

Course Learning Outcomes

The module aims to introduce students to the main theoretical and empirical concepts in public economics, equip students with a thorough analytical grasp of implications of government intervention for allocation, distribution and stabilization, and familiarise students with the main issues in government revenues and expenditure. At the end of the module the students should be able to demonstrate their understanding of the public economics. In some models, the student will be required to deal with simple algebra problems that will help them to better understand these concepts, use diagrammatic analysis to demonstrate and compare the economic welfare effects of various environmental policy options, demonstrate their understanding of the usefulness and problems related to taxation and government expenditure, and demonstrate their critical understanding of public policies

Unit 1

Public Economic Theory: Fiscal functions: an overview; Public Goods: definition, models of efficient allocation, pure and impure public goods, free riding; Externalities: the problem and its solutions, taxes versus regulation, property rights, the Coase theorem; and Taxation: its economic effects; dead weight loss and distortion, efficiency and equity considerations, tax incidence, optimal taxation

Unit 2

Indian Public Finances: Tax System: structure and reforms; Budget, deficits and public debt; Fiscal federalism in India

References

1. Alam, S. (2016). GST and the states: sharing tax administrations. *Economic and Political Weekly*, 51(31).
2. Cullis, J., Jones, P. (1998). *Public finance and public choice*, 2nd ed. Oxford University Press.
3. Das, S. (2017). Some concepts regarding the goods and services tax. *Economic and Political Weekly*, 52(9).
4. Government of India. (2017). *GST - Concept and status - as on 3rd June, 2017*. Central Board of Excise and Customs, Department of Revenue, Ministry of Finance.
5. Hindriks, J., Myles, G. (2013). *Intermediate public economics*, 2nd ed. MIT Press.
6. Rao, M. (2005). Changing contours of federal fiscal arrangements in India. In A. Bagchi (ed.): *Readings in public finance*. Oxford University Press.
7. Rao, M., Kumar, S. (2017). Envisioning tax policy for accelerated development in India. *Working Paper No. 190, National Institute of Public Finance and Policy*.
8. Reddy, Y. (2015). Fourteenth finance commission: Continuity, change and way forward. *Economic and Political Weekly*, 50(21), 27-36.
9. Stiglitz, J. (2009). *Economics of the public sector*, 3rd ed. W. W. Norton.

Teaching Learning Process

Lectures and Tutorials

Assessment Methods

Internal Assessment and Final Exam

Keywords

Taxation, public expenditure, federal system, India

Financial Economics (HE54)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course provides a strong theoretical foundation and an economic framework to understand the world of modern finance. Major topics in the course include: time-value of money; fixed-income securities; bond pricing and the term structure of

interest rates; portfolio theory and pricing models such as the capital asset pricing model; hedging, speculation, and arbitrage; futures and options contracts; determination of forward and futures prices; trading strategies involving options; binomial trees; and the Black-Scholes-Merton option pricing model

Course Learning Outcomes

Students acquire extensive theoretical knowledge in portfolio risk management, capital asset pricing, and the operation of financial derivatives. The course familiarises students with the terms and concepts related to financial markets and helps them comprehend business news/articles better. The course also helps to enhance a student's understanding of real life investment decisions. The course has a strong employability quotient given the relatively high demand for skilled experts in the financial sector.

Unit 1

Investment theory and portfolio analysis: deterministic cash flow streams; basic theory of interest; discounting and present value; internal rate of return; evaluation criteria; fixed-income securities; bond prices and yields; interest rate sensitivity and duration; immunisation; the term structure of interest rates; yield curves; spot rates and forward rates

Unit 2

Single period random cash flows; mean-variance portfolio theory; random asset returns; portfolios of assets; portfolio mean and variance; feasible combinations of mean and variance; mean-variance portfolio analysis: the Markowitz model and the two-fund theorem; risk-free assets and the one-fund theorem. CAPM: the capital market line; the capital asset pricing model; the beta of an asset and of a portfolio; security market line; use of the CAPM model in investment analysis and as a pricing formula; the CAPM as a factor model, arbitrage pricing theory

Unit 3

Futures, options and other derivatives: introduction to derivatives and options; forward and futures contracts; options; other derivatives; the use of futures for hedging, stock index futures; forward and futures prices; interest rate futures and duration-based hedging strategies, option markets; call and put options; factors affecting option prices; put-call parity; option trading strategies: spreads; straddles; strips and straps; strangles; the principle of arbitrage; discrete processes and the binomial tree model; risk neutral valuation; stochastic process (continuous variable, continuous time), the Markov property, Itô's lemma; the idea underlying the Black-Scholes-Merton (BSM) differential equation, BSM pricing formulas; the Greek letters

References

1. Brealey, R., Myers, S., Allen, F., Mohanty, P. (2013). *Principles of corporate finance, 10th ed.* Tata McGraw-Hill.
2. Hull, J., Basu, B. (2017). *Options, futures, and other derivatives, 9th ed.* Pearson Education.
3. Luenberger, D. (2013). *Investment science.* Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Finance, economics

Applied Econometrics (HE55)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

The course assumes that students have a basic knowledge of statistics, mathematics as well as basic econometric theory. It builds on the compulsory Introductory Econometrics course and teaches students a broad set of commonly used econometric methods. These include estimating models with limited dependent variables and the use of instrumental variables to estimate models with endogenous regressors.

Course Learning Outcomes

Students will learn the theoretical basis for techniques widely used in empirical research and consider their application in a wide range of problems.

Unit 1

Stages in empirical econometric research

Unit 2

The linear regression model: estimation, specification and diagnostic testing: estimation, specification and inference

Unit 3

Advanced topics in regression analysis: dynamic econometric models, instrumental variable estimation, measurement errors

Unit 4

Panel data models and estimation techniques: pooled regression, fixed and random effects models

Unit 5

Limited dependent variables: logit and probit models for binary responses, tobit models for truncated data.

Unit 6

Introduction to econometric software; publicly available data sets and software will be used to estimate models and apply the techniques learned in class

References

1. Gujarati, D. (2014). *Econometrics by example, 2nd ed.* Palgrave Macmillan.

2. Gujarati, D., Porter, D. (2012). *Basic econometrics, 5th ed.* McGraw-Hill.
3. Wooldridge, J. (2014). *Introduction to econometrics: A modern approach, 5th ed.* Cengage Learning.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Regression, instrumental variables, panel data

Economic History of India 1857-1947 (HE56)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course analyses key aspects of Indian economic development during the second half of British colonial rule. In doing so, it investigates the mechanisms that linked economic development in India to the compulsions of colonial rule.

Course Learning Outcomes

The course develops critical analytical skills and exposes students to understanding the intricacies of India's economic, political and social developments both in the past and present times. It increases their employability by enhancing their ability to deal with a variety of textual and statistical sources, and to draw upon them to construct a coherent argument. These skills would be useful in a variety of careers in academics, research, journalism and the government.

Unit 1

Colonial India: background and introduction

Unit 2

Trends in national income, population; labour and occupational structure

Unit 3

Agriculture, agrarian structure and land relations

Unit 4

Railways and industry

Unit 5

Economy and state in the imperial context

References

Some readings may be updated periodically. Material for the course will be drawn from the following sources

1. Balachandran, G. (2016). Colonial India and the world economy, C. 1850-1940. In L. Chaudhary, B. Gupta, T. Roy, A. Swami (eds.): *A new economic history of colonial India*. Routledge.
2. Bogart, D., Chaudhary, L. (2016). Railways in colonial India: an economic achievement? In L. Chaudhary, B. Gupta, T. Roy, A. Swami (eds.): *A new economic history of colonial India*. Routledge.
3. Chaudhary, L., Gupta, B., Roy, T., Swami, A. (2016). Agriculture in colonial India. In L. Chaudhary, B. Gupta, T. Roy, A. Swami (eds.): *A new economic history of colonial India*. Routledge.
4. Chaudhuri K. (1982). Foreign trade and balance of payments (1757-1947). In D. Kumar, T. Raychaudhari (eds.): *Cambridge economic history of India 1757-c.1970* 2. Orient Longman.
5. Guha, S. (1991). Mortality decline in early 20th century India. *Indian Economic and Social History Review*, 28(4), 371-87.
6. Jain, L. (2011). Indigenous credit instruments and systems. In M. Kudaisya (ed.): *The Oxford India anthology of business history*. Oxford University Press.
7. Klein, I. (1984). When rains fail: Famine relief and mortality in British India. *Indian Economic and Social History Review*, 21, 185-214.
8. Krishnamurty, J. (1982). Occupational structure. In D. Kumar, T. Raychaudhari (eds.): *Cambridge economic history of India 1757-c.1970* 2. Orient Longman.
9. Morris, M. (1965). *Emergence of an industrial labour force in India*. Oxford University Press.
10. Parthasarathi, P. (2009). Historical issues of deindustrialization in nineteenth century south India. In T. Roy, G. Riello (eds.): *How India clothed the world: The world of south Asian textiles, 1500-1850*. Brill Academic.
11. Parthasarathy, P. (2011). *Why Europe grew rich and Asia did not: Global economic divergence, 1600-1850*. Chapters 2, 8. Cambridge University Press.
12. Ray, R. (1994). Introduction. In R. Ray (ed.): *Entrepreneurship and industry in India 1800-1947*. Oxford University Press.
13. Roy, T. (2018). *A business history of India: Enterprise and the emergence of capitalism from 1700*. Chapters 4, 5, 6. Cambridge University Press.
14. Roy, T. (2011). *The Economic History of India 1857-1947*, 3rd ed. Chapters 3, 5, 6, 11. Orient Longman.
15. Washbrook, D. (2012). The Indian economy and the British empire. In D. Peers, N. Gooptu (eds.): *India and the British Empire*. Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Colonial India, railways, agriculture, industry

Political Economy I (HE57)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course explores the systemic structures and institutions of capitalist economies and their evolution in a political economic framework. Students will be exposed to alternative schools of thought and are expected to read some classic texts and commentaries as well as more contemporary essays on the subject.

Course Learning Outcomes

This course prepares the students to develop critical thinking by exposing them to elements of economic thought, juxtaposing ideas and theoretical structures based largely on original texts and journal articles. Students learn to assimilate from a diverse range of opinions and crystallize their own thought processes and standpoints. This also helps them to develop advanced writing, presentation and research skills. It further enables them to comprehend a larger view of the world around us by analysing the existing social and political structures and their links with the economic processes. It is thus a crucial course, which exposes the social science dimension of economics to the students and also provides them skills to think and analyse in an interdisciplinary manner. The exposure to interdisciplinary thinking further enables the students for pursuing studies in diverse related areas such as development studies, economic sociology, critical geography, gender studies and social work as also for taking up employment in organisations ranging from international development agencies to development NGOs and corporate CSR. It also prepares the students to face the practical world of work, where economics, business, civil society organisations, social institutions and politics often cohabit in a complex interlinked structure.

Unit 1

Analysing Social Change in Historical Perspective The method of historical materialism; the transition from feudalism to capitalism; capitalism as a historical process – alternative perspectives

Unit 2

Capitalism as an Evolving Economic System Basic features; accumulation and crisis; monopoly capitalism— alternative perspectives

Unit 3

The State in Capitalism The state and the economy – contestation and mutual interdependence; the state as an arena of conflict; imperialism – the basic foundations

References

1. Baran, P. (1973). *The political economy of growth*. Chapter 3. Pelican.
2. Gurley, J. (1978). The materialist conception of history. In R. Edwards, M. Reich, T. Weisskopf (eds.): *The capitalist system, 2nd ed.* Prentice-Hall.
3. Habib, I. (1995). Capitalism in history. *Social Scientist*, 23, 15-31.
4. Harvey, D. (2014). *Seventeen contradictions and the end of capitalism*. Chapter 3. Oxford University Press.

5. Heilbroner, R. (1985). *The nature and logic of capitalism*. Chapter 4. W. W. Norton.
6. Heilbroner, R. (1987). Capitalism. In *The New Palgrave Dictionary of Modern Economics*. Macmillan. Also reprinted in Heilbroner R. (1978). *Behind the veil of economics*. W. W. Norton.
7. Heinrich, M. (2012). *An introduction to the three volumes of Karl Marx's Capital*. (English translation by A. Locascio). Monthly Review Press.
8. Hunt, E. (2004). *History of economic thought*. Chapter 1. Shilpi Publications.
9. Kalecki, M. (1972). Political aspects of full employment. In E. Hunt, J. Schwarz (eds.): *A critique of economic theory*. Penguin Books.
10. Lange, O. (1963). *Political economy, Vol. I*. Chapters 1 and 2. Macmillan.
11. Patnaik, P. (2006). Lenin's theory of imperialism today. In K. S. Jomo (ed.): *The long twentieth century: The great divergence: Hegemony, uneven development and global inequality*. Oxford University Press.
12. Schumpeter, J. (1976). *Capitalism, socialism and democracy*. Chapters 6, 7 and 8. George Allen and Unwin.
13. Shaikh, A. (2000). Economic crises. In T. Bottomore, et al. (eds.): *The dictionary of Marxist thought*. Maya Blackwell.
14. Shaikh, A. (2000). Falling rate of profit. In T. Bottomore et al. (eds.): *The dictionary of Marxist thought*. Maya Blackwell.
15. Sweezy, P. (1942). *The theory of capitalist development*. Monthly Review Press.
16. Vakulabharanam, V. (2009). The recent crisis in global capitalism: Towards a Marxian understanding. *Economic and Political Weekly*, 44, 144-150.

Additional Resources

1. Basu, D. (2017). A unified Marxist approach to accumulation and crisis in capitalist economies. *Economics Department Working Paper Series, University of Massachusetts, Amherst*.
2. O'Connor, J. (1970). The meaning of economic imperialism. Pages 101 – 111. In R. Rhodes (ed.): *Imperialism and underdevelopment*. Monthly Review Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Feudalism, capitalism, historical perspectives, economic crisis, state, imperialism, creative destruction

Economics of Health and Education (HE62)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This is a course in applied economics, which will introduce the students to the study of health and education as components of human capital in the framework of economic theory.

Course Learning Outcomes

The students will learn the role of health and education in human development. They will be able to apply economic theory to understand the demand for health care, market failure in health insurance, economic evaluation of health care programmes and the role of public policy in the healthcare industry. They will also learn to analyse the returns to education, its role in labor market signalling, and the progress of schooling in India. They will also be exposed to the theories of discrimination.

Unit 1

Role of health and education in human development: health and education outcomes and their relationship with macroeconomic performance

Unit 2

Topics in health economic theory: demand for health, Grossman's model of demand for health, information asymmetry in healthcare demand, and the health insurance market, physician induced demand, adverse selection and moral hazard in health insurance

Unit 3

Economic evaluation of health care: cost effectiveness and cost-benefit analysis; valuing life

Unit 4

Public policy in the health sector; externalities in health and health care; rationale for government intervention in the health sector

Unit 5

Education: investment in human capital; rate of return to education: private and social; quality of education; signalling of human capital; theories of discrimination; gender and caste discrimination in India

Unit 6

Education sector in India: an overview

References

1. Bhattacharya, J., Hyde, T., Tu, P. (2014). *Health economics*, Palgrave Macmillan.
2. Ehrenberg, R., Smith, R. (2012). *Modern labor economics: Theory and public policy, 11th ed.* Addison Wesley.
3. World Development Report (1993). *Investing in Health*. The World Bank.

4. World Health Organisation (2013). *The economics of the social determinants of health and health inequalities: A resource book*. World Health Organisation.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Education, health, economics, India

Environmental Economics (HE63)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course focuses on economic causes of environmental problems. In particular, economic principles are applied to environmental questions viewed as externalities and their management through various economic institutions, economic incentives and other instruments and policies. Methods for analysing economic implications of environmental policy are also addressed as well as the valuation of environmental quality, assessment of environmental damages, and tools needed for the evaluation of projects such as cost-benefit analysis, and environmental impact assessments. Selected topics on international environmental issues are also discussed.

Course Learning Outcomes

The module aims to introduce students to the main theoretical and empirical concepts in environmental economics, equip students with a thorough analytical grasp of environmental policy theory, ranging from externalities to international environmental agreements, and familiarise students with the main issues in environmental valuation and with the basic features of the environmental policy tools. At the end of the module the students should be able to demonstrate their understanding of the economic concepts of environmental policy. In some models, the student will be required to deal with simple algebra problems that will help them to better understand these concepts, use diagrammatic analysis to demonstrate and compare the economic welfare effects of various environmental policy options, demonstrate their understanding of the usefulness and problems related to environmental valuation, and demonstrate their critical understanding of environmental policies.

Unit 1

Introduction: What is environmental economics? Review of microeconomics and welfare economics

Unit 2

The theory of externalities: Pareto optimality and market failure in the presence of externalities; property rights and the Coase theorem

Unit 3

The design and implementation of environmental policy: overview; Pigouvian taxes and effluent fees; tradable permits; choice between taxes and quotas under uncertainty; implementation of environmental policy

Unit 4

International environmental problems: trans-boundary environmental problems; economics of climate change; trade and environment

Unit 5

Measuring the benefits of environmental improvements: non-market values and measurement methods; risk assessment and perception

Unit 6

Sustainable development: concepts; measurement

References

1. Aldy, J. et al. (2010). Designing climate mitigation policy. *Journal of Economic Literature*, 48, 903-934.
2. Cropper, M., Oates, W. (1992). Environmental economics: A survey, *Journal of Economic Literature*, 30, 675-740.
3. Heal, G. (2012). Reflections – defining and measuring sustainability. *Review of Environmental Economics and Policy*, 6, 147-163.
4. Kolstad, C. (2010). *Intermediate environmental economics*, 2nd ed. Oxford University Press.
5. Newell, R., Pizer, W., Raimi, D. (2013). Carbon markets 15 years after Kyoto: Lessons learned, new challenges. *Journal of Economic Perspectives*, 27, 123-46.
6. Perman, R., Ma, Y., McGilvray, J., Common, M. (2011). *Natural resource and environmental economics*, 3rd ed. Pearson Education/Addison Wesley.
7. Stavins, R. (ed.) (2012). *Economics of the environment: Selected readings*, 5th ed. W. W. Norton.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Pollution, externalities, natural resources

Open Economy Macroeconomics (HE64)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course intends to emphasise on how a country's relations to the rest of the world influence aggregate economic activity, employment, exchange rate and inflation and

forms the scope for monetary and fiscal policy. The course includes a thorough introduction to the foreign exchange market and a discussion of world level interactions. A major part of the course deals with the dynamic effects (effects over time) of economic shocks and policies. The course prepares the student for taking part in professional discussions about the design of monetary and fiscal policy and for any kind of work where it is important to have a good understanding of macroeconomic fluctuations (e.g. for making predictions of macro variables, for choosing investment where the return depend on macro developments) when the economies are open.

Course Learning Outcomes

The student will know how exchange rates, interest rates and capital movements between currencies are determined within different institutional settings for monetary policy (e.g. inflation targeting versus money supply targeting or exchange rate targeting), how a country's current account balance is determined, or, which amounts to the same, how capital movements between countries are determined, how shocks emanating abroad or in the foreign exchange market affect output, employment, inflation and interest rates, how the effects of changes in fiscal and monetary policy and shifts in private sector behaviour are modified through the foreign exchange markets and foreign trade, the role of cost competitiveness in the determination of economic activity, the different responses to economic shocks in the traded-goods and non-traded goods sectors of the economy, how the effects of policy actions and economic shocks are transmitted from country to country in the world economy, and the merits of different exchange rate systems (fixed versus flexible, monetary unions). In particular, you will learn more about the effects over time as flows accumulate to stocks and as the economy moves towards long-run equilibrium. At the end of course the will acquire to analyze the effects of macroeconomic events on the future time path of the economy, analyse how forces inherent in the initial state of the economy will tend to change the economy over time, discuss how current and future events may influence the exchange rate through expectations, and come up with policy suggestions and consider their effects over time.

Unit 1

Open-Economy Macroeconomics and Exchange Rates: National Income accounting and balance of payment; Exchange Rates and the Foreign Exchange Market; Money, Interest Rates, and Exchange Rates; Price Levels and the Exchange Rate in the Long Run; Output and the Exchange Rate in the Short Run; Fixed Exchange Rates and Foreign Exchange Intervention

Unit 2

International Macroeconomic Policy: International Monetary Systems: An Historical Overview; Financial Globalization: Opportunity and Crisis; Optimum Currency Areas and the Euro; Developing Countries: Growth, Crisis, and Reform

References

1. Feenstra, R., Taylor, A. (2014). *International economics*, 3rd ed. Worth Publishers.
2. Krugman, P., Obstfeld, M., Melitz, M. (2018). *International economics: Theory and policy*, 11th ed. Pearson Education.
3. Pugel, T. (2015). *International Economics*, 16th ed. McGraw-Hill Education.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Open economy, international economics, exchange rate

Money and Financial Markets (HE65)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course exposes students to the theory and functioning of the monetary and financial sectors of the economy. It highlights the organisation, structure, and role of financial markets and institutions. It also discusses interest rates, monetary management, and instruments of monetary control. Financial and banking sector reforms and monetary policy with special reference to India are also covered.

Course Learning Outcomes

This allows students to understand current monetary policies and financial market outcomes. It also enables them to critically evaluate policies.

Unit 1

Money: concept, functions, measurement; theories of money supply determination.

Unit 2

Financial institutions, markets, instruments, and financial innovations

Role of financial markets and institutions; problems of adverse selection and moral hazard; financial crises

Money and capital markets: organisation, structure, and reforms in India; role of financial derivatives and other innovations

Unit 3

Interest rates

Determination; sources of interest rate differentials; theories of term structure of interest rates; interest rates in India

Unit 4

Banking System

Balance sheet and portfolio management

Indian banking system: changing role and structure; banking sector reforms

Unit 5

Central banking and monetary policy

Functions, balance sheet; goals, targets, indicators, and instruments of monetary control; monetary management in an open economy; current monetary policy of India

References

1. Baye, M., Jansen, D. (2006). *Money, banking and financial markets*. AITBS.
2. Bhole, L., Mahukud, J. (2017). *Financial institutions and markets, 6th ed.* Tata McGraw-Hill.
3. Fabozzi, F., Modigliani, F., Jones, F., Ferri, M. (2010). *Foundations of financial markets and institutions, 4th ed.* Pearson Education.
4. Jadhav, N. (2009). *Monetary policy, financial stability and central banking in India*. Macmillan.
5. Khan, M. (2015). *Indian financial system, 9th ed.* Tata McGraw-Hill.
6. Mishkin, F., Eakins, S. (2017). *Financial markets and institutions, 8th ed.* Pearson.
7. Mohan, R. (2011). *Growth with financial stability: Central banking in an emerging market*. Oxford University Press.
8. Various latest issues of RBI Bulletins, Annual Reports, Reports on Currency and Finance, and Reports of the Working Group, IMF Staff Papers.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Money, financial institutions, financial innovations, banking, monetary policy

Comparative Economic Development: 1850-1950 (HE66)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course analyses key aspects of Indian economic development during the second half of British colonial rule. In doing so, it investigates the mechanisms that linked economic development in India to the compulsions of colonial rule.

Course Learning Outcomes

By analysing the history of industrialisation and economic transition, students will be able to visualise economic development in a historical perspective and assimilate material from a diverse range of opinions. It will help them to think in an interdisciplinary manner and therefore aid them in jobs where developing and presenting comparative perspectives are key tasks.

Unit 1

Introduction and overview of the countries selected for case studies - Britain, Japan, USSR, and USA

Unit 2

Agriculture, agrarian and land relations and agrarian surplus in industrialisation and economic development

Unit 3

The industrialisation process

Unit 4

The factory system and making of the industrial working class

Unit 5

The role of the state in industrial and developmental transition

References

Some readings may be updated from year to year. Material for the course will be drawn from the following sources.

1. Davies, R. (1998). *Soviet economic development from Lenin to Khrushchev*. Chapters 1, 2, 3, 4, 5, 6, 7, 8. Cambridge University Press.
2. Dobb, M. (1966). *Soviet economic development since 1917*. Chapter 17. Routledge.
3. Hughes, J., Cain, L. (1994). *American economic history, 4th ed.* Chapters 2, 3, 7, 21. Harper Collins College Publishers.
4. Hayami, Y. (1975). *A century of agricultural growth in pre-war Japan: Its relevance to Asian development*. Chapters 1, 3. University of Minnesota Press.
5. Hobsbawm, E. (1968). *Industry and empire: An economic history of Britain since 1750*. Chapters 1, 2, 3, 5, 6, 12. Weidenfeld & Nicholson.
6. Hobsbawm, E. (1984). *Worlds of labour: Further studies in the history of labour*. Chapter 11. Weidenfeld & Nicholson.
7. Johnson, C. (1982). *MITI and the Japanese miracle: The growth of industrial policy 1925-1975*. Chapter 1. Stanford University Press.
8. Macpherson, W. (1995). *The economic development of Japan 1868-1941*. Chapters 1, 2, 3, 4, 6. Cambridge University Press.
9. Norman, E. (2007). *Japan's emergence as a modern state: Political and economic problems of the Meiji period*. Chapters 3, 4. University of British Columbia Press.
10. Okochi, K., Karsh, B., Levine, S. (1974). *Workers and employees in Japan: The Japanese employment relations system*. Chapter 13. Princeton University Press.
11. Paul, G., Robert, C. (1990). *Soviet economic structure and performance, 3rd ed.* Chapters 4, 7. Harper and Row.
12. Tauger, M. (2004). Soviet peasants and collectivization 1930-39: resistance and adaptation. *Journal of Peasant Studies*, 31: 3-4. 427-456.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Land relations, agrarian surplus, industrialisation, role of the state

Law and Economics (HE67)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

While law is a non-market institution, it impacts market and non-market outcomes. By shaping incentive structure for the private individuals and the government entities, legal rules play important role in functioning of an economy. Indeed, legal rules can have astounding effects on allocation and use of resources. Besides, legal rules greatly affect the distribution of different forms of wealth. This course will illustrate how legal rules are amenable to economic analysis, and how different legal rules can lead to different outcomes in terms of allocative efficiency and distribution.

Course Learning Outcomes

This course will familiarise students with the economic approach towards thinking about the law and public policy. Students will come to recognise the law as an important organising force that influences the actions of private citizens as well as government agencies. Students will also learn how the law can support and, at times conflict with, the functioning of the market and the government, the other two important organising forces of an economy. The course will enhance critical thinking and an inter-disciplinary approach towards the law, economics, and policymaking. Thereby, the course will help to develop an inter-disciplinary approach and enhance the employability of students.

Unit 1

Law and economics: efficiency criteria in welfare economics; Coase theorem; prisoners' dilemma. Contracts; role of contracts for the functioning of markets; efficient contracts; damages measures and their efficiency properties; property rights and their role in resource allocation; Coase theorem; legal remedies for breach of property rights and their economic effects; liability for accidents and harms; product liability; efficiency of liability rules; efficiency-compensation trade-off. Litigation - its causes and consequences; benefits of legal certainty

Unit 2

Law and public policy; land and property; market and non-market mechanisms for allocation and transfer of land; land markets; eminent domain – the land acquisition law; land-pooling. Contracts for provisions of public goods: procurement contracts; government provisions vs. public-private partnerships; cost-quality trade-off. Intellectual Property Rights (IPRs): patents, copyright and trademarks. Cost and benefits of private IPRs; individual rights vs. common good

References

1. Cooter, R., Ulen, T. (2013). *Law and economics*. Pearson.
2. Hart, O. (2003). Incomplete contracts and public ownership: Application to public-private partnerships. *The Economic Journal*, 113, 69-76.
3. Miceli, T. (2012). *The theory of eminent domain: Private property, public use, 2nd ed.* Cambridge University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Law, policy, economics

Political Economy II (HE68)

Discipline Specific Elective (DSE) Credit: 6

Course Objective

This course explores some of the fundamental structural changes and dynamics of the advanced capitalist system since the development of Fordism to the contemporary period. Particularly, the course analyses the changes in the organization of production, labour market institutions as well as shifts in corporate, managerial, financial and inter-firm governance structures. It further analyses the role of the state in the era of globalization, by studying both its changed ideological foundation and varied practices. It goes on to examine the social and geopolitical consequences of such fundamental shifts. It also integrates contemporary issues of gender and environment in a political economy framework. Though grounded in political economic traditions, the course also exposes the students to interdisciplinary thought and content. It also offers a layered and contrasting perspective to some of the issues analysed in the core theoretical courses, such as microeconomics and macroeconomics. It also provides a more global and interdisciplinary context for analyzing the issues studied in the compulsory courses on the Indian Economy and Development Economics. Whereas the course is related to the fifth semester DSE course Political Economy I, it is largely a stand-alone independent course and can be pursued without any detailed knowledge of the fifth semester course.

Course Learning Outcomes

This course exposes the students to the realities of the contemporary world economy and teaches them to develop critical analysis in an integrated and broader political economy framework. It thus enables them to form a more informed view of the world we inhabit by analyzing some of the most contemporary trends and developments from different perspectives. It also exposes the students to interdisciplinary skills and written argumentation, and prepares them for a more holistic research framework. The exposure to interdisciplinary thinking further enables the students for pursuing studies in diverse related areas such as development studies, economic sociology, critical geography, gender studies and social work as also for taking up employment in

organisations ranging from international development agencies to development NGOs and corporate CSR. It also prepares the students to face the practical world of work, where economics, business, civil society organisations, social institutions and politics often cohabit in a complex interlinked structure, and employees are expected to comprehend and synthesize materials from diverse sources and perspectives.

Unit 1

Introduction and Historical Overview: Perspective on political economy with a historical overview: Capitalist development in the pre Second World War period, the 'Golden Age' and later

Unit 2

Changing Dynamics of Capitalist Production, Organisational Form and Labour Process: Fordist and Post-Fordist production; The changing dynamics of the organisation of production, markets and labour process; The evolution of the multinational corporations and their economic logic; The contemporary forms value chain networks and forms of inter-firm governance; The changing nature of employment, job security and labour rights

Unit 3

The State in the Era of Globalisation: Ideology, Theory and Practice: Theoretical foundations and ideological underpinnings of the neoliberal state; The neoliberal state in practice: social contradictions, instability, and the nature of resolutions in a globalized world

Unit 4

The Changing Role of Finance: The changing role of finance in the dynamics of capital accumulation and the shifts in corporate structure; Financialisation: its nature and consequences

Unit 5

The Social Dimension: Globalization and Uneven Development – Growth, inequality and crisis in an uneven geographical spread and its social ramifications

Unit 6

Broader Perspectives (Gender and Environment): Dimensions of Gender in work, accumulation and globalization; Political economic issues in environment, sustainability and inequality

References

This course will draw upon the following readings:

1. Arnold, D., Bongiovi, J. (2013). Precarious, informalising, and flexible work: Transforming concepts and understandings. *American Behavioral Scientist*, 57, 289-308.
2. Beaud, M. (2001). *A history of capitalism, 1500-2000*. Chapters 2, 4, 5. Monthly Review Press.
3. Boyce, J. (2002). *The political economy of the environment*. Chapter 4. Edward Elgar.

4. Chang, D. (2009). Informalising labour in Asia's global factory. *Journal of Contemporary Asia*, 39, 161-179.
5. Dore, R. (2008). Financialisation of the global economy. *Industrial and Corporate Change*, 17, 1097-1112.
6. Dumenil, G., Levy, D. (2011). *The crisis of neoliberalism*. Chapter 1. Harvard University Press.
7. Elam, M. (1994). Puzzling out the post-Fordist debate: Technology, markets and institutions. In A. Amin (ed.): *Post-Fordism: A reader*. Blackwell.
8. Foster, J. (2009). *The ecological revolution*. Introduction. Cornerstone Publications.
9. Gereffi, G., Humphrey, J., Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy*, 12, 78-104.
10. Gottfried, H. (2013). *Gender, work and economy: Unpacking the global economy*. Chapter 10. Polity Press.
11. Harvey, D. (2005). *A brief history of neoliberalism*. Introduction, Chapters 1-3. Oxford University Press.
12. Hymer, S. (1975). The multinational corporation and the law of uneven development. In H. Radice (ed.): *International firms and modern imperialism*. Penguin Books.
13. Reddy, N. (2003). Economic globalisation, past and present: The challenges to labour. In K. Jomo, K. Jin (eds.): *Globalization and its discontents, revisited*. Tulika Books.
14. Sen, A. (1990). Gender and cooperative conflicts. In I. Tinker (ed.): *Persistent inequalities: Women and world development*. Oxford University Press.
15. Tonkiss, F. (2008). *Contemporary economic sociology: Globalisation, production, inequality*. Chapter 4. Routledge.

Additional Resources

1. Dumenil, G., Levy, D. (2004). *Capital resurgent: Roots of the neoliberal revolution*. Chapter 11. Harvard University Press.
2. Evans, P. (1998). Transnational corporations and the third world states: From old internationalisation to the new. In R. Wright, R. Rowthorn (eds.): *Transnational corporations and the global economy*. UNU/WIDER, Macmillan Press.
3. Vaasudevan, R. (2013). *Things fall apart: From the crash of 2008 to the great slump*. Chapter 3. Sage Publications.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Fordism, globalisation, MNCs, global value chains, labour flexibility, informalisation, financialisation, corporate governance, neoliberalism, gender, feminisation, environment

Generic Elective Courses

Introductory Microeconomics (GE11)

Generic Elective (GE) Credit: 6

Course Objective

This course is designed to expose the students to the basic principles of microeconomic theory. The emphasis will be on thinking like an economist and the course will illustrate how microeconomic concepts can be applied to analyze real-life situations.

Course Learning Outcomes

The course introduces the students to the first course in Economics from the perspective of individual decision making as consumers and producers. The students learn some basic principles of microeconomics, interactions of supply and demand and characteristics of perfect and imperfect markets.

Unit 1

Introduction What is microeconomics? Scope and method of economics; the economic problem: scarcity and choice; the concept of opportunity cost; the question of what to produce, how to produce and how to distribute output; science of economics; Institutions for allocating resources; the basic competitive model; prices, property rights and profits; incentives and information; rationing; positive versus normative analysis. The Scientific method; the role of assumptions; models and mathematics; why economists sometimes disagree. Interdependence and gains from trade; specialisation and trade; absolute advantage; comparative advantage and trade

Unit 2

Supply and demand: Markets and welfare Markets and competition; determinants of individual demand/supply; demand/supply schedule and demand/supply curve; market versus individual demand/supply; shifts in the demand/supply curve, demand and supply together; how prices allocate resources; elasticity and its application; controls on prices; taxes and the costs of taxation; consumer surplus; producer surplus and the efficiency of the markets. Application to international trade; comparison of equilibria with and without trade, the winners and losers from trade; effects of tariffs and quotas; benefits of international trade; some arguments for restricting trade

Unit 3

The households The consumption decision - budget constraint, consumption and income/price changes, demand for all other goods and price changes; description of preferences (representing preferences with indifference curves); properties of indifference curves; consumer's optimum choice; income and substitution effects; labour supply and savings decision - choice between leisure and consumption

Unit 4

The Firm and Perfect Market Structure Behaviour of profit maximizing firms and the production process; short run costs and output decisions; costs and output in the long run

Unit 5

Imperfect Market Structure Monopoly and anti-trust policy; government policies towards competition; imperfect competition

Unit 6

Input Markets Labour and land markets - basic concepts (derived demand, productivity of an input, marginal productivity of labour, marginal revenue product); demand for labour; input demand curves; shifts in input demand curves; competitive labour markets; and labour markets and public policy

References

1. Bernheim, B., Whinston, M. (2009). *Microeconomics*. Tata McGraw-Hill.
2. Mankiw, N. (2007). *Economics: Principles and applications, 4th ed.* Cengage Learning.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Supply, demand, elasticity, consumer behaviour, firm behaviour, perfect and imperfect markets

Introductory Macroeconomics (GE21)

Generic Elective (GE) Credit: 6

Course Objective

This course aims to introduce the students to the basic concepts of Macroeconomics. Macroeconomics deals with the aggregate economy. This course discusses the preliminary concepts associated with the determination and measurement of aggregate macroeconomic variable like GDP, savings, investment, money, inflation, and the balance of payments. It also introduces students to simple analytical frameworks (e.g., the IS-LM model) for determination of equilibrium output.

Course Learning Outcomes

This course will allow students to understand the basic functioning of the macroeconomy.

Unit 1

Introduction to macroeconomics and national income accounting Basic issues studied in macroeconomics; measurement of gross domestic product; income, expenditure and the circular flow; real versus nominal GDP; price indices; national income accounting for an open economy; balance of payments: current and capital accounts

Unit 2

Money Functions of money; quantity theory of money; determination of money supply and demand; credit creation; tools of monetary policy

Unit 3

Inflation Inflation and its social costs; hyperinflation

Unit 4

The closed economy in the short run Classical and Keynesian systems; simple Keynesian model of income determination; IS-LM model; fiscal and monetary multipliers

References

1. Abel, A., Bernanke, B. (2016). *Macroeconomics, 9th ed.* Pearson Education.
2. Blanchard, O. (2018). *Macroeconomics, 7th ed.* Pearson Education.
3. Dornbusch, R., Fischer, S., Startz, R. (2018). *Macroeconomics, 12th ed.* McGraw-Hill.
4. Jones, C. (2016). *Macroeconomics, 4th ed.* W. W. Norton.
5. Mankiw, N. (2016). *Macroeconomics, 9th ed.* Worth Publishers.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

GDP, BOP, money, inflation, classical model, Keynesian model

Data Analysis (GE31)

Generic Elective (GE) Credit: 6

Course Objective

This is a skill enhancement course for data analysis. The students will be given hands on training on using statistical and computing software to better visualize and understand data concepts. The course is to be delivered through 2 classroom lectures and 4 computer lab classes per week.

Course Learning Outcomes

The course will use data simulations and publicly available data sources to help students learn about data types, their organization and visual representation. They will learn how to compute summary statistics and do some basic statistical inference.

Unit 1

Introduction to the course: How can the representation and analysis of data help us study real-world problems. Publicly available data sets

Unit 2

Using Data: Available statistical software, steps in data storage, organization and cleaning

Unit 3

Visualization and Representation: Alternative forms of presenting summarizing and presenting data

Unit 4

Simple estimation techniques and tests for statistical inference

References

1. Levine, D., Stephan, D., Szabat, K. (2017). *Statistics for managers using Microsoft Excel, 8th ed.* Pearson.
2. Tattar, P., Ramaiah, S., Manjunath, B. (2018). *A course in statistics with R.* Wiley.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Data representation, statistical software, estimation

Money and Banking (GE32)

Generic Elective (GE) Credit: 6

Course Objective

This course highlights the organization, structure and role of financial markets and institutions. It also discusses interest rates, monetary management and instruments of monetary control. Financial and banking sector reforms and monetary policy with special reference to India are also covered.

Course Learning Outcomes

This course exposes students to the theory and functioning of the monetary and financial sectors of the economy.

Unit 1

Money Concept, functions, measurement; theories of money supply determination

Unit 2

Financial institutions, markets, instruments and financial innovations

Role of financial markets and institutions; problem of asymmetric information – adverse selection and moral hazard; financial crises

Money and capital markets: organisation, structure and reforms in India; role of financial derivatives and other innovations

Unit 3

Interest rates Determination; sources of interest rate differentials; theories of term structure of interest rates; interest rates in India

Unit 4

Banking system Balance sheet and portfolio management.

Indian banking system: Changing role and structure; banking sector reforms.

Unit 5

Central banking and monetary policy Functions, balance sheet; goals, targets, indicators and instruments of monetary control; monetary management in an open economy; current monetary policy of India

References

1. Bhole, L., Mahukud, J. (2017). *Financial institutions and markets*, 6th ed. Tata McGraw-Hill.
2. Fabozzi, F., Modigliani, F., Jones, F., Ferri, M. (2010). *Foundations of financial markets and institutions*, 4th ed. Pearson Education.
3. Khan, M. (2015). *Indian financial system*, 9th ed. Tata McGraw-Hill.
4. Mishkin, F., Eakins, S. (2017). *Financial markets and institutions*, 8th ed. Pearson.
5. Various latest issues of RBI Bulletins, Annual Reports, Reports on Currency and Finance, and Reports of the Working Group, IMF Staff Papers.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Money, financial institutions, financial innovations, interest rate, banking, monetary policy

Indian Economy I (GE33)

Generic Elective (GE) Credit: 6

Course Objective

This course reviews major trends in aggregate economic indicators in India and places these against the backdrop of major policy debates in India in the post-independence period.

Course Learning Outcomes

This course will help students understand the key issues related to the Indian economy. It will broaden their horizons and enable them to analyze current economic policy thus improving their chances of getting employed, and be more effective, in positions of responsibility and decision making.

The course also serves as the base for further study of sector specific policy discussion that is pursued in the course in the next semester.

Unit 1

Issues in Growth, Development and Sustainability

Unit 2

Factors in development: Capital formation (physical and human); technology; institutions

Unit 3

Population and economic development: Demographic trends; urbanisation

Unit 4

Employment: Occupational structure in the organised and unorganised sectors; open-, under- and disguised- unemployment (rural and urban); employment schemes and their impact

Unit 5

Indian development experience: Critical evaluation of growth, inequality, poverty and competitiveness, pre- and post- reform eras

References

Given the current nature of the course, the readings will be updated every year. Selected chapters will be prescribed from:

1. Agrawal, P. (ed.) (2018). *Sustaining high growth in India*, Cambridge University Press.
2. Balakrishnan, P. (2007). The recovery of India: Economic growth in the Nehru era. *Economic and Political Weekly*, 42(45-46), 52-66.
3. Bloom, D. (2012). Population dynamics in India and implications for economic growth. In C. Ghate (ed.): *The Oxford handbook of the Indian economy*. Oxford University Press.
4. Case, K., Fair, R. (2007). *Principles of economics*, 8th ed. Chapter 31. Pearson.
5. Dreze, J., Sen, A. (2013). *India: An uncertain glory*. Allen Lane.
6. Kapila, U. (2009). *Economic development and policy in India*. Academic Foundation.
7. Kapila, U. (2015). *Indian economy since independence*, 26th ed. Academic Foundation.
8. Mehrotra, S. (2015). *Realising the demographic dividend: Policies to achieve inclusive growth in India*. Cambridge University Press.
9. Ministry of Finance. *Economic survey* (latest)
10. Ministry of Finance. *Finance commission report* (latest)

11. Mohan, R. (2014). Pressing the Indian growth accelerator: Policy imperatives. *IMF papers*.
12. Todaro, M., Smith, S. (2011). *Economic development, 11th ed.* Pearson.
13. United Nations Development Programme. (2010). *Human development report 2010*. Palgrave Macmillan.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Indian economic development, government policy

Economic History of India (GE34)

Generic Elective (GE) Credit: 6

Course Objective

This course analyses key aspects of Indian economic development during the second half of British colonial rule. In doing so, it investigates the mechanisms that linked economic development in India to the compulsions of colonial rule.

Course Learning Outcomes

The course exposes the students to understanding the intricacies of India's economic, political and social developments both in the past and present times. It develops analytical skills, and will be useful in a variety of careers in academics, research, journalism, private sector and government.

Unit 1

Colonial India: Background and introduction

Unit 2

Macro trends in national income, population, labour and occupational structure

Unit 3

Agriculture, agrarian structure and land relations

Unit 4

Railways and industry

Unit 5

Economy and state in the imperial context

References

Some readings may be updated from year to year.

1. Chatterjee, B. (1992). *Trade, tariffs and empire*. Oxford University Press.

2. Chaudhary, L., Gupta, B., Roy, T., Swami, A. (eds.) (2016). *A new economic history of colonial India*. Chapters 4, 7, 9. Routledge.
3. Guha, S. (1991). Mortality decline in early 20th century India. *Indian Economic and Social History Review*, 28(4), 371-87.
4. Habib, I. (2006). *Indian economy 1858-1914: A people's history of India*. Chapter 3. Tulika.
5. Klein, I. (1984). When rains fail: Famine relief and mortality in British India. *Indian Economic and Social History Review*, 21 (2), 185-214.
6. Kumar, D. (ed.) (1982). *Cambridge economic history of India, c.1751-c.1970* 2. Chapters 8, 12. Orient Longman.
7. Morris, M. (1965). *Emergence of an industrial labour force in India*. Chapter 11. Oxford University Press.
8. Parthasarathy, P. (2011). *Why Europe grew rich and Asia did not: Global economic divergence, 1600-1850*. Chapters 2, 8. Cambridge University Press.
9. Parthasarathi, P. (2009). Historical issues of deindustrialization in nineteenth century South India. In T. Roy, G. Riello (eds.): *How India clothed the world: The world of South Asian textiles, 1500-1850*. Brill.
10. Roy, T. (2018). *A business history of India: Enterprise and the emergence of capitalism from 1700*. Chapters 4, 5. Cambridge University Press.
11. Roy, T. (2011). *The economic history of India 1857-1947, 3rd ed.* Chapters 3, 11. Orient Longman.
12. Subramanian, L. (2010). *History of India 1707-1857*. Chapter 4. Orient Blackswan.
13. Tomlinson, B. (1975). India and the British Empire 1880-1935. *The Indian Economic and Social History Review*, 12(14), 337-380.
14. Washbrook, D. (2012). The Indian economy and the British empire. In D. Peers, N. Gooptu (eds.): *India and the British empire*. Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Colonial India, agriculture, industry, demography

Public Finance (GE41)

Generic Elective (GE) Credit: 6

Course Objective

This course is a non-technical overview of government finances with special reference to India. The course does not require any prior knowledge of economics. It will look into the efficiency and equity aspects of taxation of the centre, states and the local governments and the issues of fiscal federalism and decentralisation in India. The course will be useful for students aiming towards careers in the government sector, policy analysis, business and journalism.

Course Learning Outcomes

The module aims to introduce students to the main concepts in public finance, equip students with a thorough analytical grasp of government taxes: direct and indirect taxes, and familiarise students with the main issues in government expenditure. At the end of the module the students should be able to demonstrate their understanding of the economic concepts of public finances, use diagrammatic analysis to demonstrate and compare the economic welfare effects of various government policy options, and demonstrate their understanding of the usefulness and problems related to government revenues and expenditures.

Unit 1

Theory: Overview of Fiscal Functions, Tools of Normative Analysis, Pareto Efficiency, Equity and the Social Welfare; Market Failure, Public Good and Externalities; Elementary Theories of Product and Factor Taxation (Excess Burden and Incidence)

Unit 2

Issues from Indian Public Finance: Working of Monetary and Fiscal Policies; Current Issues of India's Tax System; Analysis of Budget and Deficits; Fiscal Federalism in India; State and Local Finances

References

1. Alam, S. (2016). GST and the states: sharing tax administrations. *Economic and Political Weekly*, 51(31).
2. Cullis, J., Jones, P. (1998). *Public finance and public choice*, 2nd ed. Oxford University Press.
3. Das, S. (2017). Some concepts regarding the goods and services tax. *Economic and Political Weekly*, 52(9).
4. Government of India. (2017). *GST - Concept and status - as on 3rd June, 2017*. Central Board of Excise and Customs, Department of Revenue, Ministry of Finance.
5. Hindriks, J., Myles, G. (2013). *Intermediate public economics*, 2nd ed. MIT Press.
6. Rao, M. (2005). Changing contours of federal fiscal arrangements in India. In A. Bagchi (ed.): *Readings in public finance*. Oxford University Press.
7. Rao, M., Kumar, S. (2017). Envisioning tax policy for accelerated development in India. *Working Paper No. 190, National Institute of Public Finance and Policy*.
8. Reddy, Y. (2015). Fourteenth finance commission: Continuity, change and way forward. *Economic and Political Weekly*, 50(21), 27-36.
9. Stiglitz, J. (2009). *Economics of the public sector*, 3rd ed. W. W. Norton.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Taxation, public expenditure, policy

Indian Economy II (GE42)

Generic Elective (GE) Credit: 6

Course Objective

The course seeks to equip students with sector-specific knowledge and skills to analyse key economic issues and policy documents. It will also enable them to relate theoretical frameworks of macroeconomics and microeconomics to the Indian context.

Course Learning Outcomes

Students will have capability to understand government policies and will enable informed participation in economic decision making, thus improving their employment prospects and career advancement.

Unit 1

Macroeconomic policies and their Impact: Fiscal, financial and monetary policies

Unit 2

Agriculture: Policies and performance; production and productivity; credit; labour; markets and pricing; land reforms; regional variations

Unit 3

Industry: Policies and performance; production trends; small scale industries; public sector; foreign investment, labour regulation

Unit 4

Services and trade: Trends and performance; trade and investment policy

References

Given the nature of the course, readings will be updated every year.

1. Anant, T. (2006). Institutional reforms for agriculture growth. In N. Majumdar, U. Kapila (eds.): *Indian agriculture in the new millennium: Changing perceptions and development policy*, Vol. 2. Academic Foundation.
2. Balakrishnan, P. (2014). The great reversal: A macro story. *Economic and Political Weekly*, 49 (21), 29-34.
3. Bhaduri, A. (2012). Productivity and production relations: The case of Indian agriculture. In A. Bhaduri (ed.): *Employment and development*. Oxford University Press.
4. Bhagwati, J., Panagariya, A. (2012). A multitude of labor laws and their reforms. In *India's tryst with destiny*. Collins Business.
5. Chanda, R. (2012). Services led growth. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
6. De, S. (2012). *Fiscal policy in India: Trends and trajectory*. Ministry of Finance Working Paper.

7. Dev, M. (2012). Agricultural development. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
8. Dev, S., Rao, N. (2010). Agricultural price policy, farm profitability and food security. *Economic and Political Weekly*, 45 (26-27), 174-181.
9. Dhar, B. (2015). India's new foreign trade policy. *Economic and Political Weekly*, 50(16), 14-16.
10. Ghatak, M. (2012). Land reforms. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
11. Gulati, A., Saini, S. (2017) 25 years of policy tinkering in agriculture. In R. Mohan (ed.): *India transformed: 25 years of economic reforms*. Penguin.
12. Kanagasabapathy, K., Tilak, V., Krishnaswamy, R. (2013). A rethink on India's foreign trade policy. *Economic and Political Weekly*, 48 (31), 137-139.
13. Kumar, N. (2015). FDI and portfolio investment flows and development: A perspective on Indian experience. In U. Kapila (ed.): *Indian economy since independence, 26th ed.* Academic Foundation.
14. Ministry of Finance. Clothes and shoes: Can India reclaim small scale manufacturing? *Economic Survey, 2016-17*, 1.
15. Nagaraj, R. (2017). Economic reforms and manufacturing sector growth. *Economic and Political Weekly*, 52(2), 61-68.
16. Nayak, P. (2012). Privatization. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.
17. Panda, M. (2017). Macroeconomic scenario and policy options. In M. Dev (ed.): *India development report 2017*. Oxford University Press.
18. Vaidyanathan, A. (2012). Irrigation. In K. Basu, A. Maertens (eds.): *New Oxford companion to economics in India*. Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Indian economic development, government policy

Global Political Economy (GE43)

Generic Elective (GE) Credit: 6

Course Objective

This generic elective course introduces students to the contemporary structures, trends and developments in the Global Economy through a Political Economy lens. It explores the period since the end of Second World War up to recent global economic crisis – from the 'Golden age of capitalism' to the 'neoliberal' shift. It particularly explores changes in the organization of production and corporate structure along with changes in labour processes and labour regimes and also the increasing dominance of finance in the contemporary world. It also examines the shifts in the nature, scope and ideology of the state under globalisation.

Course Learning Outcomes

This course enables students who have not studied economics at the undergraduate level to develop a critical understanding of the contemporary global economy. It enables them to form a more informed view of the world we inhabit by analyzing some of the economic trends and developments over the last five or six decades. As the economy is a crucial sphere both of social life in general and the world of work in particular, an analytical exposure to the structures, institutions and processes of the global economy will thus enrich their comprehension of the contemporary world. With such a comprehension, students from all backgrounds will thus be better prepared to face the professional world and can use the knowledge base of this course for facing the challenges of group discussions and general interviews for corporate or civil service jobs. Students of other social sciences and humanities, who intend to pursue higher studies and research, will also immensely benefit from this course by being able to develop an interdisciplinary understanding of basic economic structures and processes, which are often crucial to the understanding of their core subjects.

Unit 1

Introduction and overview: Perspectives on political economy of globalisation with a historical overview

Unit 2

Changing dynamics of capitalist production, organisational forms and labour processes: Fordist and post-Fordist production regimes; multinational corporations – evolution, structural form and dynamics; global value chains and production networks; the changing nature of employment, job security and labour rights in a globalised economy

Unit 3

The political economy of global trade: Structure and institutions of the international trade regime

Unit 4

The role of finance in the globalised economy: financialisation of the global economy – trends, instruments, features and consequences

Unit 5

The state in the era of globalisation: Globalisation and the limits of the welfare and developmental states; the neoliberal state.

Unit 6

Global economic instability and crisis: The 2008 global economic crisis – prelude, proximate and long term causes; possibility of recurring crises.

References

1. Bhaduri, A. (2002). Nationalism and economic policy in the era of globalization. In D. Nayyar (ed.): *Governing globalization: Issues and institutions*. Oxford University Press.
2. Chang, D. (2009). Informalising labour in Asia's global factory. *Journal of Contemporary Asia*, 39, 161-179.

3. Dore, R. (2008). Financialisation of the global economy. *Industrial and Corporate Change*, 17, 1097-1112.
4. Harvey, D. (2005). *A brief history of neoliberalism*. Introduction, Chapters 1-3. Oxford University Press.
5. Hymer, S. (1975). The multinational corporation and the law of uneven development. In H. Radice (ed.): *International firms and modern imperialism*. Penguin Books.
6. Nayyar, D. (2003). Globalisation and development. In H.-J. Chang (ed.): *Rethinking development economics*. Anthem Press.
7. Reddy, N. (2003). Economic globalisation, past and present: The challenges to labour. In K. Jomo, K. Jin (eds): *Globalization and its discontents, revisited*. Tulika Books.
8. Rodrik, D. (2011). *The globalization paradox: Why global markets, states and democracy can't coexist*. Oxford University Press.
9. Thun, E. (2011). The globalization of production. In J. Ravenhill (ed.): *Global political economy*. Chapter 11. Oxford University Press.
10. Tonkiss, F. (2008). *Contemporary economic sociology: Globalisation, production, inequality*. Chapter 4. Routledge.
11. Vakulabharanam, V. (2009). The recent crisis in global capitalism: Towards a Marxian understanding. *Economic and Political Weekly*, 44, 144-150.
12. Varoufakis, Y. (2011). *The global Minotaur: America, the true origins of the financial crisis and the future of the world economy*. Zed Books.
13. Winham, G. (2011). The evolution of the global trade regime. In J. Ravenhill (ed.): *Global political economy*. Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Fordism, globalisation, MNCs, global production networks, labour flexibility, informalisation, global trade regime, financialisation, state under globalisation, neoliberalism, economic crisis

Game Theory (GE44)

Generic Elective (GE) Credit: 6

Course Objective

Game theory is used in various fields, such as economics, biology, business, law, politics, sociology, and computer science. The purpose of this course is to introduce the basics of game theory to undergraduate students in various disciplines. Game Theory introduces the students to optimal decision making under an interactive settings. This course introduces the basic concepts of game theory in a way that allows students to use them in solving simple problems in various disciplines. The course will deal with the solution concepts for normal form and extensive form games along with a variety of applications. Ideas related to asymmetric information among the interacting agents would also be analysed in this course. The course ends with the

application of game theory to analyse moral hazard, adverse selection and signalling problems.

Course Learning Outcomes

The students will learn how to model multi-person decision-making in an interactive setting. They will understand how to formulate different real life situations as games and learn to predict the optimal strategies of players and how the players can exploit strategic situations for the benefit of their own.

Unit 1

Normal form games. The normal form; dominant and dominated strategies; dominance solvability; mixed strategies; Nash equilibrium; symmetric single population games; applications

Unit 2

Extensive form games with perfect information. The game tree; strategies; subgame perfection; backward induction in finite games; commitment; bargaining; other applications

Unit 3

Simultaneous move games with incomplete information. Strategies; Bayesian Nash equilibrium; applications

Unit 4

Extensive form games with imperfect information. Strategies; beliefs and sequential equilibrium; applications

Unit 5

Information economics. Adverse selection; moral hazard; signalling games

References

1. Osborne, M. (2004). *An introduction to game theory*. Oxford University Press.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Normal form games, extensive form games, complete information, Nash equilibrium, subgame perfect equilibrium, incomplete information, Bayesian Nash equilibrium, sequential equilibrium

Skill Enhancement Elective Courses

Data Analysis (HS31)

Skill Enhancement Elective Courses (SEC) Credit: 4

Course Objective

This is a skill enhancement course for data analysis. The students will be given hands on training on using statistical and computing software to better visualize and understand data concepts. The course is designed to be delivered through 2 classroom lectures and 4 computer lab classes per week.

Course Learning Outcomes

The course will use data simulations and publicly available data sources to help students learn about data types, their organization and visual representation. They will learn how to compute summary statistics and do some basic statistical inference.

Unit 1

Introduction to the course: How can the representation and analysis of data help us study real-world problems. Publicly available data sets

Unit 2

Using Data: Available statistical software, steps in data storage, organisation and cleaning

Unit 3

Visualisation and Representation: Alternative forms of presenting summarising and presenting data

Unit 4

Simple estimation techniques and tests for statistical inference

References

1. Levine, D., Stephan, D., Szabat, K. (2017). *Statistics for managers using Microsoft Excel, 8th ed.* Pearson.
2. Tattar, P., Ramaiah, S., Manjunath, B. (2018). *A course in statistics with R.* Wiley.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Data representation, statistical software, estimation

Research Methodology (HS41)

Skill Enhancement Elective Course (SEC) Credit: 4

Course Objective

The course begins with the formulation of a research problem and covers the issues concerning the generation of primary sample data. In this regard the designing of a questionnaire, the methods of design of a sample and its size, the modes of data collection from direct interview to online surveys, the appreciation of possible sources of errors, and the cleaning of data forms the bulk of the classroom instruction.

Course Learning Outcomes

The course imparts skills to undertake data based research. The student enrolling in this course would develop competency in executing sample surveys and would have reasonable exposure to a variety of secondary data sources.

Unit 1

Data types and sources: Qualitative and quantity data, measurement and scales; secondary sources of data and institutions

Unit 2

Sample questionnaires: Measurement and scales; questionnaires

Unit 3

Sample type and size: Simple random sampling; cluster sampling; stratified sampling and its complications; Determining an appropriate size

Unit 4

Errors in surveys: Misunderstanding of questions and answers; problem of non-response

Unit 5

Processing of survey data: Cleaning of data and its coding

Unit 6

Ethics and scientific integrity: Standards of conduct, privacy in data

References

1. Bethlehem, J. (2009). *Applied survey methods: A statistical perspective*. Wiley.
2. Cochran, W. (2008). *Sampling techniques*, 3rd ed. Wiley.
3. Cooper, D., Schindler, P., Sharma, J. (2012). *Business research methods*, 12th ed. McGraw-Hill.
4. Flick, U. (2012). *Introducing research methodology: A beginner's guide to doing a research project*. Sage Publications.
5. Groves, R., Fowler, F., Couper, M., Lepkowski, J., Singer, E., Tourangeau, R. (2009). *Survey Methodology*. Wiley.
6. Kumar, R. (2014). *Research methodology: A step by step guide for beginners*, 4th ed. Sage Publications.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Data, sampling, surveys

Contemporary Economic Issues (HS42)

Skill Enhancement Elective Courses (SEC) Credit: 4

Course Objective

The course seeks to familiarize students with basic concepts related to the Economic Survey and Union Budget. It aims to equip students with sufficient knowledge and skills to analyse these documents.

Course Learning Outcomes

Students will have the capability to understand government policies and will in general be informed participants in economic decision making.

Unit 1

Concepts

- Fiscal policy, areas of government spending in India
- Capital and revenue expenditure, plan and non-plan expenditures
- Deficits (fiscal, primary, revenue), impact of fiscal deficits on the economy
- Capital receipts, revenue receipts, tax and non-tax revenue, direct and indirect taxes, need for rationalisation of tax structure, Goods and Services Tax (GST)
- Actual, revised and budget estimates
- Zero-base budgeting
- Gender budgeting
- Fiscal devolution and centre-state financial relations

Unit 2

The economic survey

- Analysis of current and past policy emphasis

Unit 3

The union budget

- Need for the budget, understanding the process of budget making in India
- Analysis of fiscal and revenue deficits
- Analysis of sources of revenue and expected growth in revenue, tax simplification, improvement in administration, expansion of tax net and other measures to improve revenue receipts,

- Analysis of expenditure pattern and expected growth in expenditure, thrust areas of budget, sectors that have received higher/lower shares of expenditure, the reasons and consequences thereof, steps proposed to ensure effective spending

References

Given the nature of the course, the readings will be updated every year.

1. Centre for Budget and Governance Accountability. Recent reports.
2. Chakraborty, P. (2015). Intergovernmental fiscal transfers in India: Emerging trends and realities. In P. Patnaik (ed.): *Macroeconomics*. Oxford University Press.
3. Dasgupta, D., De, S. (2012). Fiscal deficit. In *The new Oxford companion to economics in India*. Oxford University Press.
4. Kapila, U. (2016). *Fiscal and budgetary developments in Indian economy since independence*. Academic Foundation.
5. Ministry of Finance. Economic and social classification of the budget.
6. Ministry of Finance. Economic survey (latest).
7. Ministry of Finance. Finance Commission report (latest).
8. Ministry of Finance. Union Budget.
9. Mukherjee, P. (2012). Budget making. In K. Basu, A. Maertens (eds.): *The new Oxford companion to economics in India*. Oxford University Press.
10. Mukherjee, S. (2015). Present state of goods and services tax (GST) reform in India. Working Paper No. 154. *National Institute of Public Finance and Policy*.
11. Reddy, Y. (2015). Continuity, change and the way forward: The fourteenth finance commission. *Economic and Political Weekly*, 50(21), 27-36.
12. Spiegel, M. (2003). *Theory and problems of probability and statistics*. Chapter 19. McGraw-Hill.

Teaching Learning Process

Lectures and tutorials

Assessment Methods

Internal assessment and final examination as per CBCS rules

Keywords

Union budget, economic survey, government policy

**DEPARTMENT OF ENGLISH
UNIVERSITY OF DELHI
DELHI - 110007**



**Structure of BA Honours English
English for BA/ BCom/BSc Programme
and
English for BA(H)/BCom(H)/BSc (H)
under Learning Outcomes-based Curriculum Framework for Undergraduate
Education**

SEMESTER 1

**Core, Ability Enhancement Course Compulsory (AECC), B.A/B.Com Program, B.A.
English Discipline and Generic Electives (GE)**

*Syllabus applicable for students seeking admission to the
BA Honours English, BA/BCom/BSc Programme and BA(H)/BCom(H)/BSc(H) under LOCF
w.e.f. the academic year 2019-20*

SEMESTER I		
CORE COURSE	CORE 1	Indian Classical Literature
	CORE 2	European Classical Literature
ABILITY ENHANCEMENT COURSE COMPULSORY(AECC)	AECC1	AECC English
GENERIC ELECTIVE (GE) COURSE	GE 1	Academic Writing and Composition
	GE 2	Media and Communication Skills
	GE 3	Text and Performance: Indian Performance Theories and Practices
	GE 4	Language and Linguistics
	GE 5	Readings on Indian Diversities and Literary Movements
	GE 6	Contemporary India: Women and Empowerment
	GE 7	Language, Literature and Culture
	GE 8	Comic Books and Graphic Novels
	GE 9	Cinematic Adaptations of Literary Texts
	GE 10	Indian English Literatures
	GE 11	Bestsellers and Genre Fiction
	GE 12	Culture and Theory
	GE 13	Marginalities in Indian Writing
	GE 14	The Individual and Society
	GE 15	Text and Performance: Western Performance Theories and Practices
	GE 16	Literature and the Contemporary World

Structure of B. A. Honours English under LOCF

CORE COURSE

Paper Titles	Page
Sem I	
1. Indian Classical Literature	5
2. European Classical Literature	8

GENERIC ELECTIVE (GE) COURSE

(Any four for Honours students (Semesters 1,2,3,4) and any two for B.A/B.Com Programme students(Semesters 5,6))

Paper Titles	Page
1. Academic Writing and Composition	11
2. Media and Communication Skills	13
3. Text and Performance: Indian Performance Theories and Practices	16
4. Language and Linguistics	19
5. Readings on Indian Diversities and Literary Movements	21
6. Contemporary India: Women and Empowerment	23
7. Language, Literature and Culture	27
8. Comic Books and Graphic Novels	30
9. Cinematic Adaptations of Literary Texts	33
10. Indian English Literatures	35
11. Bestsellers and Genre Fiction	37
12. Culture and Theory	39
13. Marginalities in Indian Writing	41
14. The Individual and Society	45
15. Text and Performance: Western Performance Theories and Practices	47
16. Literature and the Contemporary World	50

AECC

Paper Title: AECC English

52-56

Unit 1: Introduction

Unit 2: Language of Communication

Unit 3: Speaking Skills

Unit 4: Reading and Understanding

Unit 5: Writing Skills

**B. A. & B. COM. PROGRAMME
(CORE ENGLISH LANGUAGE)**

57-74

Note for Visually Impaired Students

For visually impaired students to be able to take some of these papers, a number of supplementary readings are offered. These are to be read/discussed in connection with the texts in the classroom, so as to create a sustainable and diverse model of inclusive pedagogy. For visually impaired students, this set of readings will also be treated as primary, and may be examined as such. The supplementary readings may be used as theorizations or frameworks for understanding the course.

For purposes of assessment/ evaluation, a general advisory may be made to assist visually impaired students filter out areas they may not be able to address due to the nature of their disability and to focus on using supplementary texts to instead create other perspectives/ forms of knowledge on the same texts.

I. B. A. HONOURS ENGLISH UNDER LOCF

CORE COURSE

PAPER 1 INDIAN CLASSICAL LITERATURE Semester 1

Course Statement

The paper introduces students to a rich and diverse literature from two classical languages of India, Sanskrit and Tamil. A key feature is the study of the poetics in the epics of both languages, including their literary traditions and their representations of a pluralist society in terms of linguistic, religious, and generic diversity. The paper lays a foundation in Indian poetics, theories of representation, aesthetics, aspects of Indian theatre, and traditions of story-telling and narrative structures. Optional papers on Indian literature in subsequent semesters will reinforce the centrality of this paper in providing an understanding of key concepts related to the form and content of Indian literatures.

Course Objectives

The course aims to

- study significant sections of Vyasa's Mahabharata in order to determine conceptualisation and representation of class, caste, gender, and disability in the context of the epic battle over rights and righteousness;
- examine selections from Ilango's *Cilapattikaram* to understand the interplay of Tamil poetics and the lifestyle of communities, negotiating ideas related to love, justice, war, governance, and conduct in private and public domains;
- study Sanskrit drama, a Nataka, and a Prakarna, to appreciate its debts to Natyashastra in their formal aspects;
- explore the central concerns of Sanskrit drama in relation to notions of the ideal ruler, lover, friend, and spouse; the presence of Buddhist edicts, the voices of the poor and the marginalised, the position of women in different social strata, the subversive use of humour, and the performative aspects of Sanskrit theatre;
- introduce students to selections elucidating Tamil and Sanskrit poetics (Unit 5); a critical overview of the theorisation of Akam, Puram, and Thina in Tolkappiyam, juxtaposed to lyrics from Sangam poetry; the Rasa theory from Natyashastra, to help students appreciate the inter-connections between theory and practice in theatre; a representation of disability in theatre, examined through the portrayal of Vidushaka

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Vyasa, selections from *The Mahabharata*, from *The Mahabharata of Krishna-Dwaipayana Vyasa*, trans. K. M. Ganguli (Delhi: MunshiramManoharlal Publishers, 2012).

- a) 'The Dicing' and 'Sequel to Dicing', Book 2, Sabha Parva Section XLVI-LXXII
- b) 'The Temptation of Karna', Book 5, Udyog Parva, Section CXL-CXLVI.
- c) 'Dhritrashtra and Gandhari's Wrath', Book 11, Section XI-XV.

Unit 2

Kalidasa, *Abhijnanasakuntalam*, trans. Chandra Rajan, in *Kalidasa: The Loom of Time*, (Penguin Classics, 1989, reprint 2000)

Unit 3

Sudraka, *The Mrichchhakatika of Sudraka*, trans. M. R. Kale (Delhi: Motilal Banarsidas Publishers, 1924, reprint 2013).

Unit 4

IlangoAtikal, *The Cilappatikaram*, Cantos 1, 2, 7, 18, 19, 20, 21, 22, 24, 26, 30, trans. R. Parthasarathy (Columbia University Press, 1993; Penguin Books India, 2004).

Unit 5

- Selections from *Natyasastra*, (i) Chapter 6, 'The Sentiments'; (ii) Chapter 20, 'Ten Kinds of Play'; (iii) Chapter 35, 'Characteristics of the Jester', trans. Manomohan Ghosh (Calcutta: Asiatic Society of Bengal, 1951) pp.105-17; 355-74; 548-50.
- Irawati Karve, 'Draupadi', in *Yuganta: The End of an Epoch* (Hyderabad: Disha, 1991) pp. 79–105.
- R. Venkatachalapathy, 'Introduction', in *Love Stands Alone: Selections from Tamil Sangam Poetry* (Delhi: Penguin Classics, 2013) pp. XIII-XLI, 25, 45, 70, 186.
- Edwin Gerow et al, 'Indian Poetics' in *The Literatures of India: An Introduction*, ed. Edward. C. Dimock et al, Chicago: University of Chicago Press, 1974. Pp 115-143

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

Teaching Plan

Paper 1: Indian Classical Literature

Week1 – Introduction to Indian Classical Literature

Week 2 – Unit 1 – The Mahabharata: The Dicing

Week 3 – The Mahabharata (contd): The Temptation of Karna; Dhritrashtra and Gandhari's wrath

Week 4 – Unit 5 --*Natyashastra*, prescribed sections

Week 5 – Unit 2 -- Kalidasa, *Abhijnasakuntalam*

Week 6 – Kalidasa (contd)

Week7 – Unit 3 -- Sudraka, *Mrichchakatika*

Week 8 – Sudraka (contd)

Week 9 – Unit 5 -- Venkatachalapathy, 'Introduction', in *Love Stands Alone: Selections from Tamil Sangam Poetry*

Week 10 – Unit 4 -- Introduction to Atikal, *Cilappatikaram*, Cantos1, 2, 7, 18, 19

Week11 – Atikal (contd), Cantos 20, 21, 22, 24, 26, 30

Week12 – Unit 5 – Gerow, 'Indian Poetics' Irawati Karve, 'Draupadi'

Week 13 – Sanskrit plays revisited; critical discussion on the prescribed plays

Week 14 – Indian epics revisited; critical discussion on Mahabharata and *Cilappatikaram*

Keywords

Indian Epics

Natyashastra

Akam Puram

Rasa

PAPER 2
EUROPEAN CLASSICAL LITERATURE
Semester 1

Course Statement

This course provides a humanist foundation to English studies, to be considered essential reading. It enables an exploration of classical Greek, Roman, and Hebrew literature in English translation, tracing its impact and influence on English literature from the period of the Renaissance to the Modern. The paper offers a wide-ranging perspective on the aesthetic, philosophical, and social concerns of classical literature. It introduces students to multiple genres and forms, including the epic, tragedy, comedy, the lyric, and the dialogue. Selections from the Old and New Testament of The Bible provide the context to literary styles and ideas governing Western literature's interface with the community and its spiritual needs.

Course Objectives

This course aims to

- explore the historical, cultural, and philosophical origins of tragedy and comedy;
- engage with both genres in their distinctive form, style, and characterization, including their representation of human aspirations, foibles, grandeur, and vulnerability;
- examine representations of disability in mythology through the reading of selections from Ovid
- examine the Book of Job from the Old Testament of The Bible for its literary style, including its debate over tragic fate and human suffering, and to locate its enduring influence over subsequent humanist writings;
- juxtapose the Old Testament to ideas of compassion and surrender to God's will as outlined in the selection from the New Testament;
- study the history of ideas pertaining to the human-social-divine interface in theorisations on form, narrative, social organization, and aesthetics in the writings of Plato, Aristotle, and Horace; and
- study gendered explorations of human relations in classical literature in multiple genres, and to examine a woman writer's standpoint on love, war and the primacy of the gendered self.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Homer, *The Iliad*, tr. E.V. Rieu (Harmondsworth: Penguin, 1985).

Unit 2

Sophocles, 'Oedipus Rex', trans. Robert Fagles, in *The Three Theban Plays*, revised reprint (Penguin Classics, 1984).

Unit 3

- a) Plautus, *The Brothers Menaechmus*, trans. E. R. Walting (Penguin Classics, 1965).
- b) Ovid Selections from *Metamorphoses* 'Bacchus', (Book III), 'Tieresias' (Book III) 'Philomela' (Book VI), tr. Mary M. Innes (Harmondsworth: Penguin, 1975).

Unit 4

- a) 'The Book of Job', The Holy Bible, The New International Version (Zondervan, 2011).
- b) Selection from 'The Gospel According to St. Matthew', Chapter 5, Verses 1-48

Unit 5

- Plato, (ii) 'Theory of Art'; both in *Republic*, Book 10 (Penguin Classics, 2007) pp. 240-48; 335-53.

- Aristotle, Aristotle, *Poetics*, translated with an introduction and notes by Malcolm Heath, (London: Penguin, 1996) chaps. 6–17, 23, 24, and 26.
- Sappho, (i) ‘On the Throne of Many Hues, Immortal Aphrodite’; (ii) ‘Some Say an Army of Horsemen’, from *Lyrics 1*, trans. Diane J. Rayor and Andre Lardinois, in *A New Translation of Complete Works*, (2014).
- Horace ‘Ars Poetica’, trans. H. Rushton Fairclough (Harvard University Press, 1929). Pp 451-73

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

Teaching Plan

Paper 2: European Classical Literature

Week 1 – Introduction to European Classical Literature; Unit 1 -- Homer, *The Iliad*

Week 2 – Homer (contd)

Week 3 – Unit 2 -- Sophocles, *Oedipus Rex*

Week 4 – Sophocles (contd)

Week 5 – Unit 3 -- Discussions: Old Comedy, Roman Comedy; Plautus, *Brothers Menaechmus*

Week 6 – Plautus (contd)

Week 7 – Unit 3 -- Ovid, prescribed selections

Week 8 – Unit 5 -- Horace, ‘Ars Poetica’

Week 9 – Unit 5 -- Sappho, prescribed selections

Week 10 – Unit 5 -- Plato, prescribed selections

Week 11 – Unit 4 -- The Bible, *Book of Job*

Week 12 – *Book of Job* (contd)

Week 13 – Unit 4 -- The Bible, *The Gospel according to Matthew*, prescribed sections

Week 14 – Critical discussion of texts, discussion of question paper, examination related queries from students, revision.

Keywords

Epic

Tragedy

Comedy

Satire

Lyric

Myth

Dialogue

Bible

Poetics

War

Heroism

GENERIC ELECTIVE COURSE

PAPER G1: ACADEMIC WRITING AND COMPOSITION

Course Objectives

This course is designed to help undergraduate students develop and research composition, argument, and writing skills that will enable them to improve their written abilities for higher studies and academic endeavours.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Introduction to the Writing Process

Unit 2

Introduction to the Conventions of Academic Writing

Unit 3

Writing in one's own words: Summarizing and Paraphrasing

Unit 4

Critical Thinking: Syntheses Analyses and Evaluation

Unit 5

Structuring an Argument: Introduction Interjection and Conclusion

Unit 6

Citing Resources Editing Book and Media Review

Essential Readings

Dev, Anjana Neira. *Academic Writing and Composition*. New Delhi: Pinnacle, 2015.

Hamp-Lyons, Liz and Ben Heasley. *Study Writing: A Course in Writing Skills for Academic Purposes*.

Teaching Plan

Week 1 - Unit 1 -- Introduction to the writing process

Week 2 - Unit 2 -- Introduction to the conventions of academic writing

Week 3 - Unit 3 -- Writing in one's own words: summarizing and paraphrasing

Week 4 - Unit 3 Contd

Week 5 - Unit 4 -- Critical thinking: syntheses analyses and evaluation

Week 6 - Unit 4 Contd

Week 7 - Unit 4 Contd

Week 8 - Unit 4 Contd

Week 9 - Unit 5 -- Structuring an argument: introduction interjection and Conclusion

Week 10 - Unit 5 Contd

Week 11 - Unit 5 Contd

Week 12 - Unit 6- Citing resources editing book and media review

Week 13 - Unit 6 Contd

Week 14 - Concluding lectures exam issues etc

Keywords

Formal and informal writing

Writing process

Summary

Paraphrase

Note making

Editing

Citation

Plagiarism

Bibliography

PAPER G2: MEDIA AND COMMUNICATION SKILLS

Course Objectives

This is an introductory course in the role of media today – India and globally. It will equip students with the basic theories on various aspects of media and impart training in basic writing skills required in the profession.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Introduction to Mass Communication

- a) Mass Communication and Globalization
- b) Forms of Mass Communication

Topics for Student Presentations:

- a) Case studies on current issues Indian journalism
- b) Performing street plays
- c) Writing pamphlets and posters etc.

Unit 2

Advertisement

- a) Types of advertisements
- b) Advertising ethics
- c) How to create advertisements/storyboards

Topics for Student Presentations:

- a) Creating an advertisement/visualization
- b) Enacting an advertisement in a group
- c) Creating jingles and taglines

Unit 3

Media Writing

- a) Scriptwriting for TV and Radio
- b) Writing News Reports and Editorials
- c) Editing for Print and Online Media

Topics for Student Presentations:

- a) Script writing for a TV news/panel discussion/radio programme/hosting radio programmes on community radio
- b) Writing news reports/book reviews/film reviews/TV program reviews/interviews
- c) Editing articles
- d) Writing an editorial on a topical subject

Unit 4

Introduction to Cyber Media and Social Media

- a) Types of Social Media
- b) The Impact of Social Media
- c) Introduction to Cyber Media

Essential Reading

Kumar, Keval J. *Mass Communication in India*. Jaico Publications, 1994.

Suggested Readings

Media and Mass Communication:

Joseph, M. K. *Outline of Editing*. New Delhi: Anmol Publications, 2002.

Kamath, M. V. *Professional Journalism*. New Delhi: Vikas Publishing House, 1980.

Macquail, Denis. *Mass Communication*. New Delhi: Om Books, 2000.

Saxena, Ambrish. *Fundamentals of Reporting and Editing*. New Delhi: Kanishka Publishers, 2007.

Television Journalism:

Boyd, Andrew. *Broadcast Journalism: Techniques of Radio and Television News* 2000 Burlington: Focal Press 6 edition, 2009.
Carroll, Brian. *Writing for Digital Media*. Taylor & Francis, 2010.
Cushion, Stephen. *Television Journalism*. Sage Publications, 2012.
Feldman, Tony. *An Introduction to Digital Media*. Taylor & Francis, 2004.

Teaching plan

Week 1: Introduction to mass communication and media
Week 2: Unit 1 – Mass Communication and globalization
Week 3: Unit 1 contd -- Forms of mass communication
Week 4: Unit 2 – Forms of advertisement
Week 5: Unit 2 – contd
Week 6: Unit 2 – contd
Week 7: Unit 3 – Media writing
Week 8: Unit 3 – Media writing contd
Week 9: Unit 3 – Media writing contd
Week 10: Unit 3 – Media writing contd
Week 11: Unit 4 – Introduction to cyber media
Week 12: Unit 4 – Introduction to cyber media contd
Week 13: Class presentations
Week 14: Concluding lectures and exam preparations

Keywords

Mass media
Globalisation
Development journalism
Print
Audio-visual
Advertising
Social media
Writing skills

PAPER G3: TEXT AND PERFORMANCE: INDIAN PERFORMANCE
THEORIES AND PRACTICES

Course Objectives

This course on Text and Performance combines Indian theories of dramaturgy along with a practical understanding of the stage. These range from the classical theories of *Rasa* to the more modern ones that emerged in the twentieth century. It will acquaint the students with the rise of modern theatre in the pre- and post-independence period in India, while also familiarising them with folk theatrical traditions.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Introduction

- Introduction to theories of Performance in India: Classical to Contemporary Colonial to Resistant Endorsement of existing structures to Radicalising our world
- Historical overview of Indian theatre from the ancient to the modern

Topics for Student Presentations

- a) Perspectives on theatre and performance
- b) Historical development of theatrical forms
- c) Folk traditions
- d) Indian Theatre Movements
- e) Post-independence Indian theatre

Unit 2

Popular Theatrical Forms and Practices

- Nautanki, Jatra, Tamasha, Bhramyamaan Theatre, Street Theatre, Campus Theatre

Topics for Student Presentations:

- a) On the different types of performative space in practice
- b) Poetry reading elocution expressive gestures and choreographed movement

Unit 3

Theories of Drama

- Bharata

Topics for Student Presentations:

- a) Acting short solo/group performances followed by discussion and analysis with application of theoretical perspectives
- b) *Rasa* theory

Unit 4

Theatrical Production

- Direction production stage props costume lighting backstage support

Topics for Student Presentations:

All aspects of production and performance recording archiving interviewing performers and data collection

Course Outcomes

- A performance of minimum thirty minutes using any one form of drama studied in this course
- Interview at least one theatre practitioner who has worked with Indian theatrical forms

Suggested Readings

Devy, G.N. *Painted Words: An Anthology of Tribal Literature*. Vadodra: Purva Prakash, 2012.

Dutt, Utpal. *On Theatre*. New Delhi: Seagull, 2009.

Ghosh, Arjun. *A History of the Jan Natya Manch: Plays for the People*. New Delhi: Sage India, 2012.

Ghosh, Manomohan, trans. *The Natyashastra*. Bharata. Vol. Calcutta: The Royal Asiatic society of Bengal, 1950.

Gopal, Priyamvada. *Literary Radicalism in India*. India: Routledge, 2018.

Lal, Ananda, ed. *Theatres of India: A Concise Companion*. New Delhi: OUP, 2009.

People's Art in the Twentieth Century: Theory and Practice. Jana Natya Manch. New Delhi: Navchetan Printers. 2000.
 Pollock, Sheldon. *A Rasa Reader: Classical Indian Aesthetics*. Ranikhet: Permanent Black, 2017.
 Rangacharya, Adya, trans. *The Natyashastra*. Bharata Muni. New Delhi: Munshiram Manoharlal, 2010.
 Sircar, Badal. *On Theatre*. Calcutta: Seagull, 1999.
 Vatsyayan, Kapila. *Bharata: The Natyashastra*. New Delhi: Sahitya Akademi, 2005.

Teaching Plan

Week 1 – Introduction to the GE course on Text and Performance: Indian Performance Theories and Practices
 Week 2 – Unit 1 Introduction
 Week 3 – Unit 1 contd
 Week 4 – Unit 2 --Popular Theatrical Forms and Practices
 Week 5 – Unit 2 contd
 Week 6 – Unit 2 contd
 Week 7 – Unit 3-- Theories of Drama
 Week 8 – Unit 3 contd
 Week 9 – Unit 4 --Theatrical Production
 Week 10 -- Unit 4 contd
 Week 11 – Unit 5 -- Field work: Interviewing a theatre practitioner
 Week 12 – Unit 5 -- Working towards a Performance
 Week 13 – Unit 5 contd
 Week 14 – Concluding lectures exam issues etc

Keywords

Bharata
 Rasa
 Jatra
 Nautanki
 Tamasha
 Street theatre
 Campus theatre
 Direction
 Production
 Stage props
 Costume
 Lighting
 Backstage support

PAPER G4: LANGUAGE AND LINGUISTICS

Course Objectives

The course introduces students to, and familiarises them with, the basic concepts of language and linguistic theories.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Language: language and communication, language varieties, standard and non-standard language, language change.

Rajend Mesthrie and Rakesh M. Bhatt, *World Englishes: The study of new linguistic varieties* (Cambridge: Cambridge University Press, 2008).

Unit 2

Structuralism

Ferdinand de Saussure, *Course in general linguistics*. Introduction: Chapter 3 (New York: McGraw Hill, 1966).

Unit 3

Phonology and Morphology

A. Akmajian, R. Demers and R. M. Harnish, *Linguistics: An Introduction to Language and Communication*, 2nd edn.

V. Fromkin and R. Rodman, *An Introduction to Language*, Chapters 3 6 and 7, 2nd ed. (New York: Holt Rinehart and Winston, 1974)

Unit 4

Syntax and semantics: categories and constituents phrase structure maxims of conversation

A. Akmajian, R. Demers and R. M. Harnish, *Linguistics: An Introduction to Language and Communication*, Chapter 5 and 6, 2nd edn. (Cambridge Mass: MIT Press, 1984; Indian edition Prentice Hall, 1991)

Essential Reading

Note: Students will be examined on all the prescribed readings in Units 1 through 4. Therefore, all those texts are to be considered essential reading.

Teaching plan

Week 1 – Unit 1 -- Introduction to linguistics
Week 2 – Unit 1 contd
Week 3 – Unit 1 contd
Week 4 – Unit 2
Week 5 – Unit 2 contd
Week 6 – Unit 2 contd
Week 7 – Unit 3
Week 8 – Unit 3 contd
Week 9 – Unit 3 contd
Week 10 – Unit 4
Week 11 – Unit 4 contd
Week 12 – Unit 4 contd
Week 13 – Final summing up
Week 14 – Discussions and exam preparations, etc.

Keywords

Language
Communication
Linguistics
Structuralism
Morphology
Semantics

PAPER G5: READINGS ON INDIAN DIVERSITIES AND LITERARY MOVEMENTS

Course Objectives

This course seeks to equip students with an overview of the development of literatures in India and its wide linguistic diversity. Students will study authors and movements from different regions and time periods.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Prescribed text:

Sucrets Paul Kumar et al. eds, *Cultural Diversity, Linguistic Plurality, and Literary Traditions in India* (New Delhi: Macmillan, 2005; Editorial Board: Department of English, University of Delhi).

Unit 1

This unit is compulsory

Any 6 of remaining 7 Chapters to be covered in the classroom

Overview

Unit 2

Linguistic Plurality within Sufi and Bhatia Tradition

Unit 3

Language Politics: Hindi and Urdu

Unit 4

Tribal Verse

Unit 5

Dalit Voices

Unit 6

Writing in English

Unit 7

Woman Speak: Examples from Kannada and Bangla

Unit 8

Literary Cultures: Gujarati and Sindhi

Essential Reading

Kumar, Sukrita Paul et al. eds. *Cultural Diversity, Linguistic Plurality, and Literary Traditions in India*. New Delhi: Macmillan, 2005; Editorial Board: Department of English, University of Delhi.

Teaching plan

Week 1 – Unit 1 -- Overview

Week 2 – Unit 1contd

Week 3 – Unit 2 -- Linguistic Plurality within Sufi and Bhakti Tradition

Week 4 – Unit 2contd

Week 5 – Unit 3 -- Language Politics: Hindi and Urdu

Week 6 – Unit 3contd

Week 7 – Unit 4 -- Tribal Verse

Week 8 -- Unit 4 contd

Week 9 – Unit 5 -- Dalit Voices

Week 10 -- Unit 6 -- Writing in English

Week 11 – Unit 6 contd

Week 12 -- Unit 7 -- Woman speak: Examples from Kannada and Bangla/ Unit 8:

Literary Cultures: Gujarati and Sindhi

Week 13 – Selected Unit: contd

Week 14 – Concluding lectures discussion on exam pattern etc

Assessment methods

Unit 1 is compulsory. Any 6 of remaining 7 units to be covered in the classroom.

Assessment is through projects, assignments, group discussions and tutorial work.

Class tests may also form a basis for assessment.

At the end, the end semester exam will take place.

Keywords

Cultural diversity

Indian languages

Sufi and Bhakti movements

Oral literature

Indian literary traditions

Tribal literature

Indian literatures

Indian literature in English

Indian literature in translation

PAPER G6: CONTEMPORARY INDIA: WOMEN AND EMPOWERMENT

Course Objectives

This course engages with contemporary representations of women femininities, gender-parity and power. The course aims to help students from non-English literature backgrounds to develop a robust understanding of how discourses of gender underlie and shape our very lives, experiences, emotions and choices. The course exposes students to a broad range of literary and textual materials from various historical periods and contexts, so that they are able to examine the socially-constructed nature of gendering. Through the analysis of literary texts humanities and social sciences scholarship students will develop a nuanced understanding of how to perceive, read, understand, interpret and intervene ethically in debates on the subject.

The course will help students

- read, understand and examine closely narratives that seek to represent women, femininities and, by extension, gendering itself;
- understand how gender norms intersect with other norms, such as those of caste, race, religion and community to create further specific forms of privilege and oppression;
- identify how gendered practices influence and shape knowledge production and circulation of such knowledges, including legal, sociological, and scientific discourses;
- participate in challenging gendered practices that reinforce discrimination; and
- Create a portfolio of analytical work (interpretations and readings of literary and social-sciences texts) and analyses of fictional and non-fictional narratives that students encounter in their lived worlds.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Concepts

- Sex and Gender -- social construction of gender; socialisation into gender
- Femininities and masculinities -- normative gender privilege; heteronormativity
- Patriarchy -- history of the efforts to undo feminism

Readings

Baby Kamble, 'Our Wretched Lives', *Women Writing in India: 600 BC to the early twentieth century*, eds Susie Tharu and K Lalitha (Delhi: OUP, 1997) pp. 307-11.
Rassundari Devi, From *Amar Jiban*, in *Women Writing in India: 600 BC to the early twentieth century*, eds Susie Tharu and K Lalitha (Delhi: OUP, 1997) pp. 190-202.
Rokeya Shekhawat Hossain, 'Sultana's Dream', in *Women Writing in India: 600 BC to the early twentieth century*, eds Susie Tharu and K Lalitha (Delhi: OUP, 1997) pp. 340-51.
V Geetha, *Patriarchy*, Theorizing Gender Series (Kolkata: Stree, 2007) pp. 3-61.

Unit 2

Intersections

- Women and caste, religion, class, sexualities, race, disability
- Women and environment, technology, development
- Women and access to resources: employment, health, nutrition, education
- Women and reproductive work: singleness, marriage, motherhood, symbolical biological surrogacy and ART, parenting, abortion, and other rights over own body

Readings

Mahaweta Devi, 'Bayen', *Five Plays*, trans. Samik Bandyopadhyaya (Calcutta: Seagull, 2009).
Mary John, 'Feminism Poverty and the Emergent Social Order', in *Handbook of Gender*, ed. Raka Ray (Delhi: Oxford University Press, 2012).
Leela Kasturi, 'Report of the Sub-Committee Women's Role in Planned Economy National Planning Committee (1947)', in *Feminism in India*, ed. Maitrayee Chaudhuri (Delhi: Zed, 2005) pp. 136-55.
Vandana Shiva, *Staying Alive: Women Ecology and Development*, Chapters 2&4 (Delhi: Kali for Women, 1989).
M. M. Vinodini, 'The Parable of the Lost Daughter', in *The Exercise of Freedom*, eds K. Satyanarayana and Susie Tharu (Delhi: Navayana, 2013) pp 164-77.

Unit 3

Histories

- The women's question pre-Independence -- sati-reform, widow remarriage, debates around age of consent
- Women in the Independence movement, Partition
- Post-Independence campaigns -- against sexual harassment and rape, dowry, violence, debates around the Uniform Civil Code
- Public sphere participation of women -- in politics, in the workplace, in the economy, creating educational inclusion

Readings

Radha Kumar, *A History of Doing: An Illustrated Account of Movements for Women's Rights and Feminism in India 1800—1990*, Chapters 2, 3, 7, 8, 11 (Delhi: Zubaan, 1993).

Kumkum Sangari, 'Politics of Diversity: Religious Communities and Multiple Patriarchies', *Economic and Political Weekly* 3052 (1995).

Tanika Sarkar, 'Rhetoric against Age of Consent: Resisting Colonial Reason and Death of a Child-Wife', *Economic and Political Weekly* 2836 (1993 April).

Urvashi Butalia, Chapter 2 'Blood', in *The Other Side of Silence: Voices from the Partition of India* (Delhi: Penguin Books, 1998)

Urmila Pawar and Meenakshi Moon, *We also made history: Women in the Ambedkarite Movement*, Chs 1, 5, 6 (Delhi: Zubaan, 2008).

Unit 4

Women, the Law, the State

- Constitutional remedies and rights against gender-based violence
- The history of constitutional protections for women (Hindu Code Bill, right to property, personal laws)
- State interventions and feminist engagements with the law
- IPC sections relevant to rape protection, of the 'modesty' of women, obscenity
- The concept of 'woman' in these frameworks

Readings

Janaki Nair, 'The Foundations of Modern Legal Structures in India', in *Handbook of Gender*, ed Raka Ray (Delhi: OUP, 2012).

Flavia Agnes, 'Conjuality, Property, Morality and Maintenance', in *Handbook of Gender*, ed Raka Ray (Delhi: OUP, 2012).

Workshop: Students to examine the bare text of 4 laws (as set out in the Gazette of India) followed by discussion and analysis -- laws against dowry (The Dowry Prohibition Act 1961), against sex determination (Pre-Conception & Pre-Natal Diagnostics Act 1994), against domestic violence (Protection of Women from Domestic Violence Act 2005), against sexual harassment at the workplace (The Sexual Harassment of Women at Workplace Prevention Prohibition and Redressal Act 2013).

Essential Reading

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 4. Therefore, all those texts are to be considered essential reading. In addition to those texts, the following is also essential reading:

Indian Literature: An Introduction. Delhi: University of Delhi, 2005.

Teaching plan

Week 1: Unit 1 -- Concepts
Week 2: Unit 1 contd
Week 3: Unit 1 contd
Week 4: Unit 2 -- Intersections
Week 5: Unit 2 contd
Week 6: Unit 2 contd
Week 7: Unit 2 contd
Week 8: Unit 3 -- Histories
Week 9: Unit 3 contd
Week 10: Unit 3 contd
Week 11: Unit 3 contd
Week 12: Unit 4 -- Women the Law the State
Week 13: Unit 4contd
Week 14: Unit 4contd

Keywords

Gender
History
Law
Caste
Femininities
Masculinities
Heteronormativity
Patriarchy
Feminism
Gender-based violence
Casteism
Women's movements

PAPER G7: LANGUAGE, LITERATURE AND CULTURE

Course Objectives

This course is designed to introduce the students to the basic concepts of language, its characteristics, its structure and how it functions. The course further aims to familiarise the students with how language is influenced by the socio-political-economic-cultural realities of society. It also acquaints students with the relation between language and literature.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Language

A -- Language and Communication

- What is Language?
- The Definition of Language
- The Characteristics of Human language
- Why Does Language Matter?

B -- How Language Functions

- a. Speaker – Listener – Message
- b. Phonology Morphology Syntax and Semantics
(only terms and definitions will be asked)
- Phonemes, phonetic transcription and phonology
- Morphemes: free and bound morphemes
- Simple complex compound words

- Inflectional/ derivational morphology
- The process of word formation
- Basic notions of syntactic constituents and phrase structure
- Clauses and sentences

C -- Language and Society

- Language and Class Language and
- Gender Language and Ethnicity
- Language and Identity
- Language Variation
 - a. Dialect Idiolect Slang Pidgin Creole Jargon
 - b. Standard and Non-Standard Language
 - c. Bilingualism Multilingualism
 - d. Code-mixing Code-switching

Readings

Roger Fowler, ed., *Essay on Style and Language* (London: Routledge and Kegan Paul Ltd, 1966).

Roger Fowler, *The Linguistics of Literature* (London: Routledge and Kegan Paul Ltd, 1971)

H. G. Widdowson, *Stylistics and the Teaching of Literature* (London: Longman, 1979).

R. W. Bailey and J. L. Robinson, eds, *Varieties of present-day English* (New York: Macmillan 1973).

J. A. Fishman, *Sociolinguistics: A Brief Introduction* (Mass: Newbury House Rowley, 1971).

R. S. Gupta and K. S. Agarwal, *Studies in Indian Sociolinguistics* (New Delhi: Creative Books, 1996).

R. A. Hudson, *Sociolinguistics* (Cambridge: Cambridge University Press, 1980).

Geoffrey Leech and Michael Short, *Style in Fiction* (London: Longman, 1981).

Unit 2

Indian Literature

This section of the course will involve a study of significant themes and forms of Indian literature through the ages, with the help of prescribed texts.

Prescribed text: *Indian Literature: An Introduction* (Delhi: University of Delhi, 2005).

Different Phases of Indian literatures: Ancient, Medieval, and Modern

Chapter 1: Veda Vyasa, *The Mahabharata*: The Ekalavya Episode

Chapter 2: Sudraka, *Mrichchhakatika*: The Making of a Breach

Chapter 3: Ilanko Atikal, *Cilappatikaram*: The Book of Mathurai

Chapter 4: Mirabai, 'I Know Only Krsna'

Chapter 5: Amir Abul Hasan Khusrav, 'Separation'

Chapter 6: Asadullah Khan Ghalib, 'Desires Come by the Thousands'

- Chapter 7: Faiz Ahmad Faiz, 'Do Not Ask'
- Chapter 8: Subramania Bharati, 'The Palla Song'
- Chapter 9: Rabindranath Tagore, 'The Cabuliwallah'
- Chapter 10: Shrilal Shukla, 'Raag Darbari'
- Chapter 11: Ismat Chughtai, 'Touch-Me-Not'
- Chapter 12: Amrita Pritam, 'To Waris Shah'
- Chapter 13: MastiVenkatesha Iyengar, 'Venkatashami's Love Affair'
- Chapter 14: Indira Goswami, 'The Journey'
- Chapter 15: Omprakash Valmiki, 'Joothan'
- Chapter 16: Shrikant Mahapatra, Folk Songs

Further Reading

Sisir Kumar Das, ed., *A History of Indian Literature* (New Delhi: Sahitya Akademi, 1995).

Unit 3

Culture and Society in Contemporary India

(i) The Idea of Culture

(ii) Culture and the Media

- a) 'Notes on the History of the Study of the Indian Society and Culture', in *Structure and Change in Indian Society*, ed. Milton Singer and Bernard S Cohn (Chicago: Aldine Press 1968)
- b) 'Towards a Definition of Culture', in *India and World Culture* (New Delhi: Sahitya Academy, 1986).
- c) 'Culture and Ideology', in *Culture, Ideology and Hegemony: Intellectual and Social Consciousness in Colonial India* (London and New York: Longman, 1995).
- d) *Communications and Culture*, ed. M. R. Dua (Delhi: Galgotia Publishing Co, 1997).
- e) *Journalism: Changing Society Emerging Trends* (Delhi: Authorspeak, 2003).

Essential Readings

Note: This is a literature-based course, and students will be examined on the prescribed readings in all 3 units. Therefore, those texts are to be considered essential reading.

Teaching plan

- Week 1: Overview and introduction
- Week 2: Unit 1 – Language
- Week 3: Unit 1 contd
- Week 4: Unit 1 contd
- Week 5: Unit 2 – Literature – Chapters 1 and 2
- Week 6: Unit 2 contd – Chapters 3 and 4
- Week 7: Unit 2 contd – Chapters 5 and 6
- Week 8: Unit 2 contd -- Chapters 7 and 8

Week 9: Unit 2 contd -- Chapters 9 and 10
Week 10: Unit 2 contd – Chapters 11 and 12
Week 11: Unit 2 contd – Chapters 13 and 14
Week 12: Unit 2 contd – Chapters 15 and 16
Week 13: Unit 3 -- Culture
Week 14: Culture and concluding lectures

Keywords

Language
Indian literature
Literary diversity
Language varieties
Culture
Literature and culture
Culture and practice
Globalisation

PAPER G8: COMIC BOOKS AND GRAPHIC NOVELS

Course Objectives

The graphic narrative in long form is today a prominent and popular mode in visual cultures, its accessibility making it often the first entry point to the world of literature for many young people. As a form, it has been omnivorous in providing representation to both dominant hegemonic values as well as subversive ones. The best examples of the form work through the interconnection of art and text, the intersection of drawing coloured and blank spaces proportion and pithy dialogue

This course aims to

- introduce graphic narrative to students of non-literary studies backgrounds;
- provide a toolkit for them to acquire visual literacy and thus to equip them to better understand popular public cultures;
- examine how major graphic narratives comment on contemporary culture history and mythology;
- provide visual literacy tools through examining visual arts, as extending translating and providing a new textual vocabulary to narrative, including fictional and non-fictional narrative;
- provide exposure to major genres within the field, such as that of the mass-circulation 'comic' book, the fictionalized autobiography/memoir biographical texts, and that of fiction;
- provide tools for the exploration of form and genre that are sensitive to nuances of race, gender, caste, ethnicity, ableism and sexuality; and
- enable students from backgrounds in subjects other than English literary studies to broaden their skill-sets in textual interpretation, reading, and writing about texts.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering	Class tests

		techniques	
--	--	------------	--

Course Contents

Unit 1

George Remi, *The Adventures of Tintin: Red Rackham's Treasure* (UK: Egmont, 2013 [1943])

Rene Goscinny and Albert Uderzo, *Asterix and Cleopatra* (Delhi: Hachette, 2015 [1963])

Supplementary Reading for Visually Impaired Students

*Ariel Dorfman and Armand Mattelart. 'From the Noble Savage to the Third World', *How to Read Donald Duck: Imperialist Ideology in the Disney Comic*, [1971], OR Books, 2018, pp. 59-80.

Unit 2

Marjane Satrapi, *Persepolis* (London: Vintage, 2008 [2003])

Supplementary Reading for Visually Impaired Students

*Hillary L. Chute. 'Graphic Narrative as Witness: Marjane Satrapi and the Texture of Retracing', *Graphic Women: Life Narrative and Contemporary Comics*, Columbia UP: 2010, pp. 135-74.

Unit 3

Amruta Patil, *Kari* (Delhi: Harper Collins, 2008)

Supplementary Reading for Visually Impaired Students

*P. Coogan, 'The Definition of the Superhero, in *Superhero: The Secret Origin of a Genre*, Austin: Monkey Brain Books, 2006, pp. 30-60.

Unit 4

Srividya Natarajan and Aparajita Ninan, *A Gardener in the Wasteland* (Delhi: Navayana, 2016)

Supplementary Reading for Visually Impaired Students

*Pramod K. Nayar, 'Drawing on Other Histories', *The Indian Graphic Novel: Nation, History and Critique*, Routledge, 2016. pp. 109-54.

*Note for Visually Impaired Students

To support visually impaired students who might wish to take up this paper a number of supplementary readings are offered. These are to be read/discussed in connection with the Graphic Narrative texts in the classroom so as to create a sustainable and diverse model of inclusive pedagogy. For visually impaired students, this set of readings will also be treated as primary and are to be examined (in connection with the primary Graphic Narrative texts). The supplementary readings may be used as theorizations or frameworks for understanding the primary Graphic Narrative texts. In addition, non-classroom means of learning such as

museum visits, the use of assistive technologies like 3-D printing, and the use of sound through recordings, podcasts and the like may be employed as infrastructure and workloads allow.

For purposes of assessment/ evaluation, a general advisory may be made to assist visually impaired students filter out areas they may not be able to address due to the nature of their disability and to focus on using supplementary texts to instead create other perspectives/ forms of knowledge on the same texts.

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 4. Therefore, all those texts are to be considered essential reading. For Visually Impaired students, the prescribed supplementary readings will also be treated as essential readings.

Teaching Plan

- Week 1: Unit 1 --*The Adventures of Tintin: Red Rackham's Treasure*;
*Dorfman et al, 'From the Noble Savage to the Third World' (Supplementary Reading for VI Students).
- Week 2: Unit 1 contd – *The Adventures of Tintin: Red Rackham's Treasure*
- Week 3: Unit 1 contd --*Asterix and Cleopatra*
- Week 4: Unit 1 contd --*Asterix and Cleopatra*
- Week 5: Unit 2 –*Persepolis*;
*Chute, 'Graphic Narrative as Witness' (Supplementary Reading for VI Students)
- Week 6: Unit 2 contd --*Persepolis*
- Week 7: Unit 2 contd --*Persepolis*
- Week 8: Unit 2 contd --*Persepolis* to be completed; begin Unit 3 --*Kari*
- Week 9: Unit 3 – *Kari*;
*P. Coogan, 'The Definition of the Superhero' (Supplementary Reading for VI Students)
- Week 10: Unit 3 contd --*Kari*
- Week 11: Unit 3 contd-- *Kari* to be completed; begin Unit 4 --*A Gardener in the Wasteland*
- Week 12: Unit4 -- *A Gardener in the Wasteland*;
*Nayar, 'Drawing on Other Histories' (Supplementary Reading for VI Students)
- Week 13: Unit4 contd -- *A Gardener in the Wasteland*
- Week 14: Unit4 contd --*A Gardener in the Wasteland*

Keywords

Visual literacy
Popular public cultures
Visual arts
Narrative
Interpretation and reading

PAPER G9: CINEMATIC ADAPTATIONS OF LITERARY TEXTS

Course Objectives

This paper will equip students from non-English studies backgrounds to explore the language of cinema, through their study of a canonical literary text. The study of global film adaptations of Shakespeare's *Othello* will focalize this paper's examination of theories of adaptation, transformation and transposition.

- Students will engage with the relationship between text and film and examine the contexts of film production in global film industries, including Hollywood and Bollywood
- As an elective English studies paper, the core focus is textual study and interpretative work, wherein the student gains skills in studying Shakespeare as much as in the language of film via appreciation of its specific features as a medium.
- The paper will focus on reception and critical work and history through the comparative framework, to examine the different contexts of production of the play and the films.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

The Language of Cinema

James Monaco, 'The Language of Film: Signs and Syntax', in *How to Read a Film: The World of Movies, Media & Multimedia* (New York: OUP, 2009) Chap. 3, pp. 170–249.

Stam Robert, 'Beyond Fidelity: The Dialogues of Adaptation', in James Naremore, ed., *Film Adaptation* (New Brunswick, NJ: Rutgers University Press, 2000) pp. 54-76.

Unit 2

Shakespeare, *Othello* (play)

Unit 3

Othello (movie, dir. Stuart Burge, 1965)

Unit 4

Othello (movie, dir. Oliver Parker, 1995)

Unit 5

Omkara (movie, dir. Vishal Bhardwaj, 2006)

Essential Readings and Films

Note: This is a course on cinema and literature, and students will be examined on all the prescribed readings and films in Units 1 through 5. Therefore, all that material is to be considered essential.

Suggested Films

Pinjar (dir. Chandra Prakash Dwivedi, 2003) - Hindi

Ghare Baire (dir. Satyajit Ray, 1984) - Bangla

Kaliyattam (dir. Jayaraaj, 1997) - Malayalam

Teaching Plan

Week 1 -- Unit 1 -- The Language of Cinema

a) James Monaco, 'The Language of Film: Signs and Syntax'

b) Stam Robert, 'Beyond Fidelity: The Dialogues of Adaptation'

Week 2 – Unit 1 contd

Week 3 – Unit 1 contd

Week 4 – Unit 2 -- *Othello* (Shakespeare)

Week 5 – Unit 2 contd

Week 6 – Unit 3 -- *Othello* (1965 dir. Stuart Burger)

Week 7 – Unit 3 contd

Week 8 – Unit 3 contd

Week 9 – Unit 4 -- *Othello* (1995 dir. Oliver Parker)

Week 10 – Unit 4 contd

Week 11 – Unit 4 contd

Week 12 – Unit 5 -- *Omkara* (2006 dir. Vishal Bhardwaj)

Week 13 – Unit 5 contd

Week 14 – Unit 5 contd

Keywords

Literature

Cinema

Text

Language

Adaptation

Transformation

Transposition

PAPER G10: INDIAN ENGLISH LITERATURES

Course Objectives

Over the past two centuries, especially after the 1980s, Indian writing in English has emerged as a major contribution to Indian as well as global literary production. A close analysis of some of the major works of Indian writing in English is crucial in any exploration of modern Indian subjectivities, histories and politics.

This course aims to

- introduce students to Indian English literature and its oeuvre through the selected literary texts across genres;
- enable the students to place these texts within the discourse of postcoloniality and understand Indian literary productions in English in relation to the hegemonic processes of colonialism, neo-colonialism, nationalism and globalization; and
- allow the students to situate this corpus within its various historical and ideological contexts and approach the study of Indian writing in English from the perspectives of multiple Indian subjectivities.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

R. K. Narayan, *Swami and Friends*

Unit 2

Firdaus Kanga, *Trying to Grow*

Unit 3

Mahesh Dattani, *Tara*

Unit 4

Shashi Deshpande, 'The Intrusion'
Salman Rushdie, 'The Courter'
Rohinton Mistry, 'Swimming Lessons'
Vikram Chandra, 'Dharma'

Unit 5

Kamala Das, 'An Introduction', 'My Grandmother's House'
Nissim Ezekiel, 'Night of the Scorpion', 'Goodbye Party for Miss Pushpa TS'
Arun Kolatkar, 'The Bus', 'A Low Temple'
Vikram Seth, 'The Crocodile and the Monkey'
Mamang Dai, 'The Sorrow of Women'

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Teaching Plan

Week 1: Introduction to the Paper: Indian Writing in English
Week 2: Unit 1 – Narayan, *Swami and Friends*
Week 3: Unit 1 contd
Week 4: Unit 1 contd
Week 5: Unit 2 – Kanga, *Trying to Grow*
Week 6: Unit 2 contd
Week 7: Unit 2 contd
Week 8: Unit 3 – Dattani, *Tara*
Week 9: Unit 3 contd
Week 10: Unit 4 – Deshpande, 'The Intrusion'; Rushdie, 'The Courter'
Week 11: Unit 4 – Mistry, 'Swimming Lessons'; Chandra, 'Dharma'
Week 12: Unit 5 – Das, 'An Introduction', 'My Grandmother's House'; Ezekiel 'Night of the Scorpion', 'Goodbye Party for Miss Pushpa TS'
Week 13: Unit 5 – Kolatkar, 'The Bus', 'A Low Temple'; Seth, 'The Crocodile and the Monkey'; Dai, 'The Sorrow of Women'
Week 14: Concluding lectures and course queries

Keywords

Indian novel
Imagery in Indian poetry
Diaspora
Self and society

PAPER G11: BESTSELLERS AND GENRE FICTION

Course Objectives

The paper engages with issues surrounding the category termed ‘popular literature’. Questions about the roles of readership, bestsellers, and the role of mass-market publication are explored. Various genres, such as writing for children and young adults, detective fiction, and modern mythology, which are considered popular, are included here.

The paper aims to

- promote an understanding of popular literature as a socially relevant and pleasurable form of writing, which engages with contemporary issues;
- encourage students to question the categories of ‘high’ and ‘low’ literature and issues concerning ‘popular culture’; and
- explore the social and cultural relevance of popular texts and bestsellers, as products of their time and age, mirroring the aspirations and anxieties of the society and class of their readership.

Facilitating the Achievement of Course Learning Outcomes

Sl. No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Ruskin Bond, *The Blue Umbrella*

Unit 2

Amish, *The Immortals of Meluha*

Unit 3

Alexander McCall Smith, *The No. 1 Ladies Detective Agency*

Unit 4

John Green, *Paper Towns*

Essential Reading

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 4. Therefore, all those texts are to be considered essential reading.

Teaching Plan

Week 1 – Unit 1 -- Introduction and Bond, *The Blue Umbrella*

Week 2 – Unit 1 contd

Week 3 – Unit 1 contd

Week 4 – Unit 2 – Amish, *The Immortals of Meluha*

Week 5 – Unit 2 contd

Week 6 – Unit 2 contd

Week 7 – Unit 2 contd

Week 8 -- Unit 3 – Smith, *The No. 1 Ladies Detective Agency*

Week 9 – Unit 3 contd

Week 10 -- Unit 3 contd

Week 11 – Unit 4 – Green, *Paper Towns*

Week 12 -- Unit 4 contd

Week 13 – Unit 4 contd

Week 14 – Concluding lectures discussion on exam pattern etc

Keywords

Popular fiction

Literary cultures

Genre fiction

Mass media

High and low literature

Literature and marketing

PAPER G12: CULTURE AND THEORY

Course Objectives

This course presents key theories seminal to the development of culture in the twentieth century. It combines a theoretical base with its practical application to literature. It focuses on the construction of culture in society and its application to the simplest aspects of life. The literary texts have been selected carefully to comprehend the connections between culture, literature and life.

Facilitating the Achievement of Course Learning Outcomes

Sl No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Antonio Gramsci, 'The Formation of the Intellectuals', and 'Hegemony (Civil Society) and the Separation of Powers', in *Selections from the Prison Notebooks*, ed. and tr. Quentin Hoare and Geoffrey Novell Smith (London: Lawrence and Wishart 1971).

Short Story

Anton Chekhov, 'The Bride', *Selected Works* (Moscow: Progress P, 1973).

Unit 2

Roland Barthes, 'Novels and Children', 'Toys', 'Plastic', in *Culture* (London: Vintage, 2009).

Short Story

Thomas Mann, 'Gladius Dei', in *Little Herr Friedmann and Other Stories* (Harmondsworth: Penguin, 1961).

Unit 3

Edward Said, 'The Scope of Orientalism', in *Orientalism* (Harmondsworth: Penguin, 1977) pp. 31-73.

Short Story

Lu Xun, 'My Old Home', *Selected Works*, Vol. 1 (Beijing: Foreign Languages Press, 1980).

Unit 4

Simone de Beauvoir, *The Second Sex* (London: Vintage 1997), Introduction, pp.13-29.

Short Story

Jean Paul Sartre, 'Intimacy', *The Wall*, trans. (Alexander Lloyd Wisconsin: Hal Leonard Corp, 1995).

Unit 5

Michel Foucault, 'What is an Author?', in *Modern Criticism and Theory: A Reader*, ed. David Lodge with Nigel Wood (New Delhi: Pearson, 2007) pp. 192-205.

Short Story

Katherine Mansfield, 'The Voyage', in *The Penguin Book of Short Stories*, ed. Christopher Dolley (Harmondsworth: Penguin, rpt 1970)

Essential Reading

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Teaching Plan

Week 1 – Introduction to GE, Paper 11: Culture and Theory

Week 2 – Unit 1 – Gramsci

Week 3 – Unit 1 contd -- Gramsci

Week 4 – Unit – 1 contd -- Chekov

Week 5 – Unit 2 – Barthes

Week 6 – Unit 2 contd – Mann, 'Gladius Dei'

Week 7 – Unit 3 -- Edward Said

Week 8 – Unit 3 contd – Said; Xun 'My Old Home

Week 9 – Unit 3 contd -- Xun

Week 10 -- Unit 4 – de Beauvoir

Week 11 – Unit 4 contd – Sartre, 'Intimacy'

Week 12 – Unit 5 -- Foucault

Week 13 – Unit 5 contd – Mansfield, 'The Voyage'

Week 14 – Concluding lectures exam issues etc.

Keywords

Intellectuals

Hegemony

Culture

Orientalism

Author

Social conditioning

Feminist movement

PAPER G13: MARGINALITIES IN INDIAN WRITING

Course Objectives

Since the twentieth century, literary texts from varied contexts in India have opened up new discursive spaces, from within which the idea of the normative is problematized. Positions of marginality, whether geographical, caste, gender, disability, or tribal, offer the need to interrogate the idea of the normative as well as constitutions of the canon. Though this engagement has been part of literary academic analysis, it has just begun making its foray into the syllabus of English departments of Indian universities. This paper hopes to introduce undergraduate students to perspectives within Indian writing that acquaint them with both experiences of marginalization, as well as the examination of modes of literary stylistics that offer a variation from conventional practice.

This paper intends to

- make undergraduate students approach literature through the lens of varied identity positions and evolve in them a fresh critical perspective for reading literary representations;
- enable them to explore various forms of literary representations of marginalisation as well as writing from outside what is the generally familiar terrain of Indian writing in schools;
- make them aware of the different ways in which literary narratives are shaped, especially since some of the texts draw on traditions of the oral mythic folk and the form of life-narrative as stylistics;
- make them understand how literature is used also to negotiate and interrogate this hegemony; and
- evolve an alternative conception of corporeal and subjective difference.

Facilitating the Achievement of Course Learning Outcomes

Sl No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Caste

B. R. Ambedkar, *Annihilation of Caste: The Annotated Critical Edition*, Chaps 4 (233-236) 6 (241-244) and 14 (259-263) (New Delhi: Navayana Publications, 2015).
Bama, *Sangati*, 'Chapter 1', trans. Lakshmi Holmstrom (New Delhi: Oxford University Press, 2005) pp. 3-14.
Ajay Navaria, 'Yes Sir', *Unclaimed Terrain*, trans. Laura Brueck (New Delhi: Navayana, 2013) pp. 45-64.
Aruna Gogulamanda, 'A Dalit Woman in the Land of Goddesses', in *First Post*, 13 August 2017.

Unit 2

Disability

Rabindranath Tagore, 'Subha', *Rabindranath Tagore: The Ruined Nest and Other Stories*, trans. Mohammad A Quayum (Kuala Lumpur: Silverfish, 2014) pp. 43-50.
Malini Chib, 'Why Do You Want to Do BA', *One Little Finger* (New Delhi: Sage, 2011) pp. 49-82.
Raghuvir Sahay, 'The Handicapped Caught in a Camera', trans. Harish Trivedi, *Chicago Review* 38: 1/2 (1992) pp. 146-7.
Girish Karnad, *Broken Images. Collected Plays: Volume II* (New Delhi: Oxford University Press, 2005) pp. 261-84.

Unit 3

Tribe

Waharu Sonawane, 'Literature and Adivasi Culture', *Lokayana Bulletin*, Special Issue on Tribal Identity, 10: 5/6 (March-June 1994): 11-20
Janil Kumar Brahma, 'Orge', *Modern Bodo Short Stories*, trans. Joykanta Sarma (Delhi: Sahitya Akademi, 2003) pp. 1-9.
D. K. Sangma, 'Song on Inauguration of a House', trans. Caroline Marak, *Garos Literature* (Delhi: Sahitya Akademi, 2002) pp. 72-73.
Randhir Khare, 'Raja Pantha', *The Singing Bow: Poems of the Bhil* (Delhi: Harper Collins, 2001) pp. 1-2.

Unit 4

Gender

Living Smile Vidya, 'Accept me!' in *I Am Vidya: A Transgender's Journey* (New Delhi: Rupa, 2013) pp. 69-79.
Rashid Jahan, 'Woh', trans. M. T. Khan, in *Women Writing in India 600 BC to the Present Vol 2* Susie Tharu and K Lalita. eds (New York: The Feminist Press, 1993) pp. 119-22.
Ismat Chughtai, 'Lihaf', trans. M. Assadudin, *Manushi*, Vol. 110, pp. 36-40.
Hoshang Merchant, 'Poems for Vivan', in *Same Sex Love in India: Readings from Literature and History*, Ruth Vanita and Saleem Kidwai, eds (New York: Palgrave, 2001) pp. 349-51.

Unit 5

Region

Cherrie L Chhangte, 'What Does an Indian Look Like', ed, Tilottoma Misra, *The*

Oxford Anthology of Writings from North-East India: Poetry and Essays (New Delhi: Oxford UP, 2011) p. 49.

Indira Goswami, 'The Offspring', trans. Indira Goswami, *Inner Line: The Zubaan Book of Stories by Indian Women*, ed. Urvashi Butalia (New Delhi: Zubaan, 2006) pp. 104-20.

Shahnaz Bashir, 'The Transistor', *Scattered Souls* (New Delhi: Harper Collins, 2017).

Stanzin Lhaskyabs, 'Mumbai to Ladakh', *Himalayan Melodies: A Poetic Expression of Love, Faith and Spirituality* (Amazon Kindle, 2016. Web. Kindle Location 1239-1297).

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Teaching Plan

Week 1: Introduction to the paper through an understanding of marginality in Indian literary representations and voices from positions of marginality and the political impetus of such writing

Week 2: Introduction contd

Week 3: Unit 1 -- Caste: Ambedkar, *Annihilation of Caste*; Bama 'Ch1' *Sangati*

Week 4: 1 contd – Ajay, 'Yes Sir'; Aruna, 'A Dalit Woman in the Land of Goddesses'

Week 5: Unit2 -- Disability: Tagore, 'Subha'; Chib, 'Why Do You Want to Do BA'

Week 6: Unit 2 contd -- Sahay, 'The Handicapped Caught in a Camera'; Karnad, *Broken Images*

Week 7: Unit3 --Tribe: Sonawane, 'Literature and Adivasi Culture'; Kumar, 'Orge'

Week 8: Unit 3 contd – Sangma, 'Song on Inauguration of a House'; Khare, 'Raja Pantha'

Week 9: Unit 4: Gender: Vidya, 'Accept me!'; Jahan, 'Woh'

Week 10: Unit 4 contd – Chughtai, 'Lihaf'; Merchant, 'Poems for Vivan'

Week 11: Unit5 --Region: Bashir, 'The Transistor'; Chhangte, 'What does an Indian Look like'

Week 12: Unit 5 contd – Lhaskyabs, 'Mumbai to Ladakh'; Goswami, 'The Offspring'

Week 13: (a) Engagement with the varied positions within the course and a consideration of literary representations of the same; and (b) What close reading offers to both an understanding of narrative and the socio-political worlds from which texts emerge

Week 14: Concluding lectures and course queries

Keywords

Lived experience

Hegemony

Voice

Normative

Oppression

Self-assertion

PAPER G14: *THE INDIVIDUAL AND SOCIETY*

Course Objective

This anthology introduces students to the various issues that face society today – caste, class, race, gender violence, and globalization. It serves as an effective entry point to an understanding of these areas that students will encounter in their higher studies and daily lives, and aims to provide them with a holistic understanding of these issues and their complexities.

Facilitating the Achievement of Course Learning Outcomes

Sl No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Prescribed text:

Sood, Vinay, ed. *The Individual and Society: Essays, Stories and Poems*. Delhi: Pearson, 2005.

Unit 1

Caste and Class

Chapters 1, 2, 3, 4, 5, 6

Unit 2

Gender

Chapters 8, 9, 10, 12, 13, 15

Unit 3

Race

Chapters 16, 17, 18, 19

Unit 4

Violence and War

Chapters 22, 23, 25, 26

Unit 5

Living in a Globalized World

Chapters 29, 31, 32, 34

Essential Reading

Note: This is a text-based course, and students will be examined on all the prescribed readings in Units 1 through 5. The text, *The Individual and Society*, is therefore to be considered essential reading.

Teaching Plan

Week 1 – Unit 1-- Caste/Class

Week 2 – Unit 1contd

Week 3 – Unit 1 contd

Week 4 – Unit 2 -- Gender

Week 5 – Unit 2contd

Week 6 – Unit 2contd

Week 7 – Unit 2contd

Week 8 – Unit 3 -- Race

Week 9 – Unit 3contd

Week 10 – Unit 4 -- Violence and War

Week 11 – Unit 4contd

Week 12 – Unit 5 -- Living in a Globalized World

Week 13 – Unit 5contd

Week 14 – Concluding lectures, discussion on exam pattern, etc.

Keywords

Individual

Society

Caste

Class

Gender

Race

Violence

Globalisation

PAPER G15: TEXT AND PERFORMANCE: WESTERN PERFORMANCE
THEORIES AND PRACTICES

Course Objectives

This course combines modern Western theatrical concepts along with the praxis of performance. It will familiarise students with the seminal Western theories of performance in the twentieth century and their visualisation on stage. The course will focus on a historical understanding of the different types of theatrical spaces along with their bearing on performance. A practice based course, it will focus on techniques such as voice modulation and body movement. A designated unit towards production will help students understand the different aspects involved in theatrical production.

Facilitating the Achievement of Course Learning Outcomes

Sl No	Course Learning Outcome	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Introduction

- Introduction to western theories of performance; classical to contemporary
- Endorsement of existing structures to radicalising our world
- Historical overview of western theatre

Topics for Student Presentations:

- a) Perspectives on theatre and performance
- b) Historical development of theatrical forms
- c) Popular traditions

Unit 2

Theatrical Forms and Practices

- a) Performative spaces: eg., proscenium 'in the round' amphitheatre open-air and thrust stage; their impact on meanings of performance
- b) Performance components: voice modulation and body movement

Topics for Student Presentations:

- a) On the different types of performative space in practice
- b) Poetry reading elocution expressive gestures and choreographed movement

Unit 3

Theories of Drama

Theories and demonstrations of acting: Stanislavsky, Brecht, Boal

Topic for Student Presentations:

Acting short solo/ group performances followed by discussion and analysis with application of theoretical perspectives

Unit 4

Theatrical Production

- a) Direction production stage props costume lighting backstage support
- b) Recording/archiving performance/case study of production/performance/impact of media on performance processes

Topic for Student Presentations:

All aspects of production and performance: recording, archiving, interviewing performers, and data collection

Unit 5

Final practical assignment

- a) A performance of minimum thirty minutes using any one form of drama studied in this course
- b) Interview at least one theatre practitioner who has worked with western theatrical forms

Suggested Readings

Brecht, Bertolt. *Brecht on Theatre: The Development of an Aesthetic*. Trans. John Willet. London: Methuen, 1978.

Boal, Augusto. *Theatre of the Oppressed*. London: Pluto Press, 1979.

Brook, Peter. *The empty space: A book about the theatre: Deadly, holy, rough, immediate*. New York: Simon and Schuster, 1996. *The Empty Space*. New York: Touchstone, 1996.

Fo, Dario. *The Tricks of the Trade*. London: Taylor & Francis, 1991.

People's Art in the Twentieth Century: Theory and Practice. Jana Natya Manch. New Delhi: Navchetan Printers. 2000.

Shelley, Steven Louis. *A Practical Guide to Stage Lighting*. Oxford: Elsevier, 2009.

Stanislavski, Konstantin. *An Actor Prepares*. London: Taylor & Francis, 1989.

Stanislavski, Konstantin. *Building A Character*. London: Bloomsbury, 2013.

Williams, Raymond. *Drama From Ibsen to Brecht*. Harmondsworth: Penguin, 1983.

Teaching Plan

Week 1 – Introduction to Paper G15

Week 2 – Unit 1 -- Introduction

Week 3 – Unit 1 contd

Week 4 – Unit2 --Popular Theatrical Forms and Practices

Week 5 – Unit 2 contd

Week 6 – Unit 2 contd

Week 7 – Unit 3 --Theories of Drama

Week 8 – Unit 3 contd

Week 9 – Unit 4 --Theatrical Production

Week 10 -- Unit 4 contd

Week 11 – Unit 5 -- Field work: Interviewing a theatre practitioner

Week 12 – Unit 5 contd -- Working towards a Performance

Week 13 – Unit 5 contd -- Working towards a Performance

Week 14 – Concluding lectures exam issues, etc.

Keywords

Performance

Performativity

Performance spaces

Stanislavsky

Brecht

Boal

Voice modulation and body movement

Direction

Production

Stage props

Costume

Lighting

Backstage support

PAPER G16: LITERATURE AND THE CONTEMPORARY WORLD

Course Objectives

This course seeks to introduce students to various genres of contemporary literature, through works that are familiar and have established themselves in the popular parlance. These texts will be studied from various prisms – class, gender, race, etc., and will equip students with an understanding of the linkages between literature history and society in our times.

Facilitating the Achievement of Course Learning Outcomes

Sl No	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Isabel Allende, *The House of the Spirits* (Everyman's Library, 2005)

Unit 2

Khaled Hossaini, *The Kite Runner* (Bloomsbury, 2013)

Unit 3

Wole Soyinka, *A Dance of the Forests* (Three Crowns, 1963)

Unit 4

Short stories

- Julio Cortaza, 'The Sky Wide Open', *The Oxford Book of Latin America*, ed. Roberto Gonzalez Echevarria (OUP, 1997).
- Chimamanda Ngozi Adichie, 'The American Embassy', *The Thing Around Your Neck* (Harper Collins, 2009)
- Tenzin Tsundue, 'Kora', *Kora: Stories and Poems* (New Delhi, 2002)

Poems

- a) Nazim Hikmet, 'Ninth Anniversary', *Poems of Nazim Hikmet*, trans. Randy Blasing and Mutlu Konuk (New York: Persea Books, 2002)
- b) Maya Angelou, 'On the Pulse of Morning', *The Complete Collected Poems of Maya Angelou* (Random House Publishing Group, 1994)
- c) Yasmine Gooneratne, 'Big Match 1983', *The Arnold Anthology of Post-Colonial Literatures in English*, ed. John Thieme (USA: Oxford University Press, 2000)

Essential Reading

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 4. Therefore, all those texts are to be considered essential reading.

Teaching Plan

- Week 1: Introductory lectures on the interdisciplinary nature of literature its intersections with history and politics in the contemporary world
- Week 2: Unit 1 – Allende, *The House of the Spirits* -- analysis of the context and text
- Week 3: Unit 1 contd
- Week 4: Unit 1 contd
- Week 5: Unit 2 – Hossaini, *The Kite Runner* -- historical background and textual analysis
- Week 6: Unit 2 contd
- Week 7: Unit 2 contd
- Week 8: Unit 3 – Soyinka, *A Dance of the Forests*
- Week 9: Unit 3 contd
- Week 10: Unit 3 contd
- Week 11: Unit 4 -- Introduction to the short story: Cortázar, 'The Sky Wide Open'; Adichie, 'The American Embassy'
- Week 12: Unit 4 contd – Tsundue, 'Kora'; introduction to poetry; Hikmet, 'Ninth Anniversary'
- Week 13: Unit 4 contd – Angelou, 'On the Pulse of Morning'; Gooneratne 'Big Match 1983'
- Week 14: Concluding lectures on genre, the category of 'world literature', globalization, and conflict – gender, class, race, and nationhood

Keywords

Art
Genre
History
Politics
Globalisation
Race
Class
Gender

Examination Scheme for the Generic Elective Course

Part A

Students will be required to answer **3 questions of 10 marks** each, covering the theoretical aspects of the syllabus. A paper-specific array of choices will be provided.

3 x 10 = 30 marks

Part B

Students will be required to answer **3 out of 6 application-based questions of 15 marks each.**

3 x 15 = 45 marks

TOTAL MARKS: 75

AECC

AECC ENGLISH

Course Objectives

Effective communication is an essential skill for success in any sphere of activity, from leadership responsibilities, teamwork, interviews, presentations, and inter-personal relations. This is a skill that needs to be taught in a systematic manner so that students imbibe the fundamentals of communication. The art of persuasive speaking and writing depends crucially on clarity of thought and contextual understanding expressed through appropriate vocabulary.

The ability to think critically is crucial for a good communicator and involves an understanding of the communicative process. Therefore, we need to study every stage of this process systematically in order to be much more effective at communicating successfully -- in interviews, public speaking, letter writing, report writing, presentations, and inter-personal debates and conversations.

Learning Outcomes

- Students will master the art of persuasive speech and writing.
- Students will master the art of listening, reading, and analyzing. Students will spend the bulk of their time in class in practical exercises of reading and writing.
- Students will develop critical thinking skills.
- They will be introduced to established principles of academic reading and writing.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Content

Unit 1

Introduction

Theory of communication, types and modes of communication (Introductions to all five sections)

Unit 2

Language of Communication

Verbal and non-verbal, spoken and written

Personal communication

Social communication

Business communication

Barriers and Strategies

Intra-personal Communication

Inter-personal Communication

Group communication

Unit 3

Speaking Skills

Monologue

Dialogue

Group Discussion

Effective Communication

Mis-Communication

Interview

Public Speech

Unit 4

Reading and Understanding

Close Reading

Comprehension

Summary

Paraphrasing

Analysis

Interpretation

Translation from Indian languages to English and vice versa

Literary/Knowledge, Texts

Unit 5

Writing Skills

Documenting
Report writing
Making notes
Letter writing

Suggested Teaching Plan

Week 1

1. Introduction:

Week 2 and 3

2. Language of Communication

Verbal and non-verbal, spoken and written
Personal communication
Social communication
Business communication
Barriers and Strategies
Intra-personal Communication
Inter-personal Communication
Group communication

Week 4, 5 and 6

3. Speaking Skills

Monologue
Dialogue
Group Discussion
Effective Communication
Mis-Communication
Public Speech

Week 7, 8 and 9

4. Reading and Understanding

Close Reading
Comprehension
Summary
Paraphrasing
Analysis
Interpretation

Translation from Indian languages to English and vice versa
Literary/Knowledge, Texts

Week 10-13

5. Writing Skills

Documenting
Report writing
Making notes
Letter writing

Week 14

Revision and clarifying concepts

Keywords

Critical reading
Comprehension
Summary
Paraphrase
Translation
Context
Argumentation
Perspective
Reception
Audience
Evaluation
Synthesis
Verbal communication
Non-verbal communication
Personal communication
Social communication
Barriers to communication
Intra-personal communication
Inter-personal communication
Group discussion
Miscommunication
Public speech
Literary knowledge
Writing skills
Documentation
Report writing
Note taking
Letter writing

B. A. & B. COM. PROGRAMME

CORE ENGLISH LANGUAGE

General Course Statement

1. The course will retain streaming. The structure of three graded levels of English language learning is required in a diverse central university like Delhi University to address the differential learning levels of students and achieve the desired competence.

2. **The existing English A, B, and C will be renamed as English Language through Literature, English Fluency and English Proficiency respectively. This will remove any discriminatory, hierarchical attributes in the existing nomenclature and refocus the pedagogic exercise on the respective objectives of the three streams in an academically thorough and non-hierarchical way.**

As 98% of the BA & B.Com Programme students have done English in class 12, **streaming will be now based on their Class XII marks in English.** There will be three streams:

1. 80% and above: **ENGLISH LANGUAGE THROUGH LITERATURE**
 2. 60% and above up to 80%: **ENGLISH FLUENCY**
 3. Less than 60%: **ENGLISH PROFICIENCY**
- We have retained the present Delhi University Rule of streaming students who have done English up to Class X and Class VIII to ENGLISH FLUENCY and ENGLISH PROFICIENCY respectively to take care of the 2% who may not have done English up to Class XII
 - We have provided a 10% relaxation in Class XII English marks while streaming for students who have studied English Elective in class XII

The detailed syllabus with suggested readings, teaching plans, testing/evaluation pattern and learning outcomes for two semesters under CBCS is as follows:

ENGLISH LANGUAGE THROUGH LITERATURE I & II
ENGLISH FLUENCY I & II
ENGLISH PROFICIENCY I & II

A -- ENGLISH LANGUAGE THROUGH LITERATURE

Course Objectives

This course aims to

- develop in students the ability and confidence to process understand and examine different kinds of texts - verbal and written - that they encounter in everyday life

- enable students to identify and understand social contexts and ethical frameworks in the texts they encounter
- encourage suitable research; to recognize sources; to distinguish fact from opinion/editorialization; produce objective versus subjective pieces
- teach skilled comprehension; listening/reading; skimming; summarising; précis writing; paraphrasing; note making
- identify key topics/arguments/ideas
- accomplish writing goals: creating an essay; writing a thesis statement; producing topic sentences; developing organised paragraphs; evolving the skill of producing suitable transitions between paragraphs
- enable students to write in expository argumentative and descriptive modes
- help students identify and use the characteristic features of various writing forms: letters programmes reports/press-releases; newspaper hard news; feature articles; fiction and nonfiction
- enable students to choose between expository argumentative descriptive and narrative writing styles to assemble their own writing
- inculcate confident expression: to enable students to articulate their own views confidently because their language skills sufficiently empower them to converse research and collate information from various textual sources be these verbal or written.

COURSE CONTENT FOR SEMESTERS I / II

Unit 1

Understanding Everyday Texts

This unit aims to help students understand that we are surrounded by texts So thinking about texts reading writing and comprehension are necessary life skills not merely language skills

Reading: Texts may include reportage open letters campaigns social reports etc Students will practice skimming scanning analysing interpreting

Writing: Descriptive passage making notes drafting points creating a program sheet paragraphs outlines drafts etc

Speaking: Make short presentations 2-3 minutes long showcasing their understanding of any topical issues

Listening and responding to short presentations

Grammar/Vocabulary: Tenses -- verb tenses and the ability to use them in a variety of contexts

Suggested Readings:

Edwards, Adrian 'Forced displacement worldwide at its highest in decades'

UNHCR.orgUNHCR<http://www.unhcr.org/afr/news/stories/2017/6/5941561f4/forced-displacement-worldwide-its-highest-decades.html#> Accessed 1 June 2018

Jadhav, Radheshyam 'Groom wanted: Trader peon...anyone but a farmer' *Times News Network* 1 Jan 2018 <https://timesofindiaindiatimescom/city/chandigarh/groom-wanted-trader-peonanyone-but-a-farmer/articleshow/62321832cms> Accessed 1 June 2018

Knapton, Sarah 'Selfitis' -- the obsessive need to post selfies-- is a genuine mental disorder say psychologists' *The Telegraph* 15 December 2017 <https://www.telegraph.co.uk/science/2017/12/15/selfitis-obsessive-need-post-selfies-genuine-mental-disorder/> Accessed 1 June 2018

'13 letters every parent every child should read on Children's Day' *The Indian Express* 10 November 2014 <http://indianexpress.com/article/lifestyle/feelings/12-letters-every-parent-every-child-should-read-on-childrens-day/> Accessed 1 June 2018

Unit 2

Understanding Drama

This unit focuses on dramatic texts centre human communication; the focus will be to see how speech is connected to character and situation

Reading one-act/short plays to identify different elements of drama characterization/ conflict/ plot etc

Writing: Rewriting dialogue for a character; writing an alternative playscript for a scene with stage directions; practicing expository writing; writing analytical pieces about the plays

Speaking: Learning to use one's voice and body to perform/enact a character

Listening: Watching plays live or recorded; studying why actors perform the way they do

Grammar/Vocabulary: Observing and learning the use of the first person/second person/third person address

Suggested Readings:

Lakshmi CS 'Ambai' 'Crossing the River' *Staging Resistance: Plays by Women in Translation* edited by Tutun Mukherjee Oxford: Oxford University Press 2005

Unit 3

Understanding Poetry

Poetic texts centre the use of language in clear and striking ways: students will learn how poetic language can help them attain brevity clarity depth and complexity in verbal and written expression

Reading poetry to identify tone imagery rhythm rhyme and use of tropes

Writing and reviewing poems with particular emphasis on formal elements; paraphrase and analysing poems to produce argumentative interpretations of poems

Speaking: reading poetry out loud as in poetry slam in order to listen to tone emphasis etc

Listening to others' poetry and preparing responses

Grammar/Vocabulary: Modifiers Synonyms Antonyms Homophones Simile Metaphor

Suggested Readings:

Angelou Maya 'Caged Bird' *The Complete Collected Poems of Maya Angelou* New York: Random House Inc 1994

Ezekiel Nissim 'Goodbye Party For Miss Pushpa TS' *Collected Poems* New Delhi: Oxford University Press 2005

Okara Gabriel 'Once Upon a Time' *Gabriel Okara: Collected Poems* Nebraska: University of Nebraska 2016

Lawrence DH 'Last Lesson of the Afternoon' *The Complete Poems of DH Lawrence* Hertfordshire: Wordsworth Editions 1994

Unit 4

Understanding Fiction

Narrative texts use language to recreate experience: students will learn how to order their experiences into meaningful narratives

Reading a short story to identify themes, plot, structure, characterisation and narrative voice

Rewriting the story from another perspective to redevelop plot and characters

Speaking discussing the formal elements of a piece of fiction of their choice

Listening to audio clips of writers reading their work/work read aloud to study how fiction uses literary devices and also rhythm pauses punctuation etc

Grammar/Vocabulary: Imperatives Conditional Clauses Transitions

Suggested Readings:

Kumar E Santhosh 'Three Blind Men describe an Elephant' *Indian Review*

<http://indianreviewin/fiction/malayalam-short-stories-three-blind-men-describe-an-elephant-by-e-santhosh-kumar/> Accessed 1 June 2018

Mistry Rohinton 'The Ghost of Firozsha Baag' *Tales from FirozshaBagh* McClelland & Stewart 1992

Joshi Umashankar 'The Last Dung Cake' *The Quilt from the Flea-market and Other Stories* Delhi: National Book Trust 2017

Unit 5

Creating Your Own Voice

This unit helps students understand that the creation of a unique personal voice is possible through an understanding of the mechanics of language. This section will study how different

audiences lead us to modify what we wish to say so that our thoughts become accessible and communication is successful

Reading: Texts may include columns opinion and editorial pieces from newspapers magazines social media online news and e-zines

Writing: Examine the process of writing: drafting editing and revising; respond to what you are reading in the form of a personal essay preliminary forms can include social posts or blogs structured as brief personal essays

Speaking about thematically similar content to different audiences to help students understand how the listener affects form and content

Listening: Students' presentations can supply the core listening task; listen to texts on similar themes addressed to different audiences film clips from feature and documentary films; songs on the same theme

Grammar/Vocabulary: Register tone word choice

Suggested Readings:

<https://www.wired.com/story/wikipedias-fate-shows-how-the-web-endangers-knowledge/> Accessed 18 July 2019

Khanna Twinkle 'Lesson from Frida: Backbone can win over broken spine' in 'Mrs. Funnybones' *The Times of India* 16 September 2018
<https://timesofindia.indiatimes.com/blogs/mrsfunnybones/lesson-from-frida-backbone-can-win-over-broken-spine/> Accessed 13 June 2018

TESTING AND EVALUATION

Internal Assessment: Of 20 marks 10 marks will be allocated for assessment of reading and writing assignments and 10 marks for assessment of speaking and listening test.

Semester I/II Final Examination 75 marks

Reading and Writing skills:

- Unseen comprehension passage 650 words to test reading comprehension critical thinking and vocabulary skills 15 marks
- Questions related to the suggested literary texts: to test awareness of literary form and context through comprehension testing 2 x 15 = 30 marks
- Questions testing composition skills: descriptive passage; personal essay; paraphrasing poem; re-writing story-ending etc. 2 x 10 = 20 marks

Grammar: Different grammar topics to be tested via exercises of editing/rewriting a given passage 10 marks

Teaching Plan

Week 1 – Introduction; Unit 1 --Understanding Everyday Texts

Week 2 – Unit 1 contd

Week 3 – Unit 1 contd

Week 4 – Unit 2 -- Understanding Drama

Week 5 – Unit 2 contd

Week 6 – Unit 2 contd

Week 7 – Unit 3 -- Understanding Poetry

Week 8 – Unit 3contd

Week 9 – Unit 4 -- Understanding Fiction

Week 10 –Unit 4 contd

Week 11 –Unit 4 contd

Week 12 – Unit 5 -- Creating Your Own Voice

Week 13 – Unit 5 contd

Week 14 – Unit 5 contd and summing up

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Keywords

Language through literature

Verbal and written texts

Social and ethical frameworks

Listening and reading comprehension

Argumentative descriptive and narrative writing styles
Confident self-expression

B -- ENGLISH FLUENCY

Course Objectives

This course is intended for students who possess basic grammatical and vocabulary skills in English but may not be able to effectively communicate in their everyday contexts. The course aims to equip them with skills that will help them interact with people around their personal, institutional, and social spaces. The course will help students to

- describe or express their opinions on topics of personal interest such as their experiences of events, their hopes and ambitions
- read and understand information on topical matters and explain the advantages and disadvantages of a situation
- write formal letters, personal notes, blogs, reports, and texts on familiar matters
- comprehend and analyse texts in English
- organise and write paragraphs and short essays in a variety of rhetorical styles

COURSE CONTENTS FOR SEMESTERS I / II

Unit 1

In the University

Introducing oneself -- Note-making

Pronunciation Intonation – Nouns, Verbs, Articles

- Introduce yourselves as individuals and as groups -- group discussion exercise. Take notes on your fellow students' introductions
- Introduce characters from the text you are reading via posters

Suggested Readings:

Tales of Historic Delhi by Premola Ghose Zubaan. 2011

Unit 2

In the domestic sphere

Diary/ Blog writing

Modifiers, Prepositions, Conjunctions

- Write a diary entry and convert it into a blog post
- Convert a transcript/ script/ piece of dialogue into a diary entry/ blog post

Suggested Readings:

‘The Lost Word’ by Esther Morgan From *New Writing*, ed. Penelope Lively and George Szirtes, Picador India, New Delhi, 2001.

Squiggle Gets Stuck: All About Muddled Sentences: Natasha Sharma. Puffin Young Zubaan. 2016.

Unit 3**In public places**

CV Job applications

Tenses and concord

- Write the CV of a fictional character
- Write the perfect job application for your dream job

Suggested Readings:

‘Amalkanti’ by Nirendranath Chakrabarti From Oxford Anthology of Modern Indian Poetry, ed. Vinay Dharwadkar and A.K. Ramanujan, OUP, New Delhi, 1994, pp 52-3.

Extract from *Bhimayana* Srividya Natarajan and S. Anand. Navayana Publications. pp 60-71.

Unit 4**In the State**

Research -- Filing an FIR, making an RTI request, submitting a consumer complaint

Active & Passive voice; idioms

- Find out what the procedure is for making a complaint about trees being cut in your neighbourhood
- Draft a formal letter requesting information about the disbursal of funds collected by a residents' welfare association

Suggested Readings:

Where the Wild Things Are by Maurice Sendak Random House UK, 2000.

rtionline.gov.in/index.php

consumerhelpline.gov.in/consumer-rights.php

www.jaagore.com/know-your-police/procedure-of-filing-fir

www.consumercomplaints.in/municipal-corporation-of-delhi-b100274

Unit 5**Interface with Technology**

Book/film reviews

Punctuation

- Write a review of a text you have read in class

- Record a collaborative spoken-word review of the latest film your group have all seen

Suggested Readings:

Priya's Shakti: Ram Devineni, Lina Srivastava and Dan Goldman. Rattapallax, 2014.

www.priyashakticom/priyas_shakti/

Kennedy, Elizabeth. "Breakdown and Review of 'Where the Wild Things Are'." ThoughtCo, Jul. 3, 2019, [thoughtco.com/where-the-wild-things-are-maurice-sendak-626391](https://www.thoughtco.com/where-the-wild-things-are-maurice-sendak-626391).

Teaching Plan

Week 1 – Introduction & Unit 1 -- In the University

Week 2 – Unit 1 contd

Week 3 – Unit 2 --In the domestic sphere

Week 4 – Unit 2 contd

Week 5 – Unit 2 contd

Week 6 – Unit 3 --In public places

Week 7 – Unit 3 contd

Week 8 – Unit 3 contd

Week 9 – Unit 4 --In the State

Week 10 – Unit 4 contd

Week 11 – Unit 4 contd

Week 12 – Unit 5 --Interface with Technology

Week 13 – Unit 5 contd

Week 14 – Unit 5 contd& Summing Up

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Keywords

Effective communication
Listening
Speaking
Reading and writing
Communicative tasks and activities
Familiar contexts
Professional contexts
Social contexts

Evaluation:

Internal assessment (25 marks)
Reading & Writing assignment(10 marks)
Oral listening & speaking test(10 marks)
Attendance: 5 marks

FINAL EXAM 75 marks

Semester I/II

Book or film review(15 marks)
Comprehension passage(15 marks)
RTI request or FIR(10 marks)
Dialogue or Interview(10 marks)
Diary or blog post(10 marks)
Proofreading/Punctuation passage(5 marks)
Note-making(5 marks)
Facebook or Twitter post(5 marks)

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments

Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests
---	--	-------------

Keywords

Effective communication

Listening

Speaking

Reading

Writing

Communicative tasks and activities

Familiar context

Personal communication

Professional communication

Social communication

C ENGLISH PROFICIENCY

Course Objectives

The English Proficiency course is intended for students who have had inadequate exposure to English and hence exhibit a very low level of proficiency in the language – difficulty in comprehending simple texts, limited vocabulary, a poor grasp of basic syntactical structures, and an inability to speak or write the language with confidence. The course that is spread over two semesters aims to redress these issues and aims to

- enhance comprehension skills and enrich vocabulary through the reading of short and simple passages with suitable tasks built around these
- introduce simple syntactical structures and basic grammar to students through contextualized settings and ample practice exercises so that they can engage in short independent compositions
- introduce the sounds of the language and the essentials of English pronunciation to students in order to remove the inhibitions experienced by them while speaking English
- acquaint students with social formulae used to perform various everyday functions so that they can converse in English in simple situations

COURSE CONTENTS FOR SEMESTER I / II

Unit 1

Reading and Comprehension - I

Note: The unit names are indicative only and identify core language areas that are targeted through the course. The learning of various language skills needs to happen in an integrated fashion. It is therefore imperative that for every unit learners should work through the whole range of tasks in the prescribed readings irrespective of the title of the unit.

- Short and simple passages from the prescribed books
- These texts are to be used to enhance reading and comprehension skills of learners through various textual tasks such as reading aloud, sentence completion, true / false activities, re-ordering jumbled sentences, identifying central ideas, supplying alternative titles, attempting short comprehension questions, etc.
- Learners are encouraged to exploit the recommended books beyond the prescribed sections
- The end-semester examination will include the testing of the comprehension of an unseen passage of an equivalent level

Suggested Readings:

A Foundation English Course for Undergraduates: Reader I, Delhi: Oxford University Press, 1991, pp. 1 - 36 Units 1 - 6

Everyday English Delhi: Pearson, 2005, pp. 1 - 15 Units 1 - 3 & 21 - 31 Units 5 - 6

Unit 2

Learning about words

Students cultivate the habit of using a dictionary to learn about words - their spelling, pronunciation, meaning, grammatical forms, usage, etc. Students are introduced to word associations, the relationships between words – synonyms, antonyms, homonyms, homophones. They learn the use of prefixes and suffixes; commonly confused words; phrasal verbs and idioms

The specific reading prescribed for this unit is to be used in conjunction with the vocabulary sections in the other recommended course texts, where activities like matching, sorting, and fill-in-the-blanks are used to engage the learners with words.

As a semester-long project the learners could be required to prepare 'mini-dictionaries' of their own, consisting of unfamiliar words they come across on a daily basis

Suggested Readings:

Everyday English Delhi: Pearson, 2005, pp. 36 - 43 Unit 8

Unit 3

Basic Grammar Rules - I

Subject-verb agreement; tenses; modals; articles; prepositions; conjunctions

The prescribed reading for this unit is to be supplemented by the grammar tasks contained in the other recommended course books to provide intensive practice to learners

Suggested Readings:

Developing Language Skills I, Delhi: Manohar, 1997, pp. 186 - 195 & 206 - 209 Units 2 3 & 5 of the 'Grammar' section

Unit 4

Writing Skills - I

This section will introduce students to the structure of a paragraph; they will write a short guided composition of up to 100 words. These skill is to be practised through activities such as supplying topic sentences to given paragraphs, completing given paragraphs, expressing given facts or information from tables and expressing it in paragraphs, re-ordering jumbled sentences, and then re-writing them as connected paragraphs, using suitable linking devices etc

Relevant sections from the other recommended course books are to be used for this purpose in addition to the prescribed reading for this section

Suggested Readings:

Everyday English, Delhi: Pearson, 2005, pp. 21 - 31 Units 5 - 6

A Foundation English Course for Undergraduates: Workbook I, Delhi: Oxford University Press, 1919, pp. 1 - 31 Units I - V

Unit 5

Conversing - I

Students will learn to listen to the sounds of English; the essentials of English pronunciation; conversational formulae used for greetings. After introducing themselves and others, students will learn correct modes of thanking, wishing well, apologizing, excusing oneself, asking for and giving information, making offers and requests, and giving orders.

In addition to the prescribed reading for this unit, the 'Speaking' sections at the end of the first five units of the *Everyday English* text should be used

Suggested Readings:

Developing Language Skills I, Delhi: Manohar, 1997, pp. 8 - 26 Units 1 - 5 of 'Oral Communication: Speech Patterns'

Teaching Plan

Teaching Learning Process

Since language skills can only be learnt and mastered through the teaching-learning process, instruction needs to be learner-centric. The class time is to be taken up with hands-on activities by learners, involving reading aloud / silently, speaking, listening, and writing. Peer and group work should be used extensively. The teacher is to act as a facilitator, setting up and overseeing learner tasks and providing stimulus, encouragement, and corrective inputs as and when necessary. The teacher is also expected to source additional related material and activities pitched at an appropriate level of difficulty, to plug in gaps in the prescribed readings as well as to extend the knowledge of the learners and to hone their skills.

Teaching Plan for Semester I / II

Week 1 – Introduction; *A Foundation English Course for Undergraduates: Reader I*, pp. 1 – 15 Units 1 - 3

Week 2 – *A Foundation English Course for Undergraduates: Workbook I*, pp. 1 – 14 Unit I

Week 3 – *A Foundation English Course for Undergraduates: Reader I*, pp. 17 – 33 Units 4 – 6

Week 4 – *Developing Language Skills I*, pp. 186 – 189 Unit 2 of 'Grammar'; *Everyday English*, pp. 1- 9 Units 1 – 2

Week 5 – *Everyday English*, pp. 10 - 15 36 - 43 Units 3 & 8

Week 6 – *English at the Workplace II*, pp. 10 - 13 Unit 3; *Developing Language Skills I*, pp. 1 – 13 Units 1 & 2 of 'Oral Communication: Speech Patterns'

Week 7 – *A Foundation English Course for Undergraduates: Workbook I*, pp. 15 – 20 Unit II; *Everyday English*, pp. 21 - 27 Unit 5

Week 8 – *Everyday English*, pp. 28 - 31 Unit 6; *Developing Language Skills I*, pp. 18 – 21 Unit 4 of 'Oral Communication: Speech Patterns'

Week 9 – *Developing Language Skills I*, pp. 189 – 195 Unit 3 of 'Grammar'

Week 10 – *A Foundation English Course for Undergraduates: Workbook I*, pp. 21 – 22 Unit III; *Developing Language Skills I*, pp. 14 – 18 Unit 3 of 'Oral Communication: Speech Patterns'

Week 11 – *Developing Language Skills I*, pp. 21 - 26 Unit 5 of 'Oral Communication: Speech Patterns'

Week 12 – *Developing Language Skills I*, pp. 206 – 208 Unit 5 of 'Grammar'

Week 13 – *A Foundation English Course for Undergraduates: Workbook I*, pp. 23 – 27 Unit IV

Week 14 - *A Foundation English Course for Undergraduates: Workbook I*, pp. 28 – 31 Unit V

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Note: The entire course is practical in nature. The prescribed readings are rich in tasks and activities that aim at developing essential language skills. Working their way through these tasks will give the learners hands-on practice in the use of these skills.

References

A Foundation English Course for Undergraduates: Reader I, Delhi: Oxford University Press, 1991

A Foundation English Course for Undergraduates: Workbook I, Delhi: Oxford University Press, 1991

Everyday English, Delhi: Pearson, 2005

Developing Language Skills I, Delhi: Manohar, 1997

Additional Resources:

English at the Workplace, Delhi: Macmillan, 2006

Assessment Methods

Since the class is conceived as learner-centric and built around tasks that require learners to actively use various language skills, formative assessment can and should be used

extensively. The focus here could be on skills and activities that are harder to test in a written evaluation, such as speaking and listening skills, dictionary work, etc. Oral presentations, peer interviews, and group tasks can be used for this purpose. The end-semester written examination will test all the areas targeted in the course – reading comprehension, vocabulary, grammar, composition, and oral communication. The proposed weightage for these sections in the end-semester exam is as follows:

- Reading Comprehension - 25 marks
- Vocabulary - 15 marks
- Grammar - 15 marks
- Written composition - 10 marks
- Oral communication - 10 marks

Keywords

English proficiency

Reading

Writing

Speaking

Listening

Pronunciation

Comprehension

Vocabulary

Syntax

Grammar

Composition

Conversation

Discipline English (BA Programme) under CBCS

Course Statement

The English Discipline-centric papers are designed to give students a broad yet deep understanding of English Literatures, both through canonical and translated literary texts and anthologies. It draws on current issues and ideas to familiarize students of writings in the West and in the Asian subcontinent. Different genres are introduced to give the students knowledge of cultural motifs and ideologies that would help in their understanding of the world. Starting with the 'Individual and Society' anthology that introduces them to significant contemporary issues like Caste and Globalization, the papers move on to texts from the European Renaissance, Victorian and Modern poetry and ends with some optional papers that a student may choose out of his/her interest. They include a paper on Modern Drama, Children's Literature, Postcolonial Literature and Popular Literature.

Course Objectives

- * The course offers the BA Programme student an opportunity to study three years of English Discipline papers that enable them to go for further studies in English if they so desire
- * The course attributes to the students a working knowledge of how to read literary texts and enables them to use such knowledge to enhance and augment their professional job opportunities
- * The course introduces students to contemporary literary ideas and issues in an increasingly complex world
- *The course allows the student a familiarity with literary texts through different genres and time periods

Course Contents

Semester 1

DSC 1A

Selections from *Individual and Society: Essays, Stories and Poems*, (Pearson/Longman, 2005) with the selected chapters as follows: 28 chapters

1. From the section on **Caste/Class**: Chapters 2, 3, 4, 5, 6
2. From the section on **Gender**: Chapters 7, 8, 10, 12, 13, 14, 15
3. From the section on **Race**: Chapters 16, 17, 18, 19
4. From the section on **Violence and War**: Chapters 22, 23, 24, 25, 26, 27, 28
5. From the section on **Globalization**: 29, 31, 32, 33, 34.

Keywords: Caste, Class, Gender, Race, Violence and War, Globalization

Teaching Plan:

Weeks 1-3: Caste/Class chapters

Weeks 4-7: Gender

Weeks 8-9: Race

Weeks 9-12: War and Violence

Weeks 13-14: Globalization

**DEPARTMENT OF ENGLISH
UNIVERSITY OF DELHI
DELHI - 110007**



**Structure of BA Honours English
English for BA/ BCom/BSc Programme
and
English for BA(H)/BCom(H)/BSc (H)
under Learning Outcomes-based Curriculum Framework for Undergraduate
Education**

*Syllabus applicable for students seeking admission to the
BA Honours English, BA/BCom/BSc Programme and BA(H)/BCom(H)/BSc(H) under
LOCFw.e.f. the academic year 2019-20*

For Semesters III and IV

Structure of B. A. Honours English under LOCF

CORE COURSE

Paper Titles	Page
---------------------	-------------

Sem III

1. American Literature
2. Popular Literature
3. British Poetry and Drama: 17th and 18th Centuries

Sem IV

4. British Literature: 18th Century
5. British Romantic Literature
6. British Literature: 19th Century

SKILL ENHANCEMENTCOURSE (SEC)

Paper Titles

SEC 1: Analytical Reading and Writing

SEC 2: Literature in Social Spaces

SEC 3: Literature in Cross-Cultural Encounters

(ONLY for English Honours Students)

SEC 4: Oral, Aural and Visual Rhetoric

SEC 5: Introduction to Creative Writing for Media

SEC 6: Translation Studies

SEC 7: Introduction to Theatre and Performance

SEC 8: Modes of Creative Writing: Poetry, Fiction and Drama

SEC 9: English Language Teaching

SEC 10: Film Studies

SEC 11: Applied Gender Studies: Media Literacies

**B. A. & B. COM. PROGRAMME
(CORE ENGLISH LANGUAGE)**

Note for Visually Impaired Students

For visually impaired students to be able to take some of these papers, a number of supplementary readings are offered. These are to be read/discussed in connection with the texts in the classroom, so as to create a sustainable and diverse model of inclusive pedagogy. For visually impaired students, this set of readings will also be treated as primary, and may be examined as such. The supplementary readings may be used as theorizations or frameworks for understanding the course.

For purposes of assessment/ evaluation, a general advisory may be made to assist visually impaired students filter out areas they may not be able to address due to the nature of their disability and to focus on using supplementary texts to instead create other perspectives/ forms of knowledge on the same texts.

I. B. A. HONOURS ENGLISH UNDER LOCF

CORE COURSE

PAPER 5

AMERICAN LITERATURE

Semester 3

Course Statement:

This course offers students an opportunity to study the American literary tradition as a tradition which is distinct from, and almost a foil to, the traditions which had developed in European countries, especially in England. A selection of texts for this course therefore highlights some of the key tropes of mainstream America's self-perception, such as Virgin Land, the New World, Democracy, Manifest Destiny, the Melting-Pot, and Multiculturalism. At the same time there are specifically identified texts that draw the attention of students to cultural motifs which have been erased, brutally suppressed or marginalized (the neglected and obscured themes from the self-expression of the subaltern groups within American society) in the mainstream's pursuit of the fabled American Dream. A careful selection of writings by Native Americans, African Americans, as well as texts by women and other sexual minorities of different social denominations seek to reveal the dark underside of America's progress to modernity and its gradual emergence as the most powerful nation of the world.

Course Objectives:

The course aims to acquaint students with the wide and varied literatures of America: literature written by writers of European, particularly English, descent reflecting the complex nature of the society that emerged after the whites settled in America in the 17th century; include Utopian narrative transcendentalism and the pre- and post- Civil War literature of the 19th century introduce students to the African American experience both ante-bellum and post-bellum reflected in the diversity of literary texts, from narratives of slavery, political speeches delivered by Martin Luther King Jr. and Frederick Douglass, as well as the works of contemporary black woman writers familiarize students with native American literature which voices the angst of a people who were almost entirely wiped out by forced European settlements; and include modern and contemporary American literature of the 20th century.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive	Reading material together in

		discussions in small groups in Tutorial classes	small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Content

Unit 1

Tennessee Williams *The Glass Menagerie*

Unit 2

Toni Morrison, *Beloved*

Unit 3

Poetry

Walt Whitman, 'O Captain! My Captain', in *Walt Whitman: Poetry and Prose*, ed. Shira Wolosky (The Toby Press, 2003) pp. 360-61).

Allen Ginsberg, 'A Supermarket in California', in *Selected Poems 1947-1995* (Penguin Books, 2001) p. 59.

Langston Hughes, (i) 'The Negro Speaks of Rivers'; (ii) 'The South'; (iii) 'Aunt Sue's Stories', in *The Weary Blues* (New York: Alfred A. Knopf, 2015) pp. 33; 36; 39.

Joy Harjo, (i) 'Perhaps the World Ends Here'; (ii) 'I Give You Back', in *The Woman That I Am: The Literature and Culture of Contemporary Women of Color*, ed. D. Soyini Madison (New York: St Martin's Press, 1994) pp. 37-40.

Unit 4

Short Stories

Edgar Allen Poe 'The Purloined Letter'

William Faulkner 'Dry September'

Flannery O'Connor, 'Everything that Rises Must Converge', in *Everything that Rises Must Converge* (New York: Farrar Straus Giroux, 1965)

Leslie Marmon Silko, 'The Man to Send Rain Clouds', in *Nothing but the Truth: An Anthology of Native American Literature*, ed. John L. Purdy and James Ruppert (New Jersey: Prentice Hall, 2001) pp. 358-61.

Unit 5

Readings:

- ‘Declaration of Independence’ July 4, 1776, in *For Liberty and Equality: The Life and Times of the Declaration* (OUP, 2012) pp. 312); and ‘Abraham Lincoln Gettysburg Speech’, in *Gettysburg Speech and Other Writings* (Barnes & Noble, 2013).
- Ralph Waldo Emerson, ‘Self Reliance’ in *The Selected Writings of Ralph Waldo Emerson*. ed. with a biographical introduction by Brooks Atkinson (New York: The Modern library, 1964)
- Martin Luther King Jr, ‘I have a dream’, in *African American Literature*, ed. Kieth Gilyard, Anissa Wardi (New York: Penguin, 2014) pp. 1007-11)
- Frederick Douglass, *A Narrative of the life of Frederick Douglass* (Harmondsworth: Penguin, 1982) chaps. 1–7, pp. 47–87.
- Adrienne Rich, ‘When We Dead Awaken: Writing as Re-Vision’, *College English*, Vol. 34, No. 1, Women, Writing and Teaching, pp. 18-30.

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

TEACHING PLAN

Paper 5: American Literature

Week 1 -- Introduction to Paper 1: American Literature

Week 2 – Unit 1 -- Drama: Tennessee Williams *The Glass Menagerie*

Week 3 – Unit 1 – Tennessee Williams (contd)

Week 4 – Unit 2 -- Novel: Morrison, *Beloved*

Week 5 – Unit 2 –Morrison (contd)

Week 6 – Unit 3 -- Poetry: (a) Whitman, ‘O Captain! My Captain’;

Week 7 – Unit 3 – (b) Ginsberg, ‘A Supermarket in California’

Week 8 – Unit 3 – (c) Langston Hughes, (i) ‘The Negro Speaks of Rivers’, (ii) ‘The South’, (iii) ‘Aunt Sue’s Stories; (d) Joy Harjo, (i) ‘Perhaps the World Ends Here’, (ii) ‘I Give You Back’

Week 9 – Unit 4 -- Short Stories:

(a); Edgar Allen Poe ‘ The Purloined Letter’

b) William Faulkner 'Dry September'

Week 10 --

(c) O' Connor, 'Everything that Rises Must Converge';

(d) Silko, 'The Man to Send Rain Clouds'

Week 11 – Unit 5 -- Prose Readings:

(a) Declaration of Independence' July 4, 1776, or 'Abraham Lincoln Gettysburg Speech'

(b) Ralph Waldo Emerson, 'Self Reliance'

Week 12 – Prose Readings (contd):

(c) Martin Luther King Jr, 'I have a dream'

(d) Douglass, Frederick, Selection from *A Narrative of the life of Frederick Douglass*

Week 13 – Prose Readings (contd):

(e) Adrienne Rich, 'When We Dead Awaken: Writing as Re-Vision.'

Week 14 - Concluding lectures; exam issues, etc.

PAPER 6
POPULAR LITERATURE
Semester 3

Course Statement

The paper will trace the emergence of a mass printing culture from the nineteenth century onwards, and the rise of genres such as Literature for Children, Detective Fiction, Science Fiction, and Graphic Fiction. The course introduces students to the idea of ‘popular literature’ and stresses its importance within modern culture. It familiarises students with the debate between ‘high’ and ‘low’ culture, and the tension between what is studied as ‘canonical’ texts and other texts. Students will also engage with issues concerning print culture, bestsellers, and popular literature in other media.

Course Objectives

This course aims to

- enable students to trace the rise of print culture in England, and the emergence of genre fiction and bestsellers;
- familiarize students with debates about culture, and the delineation of high and low culture; and
- help them engage with debates about the canonical and non-canonical, and hence investigate the category of literary and non-literary fiction.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Literature for Children

- a) Lewis Carroll, 'Through the Looking Glass', in *Alice's Adventures in Wonderland and Through the Looking Glass*, ed. Hugh Haughton (Penguin Classics: London, 1998).
- b) Sukumar Ray, (i) 'The Sons of Ramgaroo'; (ii) 'Stew Much'; both in *A Few Poems by Sukumar Ray*, trans. Satyajit Ray (Open Education Project OKFN, India) pp. 4, 12. <https://in.okfn.org/files/2013/07/A-Few-Poems-by-Sukumar-Ray.pdf>

Unit 2

Detective Fiction

Agatha Christie, *The Murder of Of Roger Ackroyd* (Harper Collins :New York, 2017)

Unit 3

Science Fiction

- a) Isaac Asimov, 'Nightfall', in *Isaac Asimov: The Complete Short Stories. Vol I.* (New York: Broadway Books, 1990) pp. 334-62.
- b) Ursula le Guin, 'The Ones Who Walk away from Omelas', in *The Wind's Twelve Quarters and The Compass Rose* (London: Orion Books, 2015) pp. 254-62.
- c) Philip K. Dick, 'Minority Report', in *The Complete Stories of Philip K. Dick. Vol.4: The Minority Report and Other Classic Stories* (Citadel Books: New York, 1987) pp. 62-90.
- d) Ray Bradbury, 'A Sound of Thunder', in *A Sound of Thunder and Other Stories*. (New York: William Morrow, 2005).
- e) JayantNarlikar, 'Ice Age Cometh' in *It Happened Tomorrow* ed Bal Phondke, National Book Trust: New Delhi, 1993. Pgs 1-20

Unit 4

Graphic Fiction

DurgabaiVyam and Subhash Vyam, *Bhimayana:Experiences of Untouchability*. Navayana : New Delhi, 2011)/

B.R.Ambedkar, *Waiting for a Visa* (For the Visually Challenged students)

Unit 5

Readings

- Christopher Pawling, 'Popular Fiction: Ideology or Utopia?', in *Popular Fiction and Social Change*, ed. Christopher Pawling (London: Macmillan, 1984).
- Felicity Hughes, 'Children's Literature: Theory and Practice', *ELH* 45 (1978), pp. 542-62.
- Darko Suvin, 'On Teaching SF Critically', in *Positions and Presuppositions in Science Fiction* (London: Macmillan), pp. 86-96.
- Tzvetan Todorov, 'The Typology of Detective Fiction', trans. Richard Howard, in *The Poetics of Prose* (Ithaca: Cornell University Press, 1977).

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

Teaching Plan

Popular Literature

Week 1 – Introduction to Forms of Popular Fiction; [it is suggested that the reading for each section be done as an introduction to each of the genres represented];

Unit 5 – (a) Pawling, 'Popular Fiction: Ideology or Utopia?'

Week 2 – Unit 1 – Literature for Children: Introduction; Hughes, 'Children's Literature: Theory and Practice';

Start Unit 1 – (a) Carroll, 'Through the Looking Glass';

(b) Ray, (i) 'The Sons of Ramgaroo'; (ii) 'Stew Much'

Week 3 – Carroll and Ray (contd)

Week 4- Unit 2 --Detective and Spy Fiction, Introduction; Todorov, 'The Typology of Detective Fiction';

Week 5-Unit 2 – Christie , The Murder of Roger Ackroyd

Week 6 – Unit 2 (contd):

Week 7 – Unit 3 – Science Fiction, introduction; - Suvin, 'On Teaching SF Critically';

Week 8-(a) Asimov 'Nightfall';

(b) le Guin 'The ones who walk away from Omelas'

Week 9- (c) Dick 'Minority Report';

Week 10 – (d) Bradbury 'A Sound of Thunder';

(e) Narlikar 'The Ice Age Cometh'

Week 11 – Unit 4 -Introduction to Graphic Fiction, Sumathi Ramaswamy essay

Week 12 – Unit 4 :Bhimayana

Week 13 – Unit 4 (contd)

Week 14 – Concluding lectures; exam issues, etc.

Keywords

Popular Culture

Mass Culture

Popular Fiction

Popular Literature

Romance

Detective Fiction

Spy Fiction

Science Fiction

Children's Literature

Bestsellers

Thrillers

PAPER 7

BRITISH POETRY AND DRAMA: 17TH AND 18TH CENTURIES

Semester 3

Course Statement

The paper explores the British Literature in the 17th Century with its varied genres, the historical ruptures and the intellectual debates of the time. It begins with Shakespeare's tragedy *Macbeth*, exploring the issues of succession and individualism pertinent to the Jacobean age. Milton's significant portrayal of Satan in Book 1 of *Paradise Lost* has influenced imaginative writing on the idea of evil thereafter. Aemilia Lanyer was the first secular woman poet to be published professionally. The prescribed poem offers a perspective on Eve on the fall of Man. Aphra Behn, currently one of the most popularly studied writers of the Restoration, offers an opportunity to discuss the paradox of Tory conservatism and the woman's question in Restoration stage. Pope's *The Rape of the Lock* extends the mock epic tradition to the early 18thC as a representative of the neoclassical aesthetics. The readings enable a wide philosophical and political understanding of the period.

Course Objectives

This course aims to

- help students explore poetry, drama and prose texts in a range of political, philosophical and cultural material from the end of the Renaissance through the English Civil War and Restoration in the seventeenth century;
- examine the turmoil about succession and questions on monarchy as they lead up to the civil war, both in drama like Shakespeare and Behn as well as in the poetry of Milton;
- show a new interweaving of the sacred and the secular subjects of poetry 17th C;
- study Bacon's essay on deformity through the lens of disability and its definitions, linked back to Montaigne in the earlier paper;
- analyse Cartesian dualism that provides a basis for reading ideas of body and mind in the period and after;
- explore Hobbes's views on materialism and the equality of men, as they are interestingly juxtaposed with his argument for a strong state and his view of man as selfish by nature;
- show how Winstanley's writing, on the other hand, brings together Christianity and communality in an argument for equality after the civil war; and
- explore the newness of this century in Cavendish's bold exploration of natural philosophy or science as a domain for women

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in	Reading material together in small groups, initiating discussion topics, participation

		Tutorial classes	in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Content

Unit 1.

William Shakespeare *Macbeth*

Unit 2.

- a. *Paradise Lost* (1667) Book 1, in *John Milton: Paradise Lost*, Longman Annotated English Poets, 1998.
- b. Aemilia Lanyer, 'Eve's Apology in Defense of Women', section from *Salve Deus Rex Judaeorum* (1611), in *The Norton Anthology of English Literature*, 8th edition, ed. Greenblatt et al., Vol. 1, pp. 1317-19.

Unit 3.

Aphra Behn, *The Rover* (1677), in *Aphra Behn: The Rover and other Plays*, ed. Jane Spencer (Oxford: OUP, 2008).

Unit 4

Alexander Pope *The Rape of the Lock*

Unit 5.

- Francis Bacon, (i) 'Of Truth'; (ii) 'Of Deformity'; both in *Essays* (1597).
- René Descartes, excerpts from 'Discourse on Method' (1637) Part 4, in *Discourse on Method and Meditations on First Philosophy*, trans. Donald A. Cress, (Indianapolis: Hackett, 1998) pp. 18-19.
- Thomas Hobbes, selections from *The Leviathan* (1651): title page, Introduction, Chaps 1 and 13 from Part I, 'Of Man', ed. Richard Tuck (Cambridge University Press, 1996).
- Gerrard Winstanley, from 'A New Year's Gift Sent to the Parliament and Army' (1650), in *The Norton Anthology of English Literature*, Vol. 1, 8th edition, ed. Greenblatt et al., pp. 1752-57.
- Margaret Cavendish, excerpts from 'The Blazing World' (1666), in *The Norton Anthology of English Literature*, Vol. 1, 8th edition, ed. Greenblatt et al., pp. 1780-85.

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

TEACHING PLAN

Paper 7: British Poetry and Drama : 17th and 18th Century

Week 1 -- Introduction to the Jacobean period, the Civil War, and the Restoration:
period, genres, and themes;

Week 2 – Shakespeare *Macbeth*

Week 3 -- Shakespeare (contd)

Week 4 – Shakespeare (contd)

Week 5 - Milton, *Paradise Lost*

Week 6 -- Milton (contd)

Week 7 – Milton (contd)

Lanyer, ‘Eve’s Apology in Defense of Women’, section from *Salve Deus*

Rex Judaeorum

Week 8 – Aphra Behn ,*The Rover*

Week 9 – Behn (contd)

Week 10 – Pope, *The Rape of the Lock*

Week 11 – Pope (Contd)

Week 12 - Readings:

(a) Bacon, (i) ‘Of Truth’; (ii) ‘Of Deformity’

(b) Descartes, excerpts from ‘Discourse on Method’

Week 13 -(a) Hobbes, selections from *The Leviathan*, title page, Introduction, Chaps 1 and 13 from Part I, ‘Of Man’

(b) Winstanley, from ‘A New Year's Gift Sent to the Parliament and Army’

(c) Cavendish, excerpts from ‘The Blazing World’

Week 14 – Concluding Lectures on the 17th C: From the Jacobean to the Neoclassical.

PAPER 8
BRITISH LITERATURE: 18TH CENTURY
Semester 4

Course statement

This is a survey course covering a variety of genres in eighteenth-century England, including both canonical and new writings within a history of ideas. It is designed to represent a comprehensive study of texts both in the Augustan period and in the later eighteenth century, often called the age of sensibility. The first unit *The Way of the World* by William Congreve portrays the shift from the libertine sensibility to the culture of politeness at the turn of the century. The course includes the major canonical authors of the early eighteenth century—Swift and Johnson—with some of their representative texts, as well as writers who have received considerable recent scholarship like Daniel Defoe and Eliza Haywood. The latter half of the century is marked by the emerging genre of the novel and Fielding's first novel *Joseph Andrews* included here, is considered by many to be one of the earliest English novels. The paper includes non-fictional genres that were dominant in the age like the periodical essay and the public letter. The intellectual context includes Locke's treatise on empiricism and William Hay's observations on deformity. An excerpt from one of the earliest slave autobiographies at the end of the century helps to contextualize Britain in a global world and the debates on the abolition of the slave trade.

Course Objectives

The course aims to

- examine Congreve's *The Way of the World* as a Comedy of Manners.
- raise questions about satire as a mode, as well as look at questions of genre, through Swift's satiric narrative within the mode of fictional travel writing;
- show, through a critical examination of Johnson and Gray's poems a continued association with classical poetry, the continuities and contrasts from the age of satire to age of sensibility;
- study Fielding's *Joseph Andrews* providing a brilliant example of the amalgamation of previous genres which made the new genre of the novel, and to look at his indebtedness to Richardson despite the overt satire on *Pamela*;
- examine the eighteenth century as a great period for non-fictional forms of writing, drawing attention to the ways in which the periodical essay, for instance, sought to be like philosophy, just as Locke's treatise sought to be like a popular essay, thus pointing out the play with genre in these texts; and
- encourage an extended discussion on the meanings of disability in the early modern period through the Enlightenment, through William Hay's piece on deformity, a response to Bacon.

Course Content

Unit 1

William Congreve

The Way of the World

Unit 2

Jonathan Swift

Gulliver's Travels, Books 3-4

Unit 3

a. Samuel Johnson

'London'

b. Thomas Gray

'Elegy Written in a Country Churchyard'

Unit 4

Henry Fielding

Joseph Andrews

Unit 5

- John Locke, 'Of Ideas in general, and their Original', Paragraphs 1-8, from *An Essay concerning Human Understanding* (1689), Chap 1 Book II, ed. John Nidditch (Oxford: Clarendon Press, 1975) pp. 104-108.
- Addison and Steele, (i) Addison, Essay No. 10, Monday, March 12, 1711; (ii) Addison, Essay No. 69, on the stock-exchange, Saturday, May 19, 1711, both from *The Spectator* (1711-12); Eliza Haywood, Selections from *The Female Spectator* (1744-46), ed. Patricia Meyer Spacks, pp.7-23.
- Daniel Defoe, 'The Complete English Tradesman' (Letter XXII), 'The Great Law of Subordination Considered' (Letter IV), and 'The Complete English Gentleman', in *Literature and Social Order in Eighteenth-Century England*, ed. Stephen Copley (London: Croom Helm, 1984).
- William Hay, from *Deformity: An Essay* (1754) (London: R and J. Dodsley, 1756) pp. 1-11, 44-51.
- Olaudah Equiano, 'The Middle Passage', excerpt from Chapter Two in *The Interesting Narrative of the Life of Olaudah Equiano; or, Gustavus Vassa, the African, Written by Himself* (1789), ed. Robert J. Allison (Boston, 1995), pp. 54-8.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions

2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

TEACHING PLAN

Paper 8: Eighteenth Century Literature

Week 1 - Introduction to the long eighteenth century;

Unit 2 -- William Congreve, *The Way of the World*

Week 3 - Congreve (contd)

Week 4 - Congreve (contd)

Week 5 - Swift, *Gulliver's Travels*

Week 6 – Swift (contd)

Week 7 - Swift (contd)

Week 8 - Samuel Johnson, *London*

Week 9 - Gray, *Elegy*

Week 10 - Fielding, *Joseph Andrews*

Week 11 -Fielding (contd)

Week 12 - Fielding (contd)

Week 13 - Readings

(a) Locke, 'Of Ideas in general, and their Original', Paragraphs 1-8

b) Addison and Steele, (i) Addison, Essay No. 10, Monday, March 12, 1711; (ii) Addison, Essay No. 69, on the stock-exchange

c) Haywood, Selections from *The Female Spectator*

Week 14 – a) Defoe, (i) Letter XXII, 'The Complete English Tradesman' (1726); (ii)

Letter IV, 'The Great Law of Subordination Considered'; 'The Complete English Gentleman'

(b) Hay, from *Deformity: An Essay*

(c) Equiano, 'The Middle Passage', excerpt from Chapter Two in *The Interesting Narrative of the Life of Olaudah Equiano; or, Gustavus Vassa, the African, Written by Himself*

PAPER 9
BRITISH ROMANTIC LITERATURE
SEMESTER 4

Course Statement

This paper focuses on the Romantic period of English literature and covers a historical span of about 40 years (1789-1830). Individual units deal with both canonical and non-canonical writers of the period.

Course Objectives

This course aims to

- introduce students to the Romantic period in English literature, a period of lasting importance, since it serves as a critical link between the Enlightenment and Modernist literature;
- offer a selection of canonical poems and prose that constitute the core texts of the Romantic period;
- introduce marginal voices that were historically excluded from the canon of British Romantic writers; and
- provide an introduction to important French and German philosophers who influence the British Romantic writers.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

- a) William Blake, from *Songs of Innocence and Experience*, (i) 'Introduction' (to *Songs of Innocence*); (ii) 'Lamb'; (iii) 'Tiger'; (iv) 'Chimney Sweeper' (*Songs of Innocence*); (v) 'Chimney Sweeper' (*Songs of Experience*); (vi) 'The Little Black Boy'; (vii) 'London'.
b) Charlotte Smith, (i) 'To Melancholy'; (ii) 'Nightingale'

Unit 2

- a) William Wordsworth, (i) 'Lines Composed a Few Miles Above Tintern Abbey'; (ii) 'Ode: Intimations of Immortality'.
b) Samuel Coleridge, (i) 'Kubla Khan'; (ii) 'Dejection: An Ode'

Unit 3

- a) Lord George Gordon Noel Byron 'Childe Harold': canto III, verses 36–45 (lines 316–405); canto IV, verses 178–86 (lines 1594–674)
b) Percy Bysshe Shelley (i) 'Ozymandias'; (ii) 'Ode to the West Wind'
c) John Keats, (i) 'Ode to a Nightingale'; (ii) 'Ode on a Grecian Urn'; (iii) 'Ode to Autumn'

Unit 4

Mary Shelley, *Frankenstein*.

Unit 5

Readings

- J. J. Rousseau, 'Discourse on the Origin of Inequality', Part One, in *Jean-Jacques Rousseau: Basic Political Writings* (Hackett Publishing Company, 1987) pp. 37-60.
- Immanuel Kant, 'Analytic of the Sublime', in *The Critique of Judgment* (Cambridge University Press, 2001) pp. 128-49.
- William Wordsworth, 'Preface to Lyrical Ballads', in *Romantic Prose and Poetry*, ed. Harold Bloom and Lionel Trilling (New York: OUP, 1973) pp. 594– 611.
- William Gilpin, 'On Picturesque Travel', in *Three Essays: On Picturesque Beauty*.

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

TEACHING PLAN

Paper 9: British Romantic Literature

Week 1 -- Introduction to the Romantic period;

Blake: From *Songs of Innocence and Experience*, (i) 'Introduction' to *Songs of Innocence*; (ii) 'Lamb'; (iii) 'Tiger'; (iv) 'Chimney Sweeper' (*Songs of Innocence*); (v) 'Chimney Sweeper' (*Songs of Experience*); (viii) 'The Little Black Boy'; (ix) 'London'

Week 2 – Blake (contd)

Week 3 – Blake (contd);

Smith, (i) 'To Melancholy', (ii) 'Nightingale'

Week 4 – Wordsworth, (i) 'Lines Composed a Few Miles Above Tintern Abbey'; (ii) 'Ode: Intimations of Immortality'.

Week 5 -- Wordsworth (contd)

Week 6 – Coleridge, (i) 'Kubla Khan', (ii) 'Dejection: An Ode'

Week 7 – Keats, (i) 'Ode to a Nightingale'; (ii) 'Ode on a Grecian Urn'; (iii) 'Ode to Autumn'

Week 8 – Keats (contd); Shelley, (i) 'Ozymandias'; (ii) 'Ode to the West Wind'

Week 9 -- Shelley (contd)

Week 10 – Mary Shelley, *Frankenstein*

Week 11 -- Mary Shelley (contd)

Week 12 -- Readings:

- (a) Rousseau, 'Discourse on the Origin of Inequality', Part One;
- (b) Kant, 'Analytic of the Sublime';
- (c) Wordsworth, 'Preface to Lyrical Ballads';
- (d) Gilpin, 'On Picturesque Travel'

Week 13 – Readings (contd)

Week 14 – Readings (contd)

Keywords

Imagination

Nature

French Revolution

Sublime

Science

PAPER 10
BRITISH LITERATURE: 19TH CENTURY
SEMESTER 4

Course Statement

This paper focuses on the Victorian period of English literature and covers a large historical span from 1814 to 1900. Individual units deal with important examples of the novel form, with one unit on Victorian poetry.

Course Objectives

This course aims to

- introduce students to the Victorian Age in English literature through a selection of novels and poems that exemplify some of the central formal and thematic concerns of the period;
- focus on three novels, a major genre of the nineteenth century, so as to show both the formal development of the genre as well as its diverse transactions with the major socio-historic developments of the period; and
- introduce the students, through the readings in Unit 5, to the main intellectual currents of the period.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups, initiating discussion topics, participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Jane Austen, *Pride and Prejudice*

Unit 2

Charles Dickens, *Great Expectations*.

Unit 3

Charlotte Bronte, *Jane Eyre*.

Unit 4

Poetry

- a) Alfred Tennyson, (i) 'The Lady of Shalott' (ii) 'Ulysses' (iii) 'The Defence of Lucknow'.
- b) Robert Browning, (i) 'My Last Duchess'; (ii) 'Fra Lippo Lippi'.
- c) Christina Rossetti, 'Goblin Market'.
- d) Mathew Arnold, 'Dover Beach'

Unit 5

Readings

- Thomas Carlyle, 'Signs of the Times'.
- Oscar Wilde, 'The Critic as Artist'
- J. S. Mill, 'Of the Limits to the Authority of Society over the Individual, from 'On Liberty'.
- Karl Marx, (i) 'Mode of Production: The Basis of Social Life'; (ii) 'The Social Nature of Consciousness', both in *A Reader in Marxist Philosophy*, ed. Howard Selsam and Harry Martel (International Publishers, 1963) pp. 186–8, 190–1; 199–201.
- Charles Darwin, excerpts from 'On Origin of Species by Means of Natural Selection', from Chapter 3; from Chapter 4, ed. Joseph Carroll (Broadview Press, 2003) pp. 132–34; 144–162.

Essential reading

Note: This is a literature-based course, and therefore, all these texts are to be considered essential reading.

Teaching Plan

Paper 10: British Literature: Nineteenth Century

Week 1 – Introduction to the Nineteenth Century; Unit 1 -- Austen, *Pride and Prejudice*

Week 2 -- Austen (contd)

Week 3 -- Austen (contd)

Week 4 -- Unit 2 -- Dickens, *Great Expectations*

Week 5 -- Dickens (contd)

Week 6 -- Dickens (contd)

Week 7 -- Unit 3 – Charlotte Bronte, *Jane Eyre*

Week 8 -- Charlotte Bronte (contd)

Week 9 -- Charlotte Bronte (contd)

Week 10 - Poetry:

(a) Tennyson, (i) 'Lady of Shalott', (ii) 'Ulysses' (iii) 'The Defence of Lucknow';

(b) Browning, (i) 'My Last Duchess', (ii) 'Fra Lippo Lippi';

(c) Arnold, 'Dover Beach';

(d) Rossetti, 'Goblin Market';

Week 11 – Poetry (contd)

Week 12 – Poetry (contd)

Week 13 -- Readings:

(a) Carlyle, 'Signs of the Times';

(b) Wilde, 'The Critic as Artist';

(c) Mill, 'Of the Limits to the Authority of Society over the Individual', from 'On Liberty';

(d) Marx, (i) 'Mode of Production: The Basis of Social Life', (ii) 'The Social Nature of Consciousness';

(e) Darwin, excerpts from 'On the Origin of the Species by Means of Natural Selection'

Week 14 -- Readings (contd)

Keywords

Realism

Novel

Industrial Revolution

Liberalism

Feminism

Bourgeois

Socialism

Darwinism

SKILL ENHANCEMENT COURSES (SEC)

PAPER S1: ANALYTICAL READING AND WRITING

Course Objectives

This course will teach students the fundamentals of rhetorical or persuasive writing organized according to a pedagogic system of academic writing that is followed the world over. Students everywhere are expected to follow this system in universities while they write assignments and take term examinations. In this age of globalized academics, Indian students need to know both the theory and practice of academic analysis and academic writing in order for them to participate in an increasingly international academic environment. All of us who teach analysis and writing have learned and internalized this pedagogic structure usually without being consciously aware of its mechanics. In our M. Phil courses we learnt through trial and error, emulation and example, how to write research papers. Those of us who have written Ph. D. theses are aware that we had to write within strict academic norms. Likewise, when we read essays that students have written, we expect the same academic form of writing from them and penalize them or reward them for their accomplishment in this discipline of writing. But so far, nowhere across Indian universities have we seen a systematized codification of such norms in the form of courses or workshops. This course is an attempt to fill this academic gap.

As the title of the course suggests we focus on both reading (which is comprehending and analyzing other writers' rhetorical arguments) and writing (which is producing cogent and complex rhetorical arguments of our own. We want to pass on a uniform set of writing strategies to our students. Students will learn according to the classical principles of rhetoric.

Learning Outcomes

At the end of this course we expect the students to

- consider the act of writing as a goal oriented task, oriented towards the goal of persuasion;
- examine and interpret other writers' writings (contained in the course reader) as a crucial preliminary stage to being able to produce successfully persuasive writing themselves;
- identify the writer's central purpose or thesis;
- consider how writers use personal authority and trustworthiness, argumentative logic, comparison and contrast, example, and emotional appeals to make their arguments;
- identify their own historical social and personal contexts to understand their own biases and ideologies;
- analyse an academic topic or question;
- gather information and to notionally organize material required to address that topic or to answer that question;

- design and then write a lucid thesis statement that outlines the students' central argument in the paper, essay or article.
- produce both preliminary and fleshed-out outlines which identify the structure of the proposed paper;
- finally produce a paper that follows the guidelines of their own theses and outlines; and
- use the appeals of ethos, logos and pathos throughout the paper as multiple persuasive strategies.

Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

How to read/write/think: Rhetoric or the art of persuasion.

The Rhetorical Triangle: Consider each writing task as an act of rhetoric—that is, an act where someone is communicating to someone else on a subject that is known to both. Imagine a rhetorical triangle made up of a speaker (the writer) the subject (the answer/tute/presentation) and the audience (the teacher/examiner). It is the interaction of the three that makes the act of writing rhetorical in nature. The relationship between writer and audience is unequal, in the sense that the writer needs to prove something to an audience, who must be assumed to be skeptical and in need of persuasion. To be able to write articulately, it is first crucial to read and think with clarity. Each of the three components therefore need to be studied in detail.

a. Writer/Speaker – In the act of writing, the writer or the speaker is the student in this class. Therefore, the first task is to locate the students in their historical, socio-economic, cultural materiality. Antonio Gramsci's idea of creating a personal inventory of historical traces to date on the self would be one useful way to think about this.

b. Text – What is a text? From what perspective do we read a text? What is the perspective from which it is written? What is the context in which this argument was made? What is the context in which we are reading it? One of the ways of thinking about these issues is to consider everything around us as a text. We read the world around us all the time. Reading means critically analyzing through the prism of one's own ideology. As we read and analyze, we evaluate and also form value judgments about the text.

c. Audience – We only ever speak/write to persuade an audience. Who are we writing to? With what motive? What investment? Eagleton points out that we only speak if there is reason, a motive, a message. To analyze the appeals that are used in persuading the audience, one first needs to understand the character of the audience.

Unit 2

How to write: Creating a rhetorical argument: What, How, Why (Definition, Evaluation, Proposal)

Writing is a goal-oriented task. It is the teaching of each specific rhetorical tool that will form the stages of this course. The syllabus is structured to teach the following: how to analyze questions; how to make thesis statements, outlines and paragraphs; how to link ideas; how to write introductions and conclusions; and how to use examples and critics. These skills are to be taught not for their own sakes or to fulfil some aesthetic desire to see a nicely written essay. These skills are inextricable from the rhetorical act of persuasion itself, and persuasive writing cannot take place until these skills are systematically learnt.

Thesis Statement

How do we recognize a thesis statement? It answers the question – What are you going to prove? What do you want your reader to believe by the end of your answer? While planning the thesis statement it is important to spell out precisely what you're going to say. It should answer how and why the argument is being written.

Unit 3

How to write: Creating a rhetorical argument: What, How, Why (Definition, Evaluation, Proposal)

Outline

The thesis statement discussed earlier outlines the major sections of the essay. The technique of writing the thesis statement is sometimes called *blueprinting*. Based on the thesis statement, the formal outline provides a clearer blueprint of the assignment.

Expanding the Outline

In this step the information required under each point in the rough outline needs to be sourced and noted. The evidence needed to support the thesis statement and the authority or analysis of the evidence will flesh out the outline made in the above section.

Unit 4

How to write: Creating a rhetorical argument.

Introduction and Conclusion

There is a format or structure for writing the introduction and the conclusion that is generic to all tasks of writing. These two paragraphs are to be written after the argument has been established and proven to aid the rhetorical task of persuasion.

Unit 5

How to write: Creating a rhetorical argument.

Linkages Transitions and Signposting

These elements are crucial for the writer to lead the reader through the process of following the thesis, the outline, the evidence, and the progression of the argument.

Paragraphing and Sentence Structure

These skills are not taught for their aesthetics. They are crucial to the logical argument, as language determines order at the sentence level, and the ordering of points in paragraphs determines the structure of the argument.

Readings

There will be a Reader with 8 – 12 texts/readings, which will be selected according to graded difficulty to be accessible to students of different abilities. Each reading will be accompanied by a series of topics of discussion to aid reading the text from the different aspects taught in the class. They will also be accompanied by a series of 6 – 10 questions from which one or two questions can be chosen to ask the class to write assignments. The texts would try to cover different issues of interest to students to generate meaningful discussion in class and analysis in the process of writing.

Course structure

The course will be structured around 3 assignments. In the first assignment the student will be expected to analyze the reading and the question and to write about the issues the question asks for and then to condense that into a roughly three sentence thesis statement. The second assignment will require the student to write a thesis statement and to make an outline to match the thesis statement. The third assignment will require the student to start with the thesis statement follow with outline and finally produce an entire essay.

Prose:

1. Jane Tomkins, 'Indians', Textualism Morality and the Problem of History' (Difficult)
2. Paulo Friere, 'The Banking Concept of Education' (Medium Difficult)
3. Martin Luther King Jr, Letter from Birmingham Jail (Medium Medium)
4. Rebecca Solnit:, 'Men Explain Things to Me' (Medium Easy)
5. Aurangzeb, Letter to his Teacher (Easy)

Poetry

1. Agha Shahid Ali, 'Ghazal', (Difficult)
2. Margaret Atwood, 'This is a photograph of me' (Medium Difficult)
3. Dylan Thomas, 'Do not go gentle into the night' (Medium medium)
4. Bob Dylan, 'The Times They are A-changing' (Medium easy)
5. Robert Frost, 'The Road Not Taken' (Easy)

Short Story

1. Heinrich Boll, 'Stranger Bear word to the Spartans we...' (Difficult)
2. Alice Munro, 'Gravel' (Medium Difficult)
3. Shirley Jackson, 'The Lottery' (Medium Medium)
4. Vaikom Basheer, 'The Card-Sharpers Daughter' (Medium Medium)
5. Om Prakash Valmiki, 'Joothan' (Easy)

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading. The 15 texts of essential reading are listed above – 5 prose pieces, 5 poems, and 5 short stories.

Teaching Plan

Paper S1 – Analytical Reading and Writing

Week 1 – Introduction to Analytical Reading and Writing

Weeks 2 – How to read

Week 3 -- Introduce and Discuss Reading 1

Week 4 -- Thesis Statement

Assignment 1 due Week 4: Three paragraphs for thesis statement, reduced to three sentences

Week 5 -- Introduce and Discuss Reading 2

Week 6 -- Thesis Statement

Week 7 & 8 -- Outline corresponding to Thesis statement

Assignment 2 due Week 8

Week 9 -- Introduce Reading 3

Week 10 --Thesis Statement
Week 11 -- Outline/ Introduction and Conclusion
Week 12 -- Rough draft
Week 13 -- Assignment 3 due
Week 14 – Concluding discussion

Keywords

Reading analytically
Reading techniques
Audience
Persuasive writing
Argumentation
The appeals
Logical argument
Authority
Rhetoric
Thesis
Outline
Writing introduction
Writing conclusion
Signposting
Transitions

PAPER S2: LITERATURE IN SOCIAL SPACES

Course Objectives

According to Emile Durkheim, the categories of time, space, class, personality (and so on) are social in nature. Social spaces therefore have to be understood as products of the distribution of individuals/communities, kinship ties, and professional relationships. Since such spaces are crucial for the orientation and growth of individuals, ideally they should be constructed by ensuring inclusivity empathy and self-awareness.

Humanities as a field encourages us to ask pertinent questions, share different world-views, and produce alternate truths in the process. It is in this regard that we are offering a course that will use texts (literary or otherwise) to equip students with skills crucial to understand and deal with the practicalities of the everyday, be it with regard to workplace intimate networks or social media.,Recent research has inferred that the study of Humanities and Social Sciences are effective in developing soft skills considered of vital importance in the dynamic workplace of the 21st Century.

This course draws attention to the link between critical thinking skills developed by studying the Humanities, especially Literature, and other skills that are often termed, ‘soft skills’. The course focuses on the empathy building capacity of Literature and the application of critical thinking and problem solving skills employed in literary analysis to develop an understanding

of the value of literature in social and professional spaces. Literary readings will provide the foundation for developing skills such as better communication and empathy, understanding the value of teamwork, the need for adaptability, and the role of leadership and mentoring.

Learning Outcomes

- Students will be familiarised with the link between the Humanities and, ‘soft skills’
- They will be encouraged to focus on the value of literature as an empathy-building experience.
- They will learn to apply critical thinking and problem solving skills developed by the study of literature to personal social and professional situations.
- Students will be encouraged to enhance their teamwork skills by working in groups and to understand the processes of leadership and mentoring.
- Students will work on their presentation skills and build on the idea of, ‘narratives’, to better communicate with target audiences.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2.	Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Humanities and Soft skills

- ‘Creative and Arts Graduates have the Soft Skills needed to make them Work-Ready’, by Mark Harman in *The Independent* 22 June 2016
(<https://www.independent.co.uk/student/career-planning/creative-arts-graduates-soft-skills-graduate-employment-university-subjects-work-ready-a7095311.html>)
- ‘Leadership in Literature’, by Diane Coutu in *The Harvard Business Review* March

2006 (<https://hbr.org/2006/03/leadership-in-literature>)

- c) 'How Literature informs Notions of Leadership', by Gregory L. Eastwood in *Journal of Leadership, education* Vol 9 Issue 1 2010 (http://journalofleadershiped.org/attachments/article/161/JOLE_9_1_Eastwood.pdf)

Unit 2

Emotional Intelligence Adaptability and Mental Health

- a) Daniel Goleman., 'Don't let a bully boss affect your mental health', <http://www.danielgoleman.info/dont-let-a-bully-boss-affect-your-mental-health/>
- b) William Blake, 'The Chimney Sweeper', from *Songs of Innocence and Songs of Experience* (both versions - 2 poems)
- c) W. Somerset Maugham, 'The Verger', (short story)

Unit 3

Critical Thinking and Problem Solving

- a) 'On the Writers Philosophy of Life', by Jack London in *The, editor* October 1899 (essay)
- b) Nicholas Bentley, 'The Lookout Man', (short story) in S. P. Dhanvel's *English and Soft Skills* (Delhi: Orient Blackswan 2010).
- c) J. K. Rowling., 'The Fringe Benefits of Failure and the Importance of Imagination', (extract from her speech at Harvard 2008) <https://news.harvard.edu/gazette/story/2008/06/text-of-j-k-rowling-speech/>

Unit 4

Teamwork and Team Management

- a) Extract from Mark Twain *Huckleberry Finn* in S.P. Dhanvel's *English and Soft Skills* (Delhi: Orient Blackswan 2010).
- b) 'The Builders', by Henry Wadsworth Longfellow (poem)

Unit 5

Leadership and Mentoring

- a) 'If', by Rudyard Kipling (poem)
- b) 'Are you my Mentor?', by Sheryl Sandberg in *Lean in: Women Work and the Will to Lead* (London: Penguin Random House 2015).

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Suggested Films

1. 2002 Documentary -- *The Tales of the Night Fairies* (teamwork leadership and adaptability)
2. 1993 Film -- *What's Eating Gilbert Grape?* (self-awareness family and care)
3. 2000 Film -- *Erin Brockovich* (soft skills and empathy)
4. 2003 Film -- *Monalisa Smile* (leadership and mentorship)
5. 2016 Film-- *Hidden Figures* (affective leadership and teamwork)
6. 2016 TV Serial -- *Black Mirror: Season 3 Nosedive* (mental health and social media)
7. 2007 Film -- *Chak De India* (teamwork leadership mentoring)

Teaching Plan

Paper S2 – Literature in Social Spaces

Week 1 – Introduction

Week 2 – Unit 1 - Humanities and Soft skills

Week 3 – Unit 1 - contd

Week 4 – Emotional Intelligence, Adaptability, and Mental Health

Week 5 – Unit 2 - contd

Week 6 – Unit 2 - contd

Week 7 –Unit 3 - Critical Thinking and Problem Solving

Week 8 – Unit 3 - contd

Week 9 – Unit 3 - contd

Week 10 – Unit 4 - Teamwork and Team Management

Week 11 – Unit 4 - contd

Week 12 – Unit 5 - Leadership and Mentoring

Week 13 – Unit 5 - contd

Week 14 – Conclusion

Keywords

Soft skills

Humanities and soft skills

Literature and EQ

Leadership and Literature

Critical thought in Humanities

Mentoring and Literature

PAPER S3: LITERATURE IN CROSS-CULTURAL ENCOUNTERS

Course Objectives

Acknowledging literature's status as an important medium in making sense of the world we live in, this paper will enable students to critically view their location within a larger globalized context. By reading texts cross-culturally, students will engage with people's

experience of caste/class, gender, race, violence and war, and nationalities and develop the skills of cross-cultural sensitivity. The paper will give them the vocabulary to engage with experiences of people from varying cultures and backgrounds, particularly relevant in contemporary times as these issues continue to be negotiated in the workplace as well as larger society.

Learning Outcomes

This course aims to help students

- develop skills of textual and cultural analysis;
- develop insights into and interpretations of complex cultural positions and identities; and
- pay specific attention to the use of language and choice of form/genre that affects the production and reception of meaning between writers and readers.

Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

The readings of all units are taken from *The Individual and Society: Essays Stories and Poems*, edited by Vinay Sood et al., for The Department of English, University of Delhi, New Delhi: Pearson, 2006.

Unit 1

Caste/Class

1. Jotirao Phule, 'Caste Laws'
2. Munshi Premchand, 'Deliverance'
3. Ismat Chughtai, 'Kallu'
4. Hira Bansode, 'Bosom Friend'

Unit 2

Gender

1. Virginia Woolf, 'Shakespeare's Sister'
2. Rabindranath Tagore, 'The Exercise Book'
3. W. B. Yeats, 'A Prayer for My Daughter'
4. Eunice de Souza, 'Marriages Are Made'
5. Margaret Atwood, 'The Reincarnation of Captain Cook'

Unit 3

Race

1. Roger Mais, 'Blackout'
2. Wole Soyinka, 'Telephone Conversation'
3. Langston Hughes, 'Harlem'
4. Maya Angelou, 'Still I Rise'

Unit 4

Violence and War

1. Wilfred Owen, 'Dulce et Decorum Est'
2. Edna St Vincent Millay, 'Conscientious Objector'
3. Henry Reed, 'Naming of Parts'
4. Bertolt Brecht, 'General Your Tank Is a Powerful Vehicle'
5. Intizar Husain, 'A Chronicle of the Peacocks'
6. Amitav Ghosh, 'Ghosts of Mrs Gandhi'

Unit 5

Living in a Globalized World

1. Roland Barthes, 'Toys'
2. Chitra Banerjee Divakaruni, 'Indian Movie New Jersey'
3. Imtiaz Dharker, 'At Lahore Karhai'
4. Naomi Klein, 'The Brand Expands'

(5 sections – 12 poems 11 essays/stories – to be completed in 14 weeks 42 lectures + 14 practicals)

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Teaching Plan

Paper S3 -- Literature in Cross-Cultural Encounters

Week 1 -- Introduction

Week 2 -- Unit 1 -- Caste/Class

Week 3 -- Unit 1 contd

Week 4 -- Unit 2 -- Gender

Week 5 -- Unit 2 contd

Week 6 -- Unit 2 contd

Week 7 -- Unit 3 -- Race

Week 8 -- Unit 3 contd

Week 9 -- Unit 3 contd

Week 10 -- Unit 4 -- Violence and War

Week 11 -- Unit 4 contd

Week 12 -- Unit 5 -- Living in a Globalized World

Week 13 -- Unit 5 -- contd

Week 14 -- Concluding lectures; discussion on exam pattern etc.

Keywords

Race

Caste

War

Class

Globalisation

Gender

Violence

Literature

Culture

Cross Cultural Encounters

Critical thinking

PAPER S4: ORAL AURAL AND VISUAL RHETORIC

Course Description

This paper is designed to introduce students to the theory and practice of rhetorical studies. Rhetoric has meant an art, an artifact, and a kind of discourse. The aim here is to investigate the art of expression, whether with words, with musical notes or with lens. It is to treat all cultural artifacts such as oratory, music, and photography as texts that can be read/heard/seen, and analyzed and appreciated in class. The paper initiates the students to classical and modern rhetorical theories, both in the West and in India, in the first unit. In the rest of the units, students will learn to closely read any non-literary text, become attentive listeners, and feel the tone and texture of images.

This course surveys and explores a number of rhetorical traditions from around the world, studying sample texts along two axes: firstly, *temporal* where texts are read in their original historical contexts; and secondly, *ideational* where texts are read for themes and perspectives.

Learning Outcomes

In this course, students will

- develop their oral/aural/visual senses to appreciate a cultural text, while at the same time using a theoretical framework and position to read a text; and
- identify and engage with the themes of:

- i. Argumentation and persuasion
- ii Language and writing
- iii. Intention and motivation of the author/orator/painter/musician.
- iv. Emotive element in speech and music
- v. Performative language

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests	Discussing exam questions and answering	Class tests

	and examinations	techniques	
--	------------------	------------	--

Course Contents

Unit 1

Theory of Rhetoric: Western and Indian

1. James A. Herrick, 'An overview of rhetoric', *The History and Theory of Rhetoric: An Introduction* (Routledge 2016)p 1-30
2. Aristotle *On Rhetoric: A Theory of Civic Discourse*, trans. George A Kennedy. Book 1 chapter 3 p 46-51.
3. M. Perelman, *The Idea of Justice and the Problem of Argumentation* ('Act and Person in Argument p 196-208).
4. Bharata, *Natyasastra*, ed. and trans. Manmohan Ghosh (selections Chapter 19 p 344-352).
5. Lawrence McCrea, "'Resonance", and its Reverberations: Two cultures in Indian epistemology of Aesthetic Meaning', *The Bloomsbury Research Handbook of Indian Aesthetics and the Philosophy of Art.*, ed. Arindam Chakrabarti (London: Bloomsbury 2016) pp. 25-42.

Unit 2

Oratory

1. Martin Luther King: Messianic Myth
28th August 1963, 'I have a Dream', address at march on Washington for Jobs and Freedom
<https://www.youtube.com/watch?v=3vDWWy4CMhE>
25th March 1965, 'Our God is Marching on!' <https://www.youtube.com/watch?v=5n5WbNCEeHM>

Reading

Black Jonathan-Charteris., 'Martin Luther King: Messianic Myth', (chapter 3 pp 58-84) *Politicians and Rhetoric: The Persuasive Power of Metaphor* (Palgrave Macmillan 2005).

2. Susan B Anthony on Women's Right to Vote
<https://www.youtube.com/watch?v=T57dwhJBtts>

Reading

Katheryn M. Conway, 'Woman Suffrage and the History of Rhetoric at the Seven Sisters College 1865-1919' *Reclaiming Rhetorica: Women in the Rhetorical Tradition*, ed. Andrea A Lunsford.

3. Nehru Tryst with Destiny speech to the Indian constituent assembly on 14th August 1947.
<https://www.youtube.com/watch?v=AzdVKGdZUpQ>

Reading

Black Jonathan-Charteris., 'Persuasion Legitimacy and Leadership', (chapter 1 pp 1-26)
Politicians and Rhetoric: The Persuasive Power of Metaphor (Palgrave Macmillan 2005).

Unit 3

Music

1. Bob Dylan musical piece, 'Blowin', in the wind'.
<https://www.youtube.com/watch?v=G58XWF6B3AA>

Readings and music

1. Brian Vickers, 'Figures of Rhetoric/Figures of Music?', *Rhetorica* ii (1984) 1-44
Karl Eschman, 'The Rhetoric of Western Music', *The Musical Quarterly* vol 7 no 2
(April 1921) pp 157-166.
2. Ol', Man River in many versions and contexts:
 - i. Ol', Man River by Paul Robeson for the film, 'Showboat', in 1936.
 - ii. The version with altered and more revolutionary lyrics which he sang on stage in the 1930s.
 - iii. Bhupen Hazarika's Assamese version, 'BistirnoParare'
 - iv. Bangla, 'BistirnoDupare',
 - v. Nepali, 'Bristit Kinarako', with subtitles
3. The chapter, 'Ol', Man River', in the book *The Undiscovered Paul Robeson: An Artist's Journey 1898-1939* by Paul Robeson Jr.
4. Hemango Biswas, 'A Glorious Heritage', *Folkmusic and Folklore: An Anthology*.
Pradip Kumar Sengupta *Foundations of Indian Musicology* (ch7:, 'Raga and Rasa', p 99-124).
5. 'Na to Karvankitalaashhai', *BarsaatkiRaat* movie of 1950s.
6. Kumkum Sangari, 'Viraha: A Trajectory in the Nehruvian Era', in *Poetics and Politics of Sufism and Bhakti in South Asia: Love Loss and Liberation*, ed. Kavita Panjabi

Unit 4

Photography

Lady Filmer's Album

Readings and visuals

1. 'Photographs fun and flirtations', Patrizia De Bello *Women's Albums and Photography in Victorian England: Ladies Mothers and Flirts* (Ashgate 2007).
2. Jyotindra Jain, 'The visual culture of the Indo-British cotton trade', *Marg: A Magazine of the Arts The Story of Early Indian Advertising* (March-June 2017).
3. 1857 uprising photos - Memorial well at Cawnpore (Kanpur) Kashmiri Gate in Delhi the Residency at Lucknow.

4. Malavika Karlekar, 'Sites of Past Conflict', (pp57-62) and, 'The, 'Second Creature' (pp. 15-164) *Visual History: Photography in the Popular Imagination* (OUP, 2013)
5. Dayanita Singh and Aweek Sen, 'House of Love'(short story) *House of Love* (Peabody Museum Press 2010)

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Teaching Plan

Paper S4 - Oral Aural and Visual Rhetoric

Week 1 – Unit 1 -- Theory of Rhetoric: Western and Indian
Week 2 – Unit 1 (contd)
Week 3 – Unit 1 (contd)
Week 4 – Unit 1 (contd)
Week 5 – Unit 2 -- Oratory
Week 6 – Unit 2 (contd)
Week 7 – Unit 2 (contd)
Week 8 – Unit 3 -- Music
Week 9 – Unit 3 (contd)
Week 10 – Unit 3 (contd)
Week 11 – Unit 4 -- Photography
Week 12 – Unit 4 (contd)
Week 13 – Unit 4 (contd)
Week 14 – Concluding lectures discussion on exam pattern etc.

Keywords

Rhetoric
Close Reading
Writing
Oratory
Photography
Music

PAPER S5: INTRODUCTION TO CREATIVE WRITING FOR MEDIA

Course Objectives

This course introduces students to the concepts of ‘creativity’ in general and ‘creative writing’ in particular. This paper focuses especially on writing for the media, ranging from newspapers and magazines to emerging new media forms. After being given a foundation in the theoretical aspects of writing for the media, real life examples will provide practical exposure. This course will encourage students to be active readers and writers, who will engage with contemporary issues in a well informed manner. This course will be of interest to those students who wish to pursue creative writing, especially those who wish to work in the media.

Learning Outcomes

This course aims to

- introduce students to the idea that creativity is a complex and varied phenomenon that has an important relationship with social change;
- familiarize students with ideas about language varieties and the nuances of language usage;
- introduce students to the language and types of media writing across forms and genres; and
- encourage students to revise their work critically and inculcate the skills of proofreading.

Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests	Discussing exam questions and answering	Class tests

	and examinations	techniques	
--	------------------	------------	--

Course Contents

Unit 1

What is Creative Writing?

- a) Defining and Measuring Creativity
- b) Inspiration and Agency Creativity and Resistance
- c) What is Creative Writing? Can it be taught?
- d) The importance of Reading

Unit 2

The Art and Craft of Creative Writing

- a) Styles and Registers
- b) Formal and Informal Usage
- c) Language Varieties Language and Gender
- d) Disordered Language
- e) Word order Tense and Time Grammatical differences

Unit 3

Writing for the Media

- a) Introduction to Writing for the Media
- b) Print Media
- c) Broadcast Media
- d) New Media
- e) Advertising and Types of Advertisements

Unit 4

Revising Rewriting and Proof Reading (pages 205-208)

- a) Revising
- b) Rewriting
- c) Proof reading and proof-reading marks

Prescribed Text

Creative Writing: A Beginners', Manual by Anjana Neira Dev et al. For The Department of English, University of Delhi (New Delhi: Pearson, 2008).

Essential Reading

Dev, Anjana Neira et al. *Creative Writing: A Beginners' Manual*. For The Department of English, University of Delhi, New Delhi: Pearson, 2008

Suggested Methods of Internal Evaluation

It is recommended that students be asked to prepare a portfolio of original writings, which will include any 4 from:

- a) Creativity in everyday life
- b) An advertisement
- c) A news report
- d) A review of a film/book/play/restaurant
- e) A travel review /page from a travelogue
- f) An, editorial
- g) A blog /vlog entry

Teaching Plan

Paper S5 -- Introduction to Creative Writing for Media

Note: Ample time must be devoted in during practical periods to actual writing and the practice of the theory that is taught in class. Contemporary real time examples are encouraged. The student's portfolio must emerge based on classroom work and exercises

Week 1 – Introduction to Paper S5 -- Creative Writing for Media

Week 2 – Unit 1 -- What is Creative Writing?

Week 3 – Unit 1 contd

Week 4 – Unit 1 contd

Week 5 – Unit 2 -- The Art and Craft of Creative Writing

Week 6 – Unit 2 contd

Week 7 – Unit 2 contd

Week 8 – Unit 3 -- Writing for the Media

Week 9 – Unit 3 contd

Week 10 – Unit 3 contd

Week 11 – Unit 4 -- Revising, Rewriting and Proof Reading

Week 12 -- Unit 4 contd

Week 13 – Unit 4 contd

Week 14 – Concluding lectures; exam issues, etc.

Keywords

Creative writing

Writing for the media

Advertisements

Proof reading

Newspaper reports

Media literacy

Blogs
Vlogs
Reviews
Language for the media

PAPER S6 -- TRANSLATION STUDIES

Course Objectives

In a multicultural country like India, translation is necessary for better governance and for greater sensitivity to other cultural groups. As the world shrinks further due to increased communication, translation is required for smooth flow of knowledge and information. The course will sensitise students to the processes involved in translation. Students will be familiarised with various methods, strategies and theories of translation. Further they will learn to recognise a translated text as a product of its cultural, social, political and historical contexts.

Learning Outcomes

Through the study of this course the student will develop the ability to

- sensitively translate literary and non-literary texts including official and technical documents from one language to another;
- interpret from one language to another;
- examine what is translated and why;
- discern the difference in language systems through the practice of translation;
- understand the processes involved in translation in mass media, especially news reporting, advertising and films;
- engage with the demands of subtitling and dubbing;
- compare translations;
- evaluate and assess translated texts; and
- edit translated texts.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
2.	Expressing concepts through writing	How to think critically and write	Writing essay length assignments

		with clarity	
3.	Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Introducing Translation

Introducing a brief history and significance of translation in a multi-linguistic and multicultural society like India.

Introducing basic concepts and terms used in Translation Studies through relevant tasks:

Equivalence, Source Language, Target Language, Source Text, Target Text, Language variety, Dialect, Idiolect, Register, Style, Mode, Code mixing and Switching, transliteration, simultaneous and consecutive interpreting.

Unit 2

- Brief Theory of Linguistics – morphology phonology syntax
- Defining the process of translation (analysis transference restructuring) through critical examination of diverse translated texts.

Unit 3

Types and modes of translation

- Semantic and Literal translation
- Free Sense-to-sense and Literary translation
- Functional and Communicative translation
- Technical and Official translation
- Transcreation
- Audio-visual translation: subtitling dubbing voice-overs
- Back translation
- Rank-bound and Unbounded translation
- Machine Translation

Unit 4

Practice of Translation

Source Texts
 Idiomatic Expressions/ Headlines/Taglines
 Poetry
 Short-story/Novella/Excerpt from a novel
 Newspaper Report/Editorial/Review/Feature Article
 Songs/Films

Unit 5

Issues in Translation

Translation and Gender
Translation and Caste
Translation and Culture
Translation and Technology
Translation and Mass Communication
Comparison and Evaluation of Translated texts

Essential Readings

Baker, Mona, *In Other Words: A Coursebook on Translation*. London and New York: Routledge, 2011. (Useful exercises for practical translation and training)
Bassnett, Susan. *Translation Studies*. 4th edn. London and New York: Routledge, 2014.
Bassnett, Susan and Trivedi, Harish eds. *Postcolonial Translation: Theory and Practice*. London and New York: Routledge, 1999.
Routledge Encyclopedia of Translation Studies. London and New York: Routledge, 2001.

Teaching Plan

Paper S6 – Translation Studies

- Week 1 – Unit 1 (a) -- Introduction to Translation Studies; A brief history of translation in India; significance of translation in a multilingual and multicultural society like India
- Week 2 – Unit 1 (b) Introduction to basic terms and concepts used in translation studies through relevant tasks -- Source Language, Target Language, Source Text, Target Text.
- Week 3 -- Unit 1 (b) contd -- Language Variety, Dialect, Idiolect, Register, Style, Equivalence, Mode, Code Mixing and Switching, Transliteration, Simultaneous and Consecutive Interpreting.
- Week 4 -- Unit 2 (a) Brief theory of Linguistics – Morphology, Phonology, Syntax
- Week 5 -- Unit 2 (b) Defining the process of translation (analysis, transference, restructuring) through critical examination of diverse translated texts.
- Week 6 -- Unit 3: Discussing types and modes of translation with examples
- Semantic and Literal translation
 - Free, Sense-to-sense and Literary translation
 - Functional and Communicative translation
- Week 7 -- Unit 3 contd.
- Technical and Official translation
 - Transcreation

- f. Audio-visual translation: subtitling, dubbing, voice-overs
- Week 8 -- Unit 3 contd. g. Back translation
- h. Rank-bound and Unbounded translation
- i. Machine Translation
- Week 9 -- Unit 4: Practice of translation with examples
 - Idiomatic Expressions/ Headlines/Taglines
 - Newspaper Report/Editorial/Review/Feature Article
- Week 10 -- Unit 4 contd.
 - Poetry
 - Songs/Films
 - Advertisements: Print and Audio-Visual
- Week 11 -- Unit 5: Discussing Issues in Translation
 - Translation and Gender
 - Translation and Caste
- Week 12 -- Unit 5 contd -- Translation and Technology
 - Translation and Mass Communication
 - Translation and Culture
- Week 13 -- Unit 5 contd -- Comparison and Evaluation of Translated Texts
- Week 14 -- Discussion of individual portfolios

Keywords

Translation
 Interpreting
 Source text
 Target text
 Source language
 Target language
 Equivalence
 Machine translation
 Adaptation
 Transcreation

PAPER S7 -- INTRODUCTION TO THEATRE AND PERFORMANCE

Course Objectives

The course is intended for students who specialise in English Literature. The idea is to acquaint them with historical processes at work, to understand the way in which techniques/methodology of drama have evolved over a period of time. There are two aspects to this course. One is the development of aesthetics in the Indian context, from the pre-Independence to post-Independence period. The course also looks at censorship acts, the

politics of the market and other factors, to locate the socio-political context of drama. There will also be a discussion of the popular forms of performance in India. The second aspect is the development of theories and practice of drama in Europe and their impact on the Indian context.

Learning Outcomes

Through this course, students will be able to

- understand the different theories of drama in Europe and India, both from the point of view of theory and performance;
- make connections between socio-economic processes at work and the emergence of a certain kind of dynamic within theatre; and
- put up a performance at the end of the course, making use of the different kinds of aesthetics they have studied (since this is a Skill Enhancement Course)

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Introduction

- What is a text?
- What is a performance?
- The uniqueness of the dramatic text: Literature and/or Performance?

- The politics of a Dramatic text: endorsement status quo vs. subversion

Unit 2

Theories of Performance

- Performance theory
(Richard Schechner/Dwight Conquergood)
- Radical theories
(Bertolt Brecht, Augusto Boal)
- Classical theories
(Natyashastra, Aristotle)

Unit 3

The State the Market and the History of Theatre

- Under British rule
(Viceroy Northbrook—censorship Neeldarpan Nabanna— Pre-Independence Indian Theatre)
- (Popular forms: Jatra Tamasha Nautanki Burrakatha Dastangoi and others)
- Modern Indian theatre in the post-independence period
 - o (Bourgeois theatre and theatre of change Feminist theatre)
 - o (Street theatre Janam)

Unit 4

Modern Western theatre

- Naturalism (Realism)
 - o (Stanislavsky)
- Epic theatre: theatre as criticism
 - o (Brecht, Dario Fo, France Rame)
- Theatre that resists the state and market

Unit 5

The Performative Act

- Performance space
 - o (in the round proscenium amphitheatre thrust stage etc.)
- Space, Lights, Costumes, Sets

The students must be asked to create a performance from a text (their choice/assisted by the teacher).

Essential Readings

Brecht, Bertolt. 'A Short Organum for the Theatre' (para 26 - 67) in *Brecht on Theatre: The Development of an Aesthetic*. Trans. and Ed. Willett, John. New York: Hill and Wang, 1957, pp. 186-201.

Fo, Dario. 'Breaking Down the Fourth Wall', in *The Tricks of the Trade*. Trans. Joe Farrell. London: Methuen Drama, 1991, pp. 73-4.

Schechner, Richard. 'The Fan and the Web', in *Performance Theory*. New York:

Routledge, 2002, pp. xvi-xix.

Stanislavski, Constantin. 'Faith and the Sense of Truth', Chapter 8, Section I, in *An Actor Prepares* [1936]. London: Methuen, 1988, pp. 121-23.

Suggested Plays for Performance

Bertolt Brecht, *Caucasian Chalk Circle*

Bijon Bhattacharya, *Nabanna*

Clifford Odet, *Waiting For Lefty*

Dario Fo, *Can't Pay Won't Pay*

Euripides, *Medea*

Franca Rame, *A Woman Alone*

Mahesh Dattani, *Dance Like A Man*

Teaching Plan

Paper S7 -- Introduction to Theatre and Performance

Week 1 – Introduction to Paper 10: Introduction to Text and Performance

Week 2 – Unit 2 – Theories of Performance

Week 3 – Unit 2 contd

Week 4 – Unit 3 -- The State, the Market and the History of Theatre

Week 5 – Unit 3 contd

Week 6 – Unit 3 contd

Week 7 – Unit 4 -- Modern Western theatre

Week 8 – Unit 4 contd

Week 9 – Unit 4 contd

Week 10 – Unit 5 -- The Performative Act

Week 11 -- Unit 5 contd

Week 12 – Discussion of plays and rehearsals for performance

Week 13 – Discussion of plays and rehearsals for performance

Week 14 – Concluding lectures; exam issues, etc.

Keywords

Performance theory

Natyashastra^[1]_[SEP]

Classical theory

Bertolt Brecht

Augusto Boal

Neeldarpan

Nabanna

Jatra

Tamasha

Nautanki

Burrakatha
Dastangoi
Street theatre
Janam in the round
Proscenium
Amphitheatre
Thrust stage

PAPER S8: MODES OF CREATIVE WRITING – POETRY, FICTION, AND DRAMA

Course Objectives

This course introduces students to Creative Writing in the three fundamental modes – poetry, fiction (short story and novel), and drama (including scripts and screenplays). The students will be introduced to the main tropes and figures of speech that distinguish the creative from other forms of writing. The students will be able to see language as not just a means of communication but as something that can be played with and used for the expression of the whole range of human emotion and experiences. Within each literary mode, the students will study conventional as well as contemporary expressions. This course will interest those who wish to engage with the discipline of creative writing in its varied manifestations.

Learning Outcomes

Through this course, students will

- be introduced to a variety of tropes and figures of speech, and sensitised to the texture of literary language;
- understand the importance of reading with a view to unlocking the writers' craft;
- be introduced to various forms of poetry, fiction and drama and the wide range of possible genres within them;
- be made aware of the range of career opportunities that exist within the field of creative writing as well as within the realm of theatre and performance; and
- be encouraged to revise their work critically and inculcate the skills of editing and preparing their work for publication.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide	Reading theoretical material together in small groups working in peer groups to discuss

		them towards skill based learning	material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

Prescribed Text

Creative Writing: A Beginners' Manual by Anjana Neira Dev et al. for The Department of English, University of Delhi (New Delhi: Pearson, 2008).

Unit 1

The Art and Craft of Writing

Tropes and Figures of Speech

(examples of figures of speech based on similarity/obliqueness/difference/extension/utterance and word building should be discussed and practiced in class)

Unit 2

Modes of Creative Writing -- Poetry and Fiction

- a) Writing to Communicate
- b) Writing Poetry -- Definitions of Poetry/Difference between Poetry and Prose
- c) Form and Technique Shapes
- d) Dominant Forms and Modes of Poetry
- e) Writing Verse for children
- f) Writing Fiction -- Differences between Fiction and Non Fiction
- g) Literary and Popular Fiction
- h) Creating Character, Plot, Setting, and POV
- i) Writing for Children

Unit 3

Modes of Creative Writing-Drama and Screenplay

- a) What is a Drama -- Concept
- b) Plot and Character in Drama
- c) Verbal and Non-verbal Elements in Drama
- d) Contemporary Theatre in India – a brief overview

- e) Writing for Films -- Screenplay conventions
- f) Scripting for Children -- Theatre and Films

Unit 4

Editing and Preparing for Publication (pages 208-216)

- a) Editing and proof-reading your manuscript
- b) Preparing a manuscript for Publication

Essential Reading

Dev, Anjana Neira et al. *Creative Writing: A Beginners' Manual*. For The Department of English, University of Delhi, New Delhi, Pearson, 2008.

Suggested Methods of Internal Evaluation

It is recommended that students be asked to prepare a portfolio of original writings which will include any 4 from:

- a) Illustrated examples using tropes and figures of speech in writing
- b) A Poem
- c) A Short Story
- d) A Dramatic Sequence
- e) Writing for Children -- a poem/short story/dramatic sequence
- f) A Dummy Manuscript
- g) A poem/short story/dramatic sequence in a different form from the one used in a)/b)/c)

Teaching Plan

Paper S8: Modes of Creative Writing -- Poetry Fiction and Drama

Note: Ample time must be devoted, during practical periods, to actual writing and the practice of the theory that is taught in class. Students should be encouraged to engage with texts and can suggest texts in which they are interested. The students' portfolio must emerge based on classroom work and exercises.

Week 1 -- Introduction

Week 2 -- Unit 1 -- The Art and Craft of Writing

Week 3 -- Unit 1 contd

Week 4 -- Unit 2 -- Modes of Creative Writing- Poetry and Fiction

Week 5 -- Unit 2 contd

Week 6 -- Unit 2 contd

Week 7 -- Unit 2 contd

Week 8 -- Unit 3 -- Modes of Creative Writing-Drama and Screenplay

Week 9 -- Unit 3 contd

Week 10 -- Unit 3 contd

Week 11 -- Unit 4 -- editing and Preparing for Publication

Week 12 – Unit 4 contd

Week 13 – Unit 4 contd

Week 14 – Concluding lectures; discussion on exam pattern etc.

Keywords

Creative writing

Writing fiction

Writing poetry

Writing for children

Writing for the stage

Script writing

Writing for theatre

PAPER S9: ENGLISH LANGUAGE TEACHING

This course is designed to help students of the undergraduate program develop pedagogical and theoretical skills required for teaching the English language. Other than basic theories in ELT, the course will examine a variety of aspects related to learner needs, including multiple intelligences, learning styles and strategies, communication strategies, classroom management issues, the use of technology, and concepts of learner autonomy and learner training. The course will also explore important aspects of learning, teaching, and assessment for the English language.

Course Objectives

The course intends to enable students to

- recognize the role of affect in language learning, and account for individual differences among learners in regard to motivation and attitude, personality factors, and cognitive styles;
- identify and adapt to the needs and expectations of the learner;
- be aware of the significant and current approaches in the fields of cognition and language pedagogy;
- understand the importance of teaching materials (in relation to the teaching-learning context and their teaching purposes);
- recognise the importance of planning in ELT and develop lessons in the framework of a planned strategy adapted to learners' levels;
- strengthen concepts of the fundamentals of the English language; and
- understand the need for assessment and devise techniques for an evaluation plan that is integrated into the learning process.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

English Language Teaching

1. Knowing the Learner
2. Learner Variables – age, gender, learning and participation styles, learning disabilities, multiple intelligences, socioeconomic & cultural background, motivation, levels of proficiency
3. Theories of Learning – Bloom’s taxonomy, Krashen’s concept of Comprehensible Input, Vygotsky’s Zone of Proximal Development (Vygotsky could be deleted)
4. Modern Approaches to teaching -- Communicative Language, Teaching Task based Approach, Cooperative Learning, Dogme approach (materials-light teaching) and Bring your own device (Mobile learning).

Unit 2

Structures of English Language:

1. Phonetics – speech mechanisms (vowels and consonants) features of connected speech – word stress rhythm intonation
2. Morphology – word formation processes (coining borrowing etc.)
3. Syntax – parts of speech clauses & phrases punctuation

Unit 3

Teaching Language: Methods Practices and Materials

1. Lesson Planning: lesson aim and objectives context for practice skill focus board work.
2. Teaching listening skills
3. Teaching speaking skills
4. Teaching reading skills
5. Teaching vocabulary
6. Teaching writing skills
7. Teaching grammar

Unit 4

Assessing language skills

1. Addressing errors and language expectations (desired level of proficiency)
2. Qualities of a good test – transparency validity reliability wash back effect
3. Types of assessment – formal versus informal summative versus formative large scale versus classroom

Essential Readings

Celce-Murcia, Marianne et al. *Teaching English as a Second or Foreign Language*. Delhi: Cengage Learning, 4th, edn, 2014.

Ur, Penny. *A Course in Language Teaching: Practice and Theory*. Cambridge: CUP, 1996.

Woodward, T. *Planning Lessons and Courses*. Cambridge: CUP, 2012.

Teaching Plan

Paper S9 -- English Language Teaching

- Week 1 -- Introduction to ELT, Knowing the variables regarding the learner
- Week 2 -- Learning Theories
- Week 3 -- Learning Theories contd
- Week 4 -- Modern Approaches to teaching
- Week 5 -- Phonetics, morphology and Syntax
- Week 6 -- Lesson Plan
- Week 7 & 8 --Teaching Listening, Speaking, Reading, Writing Skills
- Week 9 --Teaching Vocabulary and Grammar
- Week 10 -- Assessing proficiency
- Week 11 -- Knowing the Qualities of a good test
- Week 12 -- Knowing the different kinds of test
- Week 13 -- Preparing a lesson plan and a test of proficiency

Keywords

Pedagogical skills

Learner needs

Learner autonomy

Assessment

Teaching Plan

Phonetics

Listening

Good test

Teaching Plan

Communicative skills

Reading skills

Writing skills

Speaking and listening

PAPER S10: FILM STUDIES

Course Objectives

This paper enables students to gain skills in the language of film via the appreciation of its specific features as a medium. The course is practically oriented so as to encourage students to acquire the competence necessary to become engaged viewers critics/reviewers and creators/producers in the medium. The course will attempt to make film a democratic and accessible medium for students as creative and analytical persons, and may further enable students to take up work in different arenas of digital humanities.

Learning Outcomes

This course will enable students to

- examine those specific features of composition that help create films: camera, sound, script, and editing will be studied, so that students learn the elements of putting a film together
- study cinema as a form with history and context, tracing genres and geographies, examining legacies, and exploring potential renewals;
- take up work in the medium, to write and review films so as to generate a repertoire of analyses and interpretations;
- engage in projects and/or practical work to supplement units 1&4; and
- build up a portfolio of work through practice of the discipline.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders
3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests

Course Contents

Unit 1

Language of Cinema

Mise en scene -- cinematography -- editing -- sound

Reading

Andrew Dix, *Beginning Film Studies* (New Delhi: Viva, 2010) pp. 9-100.

Unit 2

Genre in Hollywood Cinema

Definitions of genre -- taxonomies of genre -- genre as economic strategy -- genre as cognition -- rethinking genre

Reading

Jill Nelmes, ed. *An Introduction to Film Studies* (London and New York: Routledge, 2003) pp. 152-69.

Unit 3

Themes from Contemporary Indian Cinema (from the 70s to the present)

The city -- underworld -- communalism -- terrorism -- gender issues -- the Indian Art Cinema

Readings

Ranjani Mazumdar, *Bombay Cinema: An Archive of the City* (Ranikhet: Permanent Black 2007) pp. 79-109.

Ravi Vasudevan, *The Melodramatic Public* (Ranikhet: Permanent Black, 2010) pp. 303-33.

Unit 4

Film Review Criticism and Script writing

Readings

Timothy Corrigan, *A Short Guide to Writing About Film*, 9th edn, (Pearson, 2014).

Unit 5

Practical Component Evaluation

1. Students may turn in a portfolio of 4 film reviews/one academic paper/one short film/one film script (fiction or nonfiction)
2. For reviews: criteria for choice of films must be explicitly stated in the form of a position paper. Films must be from a wide time-arc and must include old and just-released films. Total word count of 4 reviews+position paper must not exceed 3000 words.
3. Academic paper can be on any aspect of film and follow all the usual considerations thereon. 3000 words including bibliography and notes.
4. Film script including shots camera position sound/background notes and cuts. Script may be for a film of max 20 minutes length.
5. Film Length: 5-7 minutes of moving image not stills. Films can be evaluated as creative output on the following counts and teachers may decide what gets weightage for the entries they receive: Creativity Originality Screenplay/ Storytelling Technical Execution Narrative/ Performance/Props costumes sets locations (production design) Cinematography (camera angles movement lighting frames etc.) Use of background music/enhancement w credit - Use of visual enhancements like transitions titles credits subtitles or even special effects etc...if any

Suggested Films

- a) *Psycho* (1960 dir. Alfred Hitchcock)
- b) *JaaneBhi Do Yaaro* (1983 Kundan Shah)
- c) *Akam* (2013 dir. Shalini Usha Nair)
- d) *Nayakan* (1987 dir. Mani Ratnam) - Tamil
- e) *HirakRajarDeshe* (1980 dir. Satyajit Ray) – Bangla

Suggested Screenplays

- a) Vishal Bhardwaj, *Maqbool*
- b) Callie Khouri, *Thelma and Louise*

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 5. Therefore, all those texts are to be considered essential reading.

Teaching Plan

Paper S10 – Film Studies

Week 1 – Introduction to Film Studies

Week 2 – Unit 1 -- Language of Cinema

Mise en scene - cinematography - editing - sound

Readings: Dix, *Beginning Film Studies*

Week 3 – Unit 1 contd

Week 4 – Unit 1 contd

Week 5 -- Unit 2 -- Genre in Hollywood Cinema; definitions of genre - taxonomies of genre – genre as economic strategy - genre as cognition – rethinking genre

Readings: Nelmes, *An Introduction to Film Studies*. Pp. 152-169. London and New York: Routledge, 2003.

Week 6 – Unit 2 contd

Week 7 – Unit 2 contd

Week 8 – Unit 3 -- Themes from Contemporary Indian Cinema. From the 70s to the present, city

—underworld - communalism - terrorism - gender issues - the Indian Art Cinema

Readings: (a) Mazumdar, *Bombay Cinema: An Archive of the City*; Vasudevan, *The Melodramatic Public*

Week 9 – Unit 3 – contd

Week 10 -- Unit 3 – contd

Week 11 – Unit 4 -- Film Review, Criticism and Script writing

Readings: *How to write about film* by Timothy Corrigan.

Week 12 – Unit 4 contd

Week 13 – Unit 5

Week 14 – Unit 5 contd; conclusion

Keywords

Language of Cinema

Genre

Hollywood Cinema

Contemporary Indian Cinema

Indian Art Cinema

Film Review

Criticism

Script Writing

PAPER S11: APPLIED GENDER STUDIES: MEDIA LITERACIES

Course Objectives

- This course will help students perceive, understand and interpret issues of gender in various cultural texts in India, particularly in mass media representations, including advertising, cinema and journalism. The course aims to mainstream ideas from gender theory, so as to equip the common student to intervene in these issues in an informed way and to become both an informed consumer as well as a confident and ethical participant. The course will focus on enhancing students' textual skills via the use of Indian primary, conceptual, critical and applied texts to create media literacy. The course may be taught to Honours and Program course students. Teachers may evolve more advanced practical work methodologies for advanced students.

Learning Outcomes

This course will enable students to

- identify, read closely, and rewrite narratives of gendered privilege in contemporary Indian popular representation;
- examine the intersections of gender with other categories like caste, race, etc., to understand how different forms of privilege/oppression and resistance/subversion interact in heterogeneous and variable formations; and
- focused on practical application, creating, over the duration of the course, a portfolio of interpretative work that analyses fictional and non-fictional mass medium narratives and that can serve as foundations/sourcebooks for intervention to reduce gender discrimination through media literacy.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understanding concepts of skill to be taught	Interactive discussions with students to guide them towards skill based learning	Reading theoretical material together in small groups working in peer groups to discuss material
2.	Application of skill	Practical application of skill performed under supervision of teacher	Producing assignments preparing project folders

3.	Demonstrating conceptual understanding and practical application of skill in tests and examinations	Discussing exam questions and answering techniques	Class tests
----	---	--	-------------

Course Content

Unit 1

Gender/s: concepts and frameworks

Femininities/Masculinities Cis/Trans bodies Heterosexuality/ Homosexuality/ Heteronormativity/ Heteropatriarchy/Sexism/Privilege/Biology/Reproduction

Unit 2

Analysing gender in advertising

The use of gendered stereotypes and privilege in advertising; hegemonic and normative ideas of gender and sexuality in selling and buying products; consumption of goods/bodies; commodification and objectification; the reach and memorability of advertising; matrimonial and personal ads; and reinforcement of caste/class/gender binaries.

Unit 3

Analysing representations of gender in reporting and journalism

Vocabulary of news media coverage in relation to gender representation of masculine/feminine/non-dimorphic bodies re-narrativizing this vocabulary productively; difference in coverage of stories of obviously 'gendered' subjects such as rape, heroism, war, domestic violence, sexual harassment, and supposedly 'neutral' subjects, like labour rights, or work and wages, or health, or politics; advocacy networks for various minority subjects; persistence of sexism in new media

Unit 4

Gender as represented in film (fiction and nonfiction/documentary);

Narrative time available to male/female/trans subjects; use of normative heterosexuality and gender privilege in plots, casting, narrative development, and marketing of films; the Bechdeltest: the importance of clearing it and the implications for mainstream narrativization; consistently failing the test; documentary films for presentation of alternative narratives.

Readings

1. Kandasamy, Meena. "Screwtiny," "Pride goes before a full-length mirror," "Joiissance," and "Backstreet Girls" in *Ms Militancy*. Delhi: Navayana, 2014.

2. Dasgupta R.K and Gokulsing K. M., Introduction: Perceptions of Masculinity and Challenges to the Indian Male from Rohit K. Dasgupta & K. Moti Gokulsing (eds). *Masculinity and its Challenges in India: Essays on Changing Perceptions*. Jefferson, NC: McFarland, 2014. pp 5-26

3. Revathi, A. *A Life in Trans Activism*. Delhi: Zubaan, 2016. Pp. 158—168
4. Nadimpally, S., and V. Marwah.. “Shake Her, She is Like the Tree That Grows Money! In Of Mothers and Others: Stories, Essays, Poems.” Edited by J. Mishra. New Delhi: Zubaan, 2013.

5. Chaudhuri, Maitrayee. “Gender and Advertisements: The Rhetoric of Globalisation”, *Women's Studies International Forum* 2001 24.3/4 pp. 373-385.

6. Jha, Sonora, and Mara Adelman. "Looking for love in all the white places: a study of skin color preferences on Indian matrimonial and mate-seeking websites." *Studies in South Asian Film & Media* 1.1 (2009): 65-83.

7. View and discuss *any one* of the feature films: *Dangal* (Dir. Nitish Tiwari. 2016. UTV and Walt Disney Pictures) or *Chak De* (Dir. Shimit Amin. Yash Raj Films, 2007). *Pink* (Dir. Aniruddha Roy Chowdhury. Rashmi Sharma Telefilms, 2016).

8. View and discuss the documentary films *Unlimited Girls* (Dir. Paromita Vohra. Sakshi, 2002); and, *Newborns* (Dir. Megha Ramaswamy. Recyclewala Labs, 2014).

9. Khabar Lahariya FAQ (<http://khabarlahariya.org/faqs/>, accessed on 05.05.2018) and “Open letter to our Male Colleagues of the Media World, from Khabar Lahariya Editors” (<http://khabarlahariya.org/an-open-letter-to-our-male-colleagues-of-the-media-world-from-khabar-lahariya-editors/> May 03. 2018. Accessed on 05.05.2018).

10. Rege, Sharmila, ‘Dalit Women Talk Differently: A Critique of 'Difference' and Towards a Dalit Feminist Standpoint Position’ in *Economic and Political Weekly*, Vol. 33, No. 44, 1998, pp. WS39-WS46.

11. “Sarpanch, Woodcutter, Handpump Mechanic: Dalit Women in UP tell Women@WorkStories”. (<http://theladiesfinger.com/woodcutter-sarpanch-handpump-mechanic-dalit-women-work-stories>. May 02, 2018. Accessed on 05.05.2018).

12. Siddiqui, Gohar. "Behind her Laughter is Fear: Domestic violence and transnational feminism". *Jump Cut* 55 (2013 Fall) (<https://www.ejumpcut.org/archive/jc55.2013/SiddiquiDomesAbuseIndia/index.html>. accessed on 05.05.2018)

For Visually Disabled Students

(i) Reading no. 7 (*Dangal* and *Pink* movies) replaced with

Phadke, Shilpa, Sameera Khan, and Shilpa Ranade. *Why Loiter? Women and Risk on Mumbai Streets*. New Delhi: Penguin, 2011. Pp. 65—106.

(ii) Reading no. 8 (documentaries *Unlimited Girls* and *Newborns*) replaced with

Agnihotri, Anita. "The Peacock." *Seventeen*. New Delhi: Zubaan, 2011.69-79 **and**

Paromita Vohra's "Interview with Veena Mazumdar, part 1" and "Interview with Veena Mazumdar, part 2". *Unlimited Girls* footage. Point of View.

<https://pad.ma/MH/info> and (<https://pad.ma/NC/info>. Accessed on 05.05.2018).

Essential Readings

Note: This is a literature-based course, and students will be examined on all the prescribed readings in Units 1 through 4. Therefore, all those texts are to be considered essential reading.

Suggested Reading

Poyntz, Stuart R. *Media Literacies: A Critical Introduction*. Wiley Blackwell, 2012.

Evaluation

Emphasis will be on student's ability to apply concepts generatively rather than to test memory and to encourage intersectional thinking. Therefore all the readings may be treated as applying to all units in terms of concepts and techniques therein.

Practicals (14 hours)

1. Students may submit for evaluation either one full-length academic essay or produce a portfolio that re-writes or re-scripts or reviews texts they select (with the assistance of the teacher) from contemporary Indian media such that units 2 3 and 4 each are represented in the portfolio. Alternatively students may choose to focus on any one of units 2/3/4 should they have special aptitude for or interest in any area.
2. The objective of the course is to enable the student to intervene as an informed gender-ethical respondent to media narratives so any mode of media that permits this analysis such as blog-posts television programming new media including social media documentary and other short films news coverage may also be admitted such that they are equivalent in total effort to a full-length academic essay.
3. Students may also be encouraged to create samplers and portfolios of contemporary coverage thematically.
4. Students are to be encouraged to find and bring supplementary texts to classroom discussion for all units.

Teaching Plan

Paper S11: Applied Gender Studies: Media Literacies

Week 1 – Introduction to Paper S11

Week 2 -- Unit 1 -- Gender/s: concepts and frameworks

Topics: Femininities/Masculinities; Cis/Trans bodies; Heterosexuality/ Homosexuality/ Heteronormativity/ Heteropatriarchy; Sexism/Privilege/Biology/Reproduction

Texts:

a. Kandasamy, Meena. “Screwtiny,” “Pride goes before a full-length mirror,” “Joiissance,” and “Backstreet Girls”.

b. Dasgupta R.K and Gokulsing K. M., Introduction: Perceptions of Masculinity and Challenges to the Indian Male.

c. Revathi, A. *A Life in Trans Activism*. Pp. 158—168.

d. Nadimpally, S., and V. Marwah. “Shake Her, She is Like the Tree That Grows Money!”

e. Rege, Sharmila, ‘Dalit Women Talk Differently: A Critique of, ‘Difference’, and Towards a Dalit Feminist Standpoint Position’.

(Practicals as applicable to unit)

Week 3 -- Unit 1 contd

Week 4 -- Unit 1 contd

Week 5 -- Unit 2 -- Analysing gender in advertising

Topics: The use of gendered stereotypes and privilege in advertising; hegemonic and normative ideas of gender and sexuality in selling and buying products; consumption of goods, bodies; commodification and objectification; the reach and memorability of advertising; matrimonial and personal ads and reinforcement of caste/class/gender binaries.

Readings

a. Chaudhuri, Maitrayee. “Gender and Advertisements: The Rhetoric of Globalisation”.

b. Jha, Sonora, and Mara Adelman. "Looking for love in all the white places: a study of skin colour preferences on Indian matrimonial and mate-seeking websites."

(Practicals as applicable to unit)

Week 6 -- Unit 2 contd

Week 7 -- Unit 2 contd

Week 8 -- Unit 3 -- Analysing representations of gender in reporting and journalism

Topics: Vocabulary of news media coverage in relation to gender; representation of masculine/feminine/non-dimorphic bodies; Re-narrativizing this vocabulary productively; difference in coverage of stories of obviously “gendered” subjects such as rape; heroism; war; domestic violence; sexual harassment, and supposedly “neutral” subjects like labour rights or work and wages, or health or politics; advocacy networks for various minority subjects; persistence of sexism in new media

Readings

a. *Khabar Lahariya* FAQ (<http://khabarlahariya.org/faqs/>) and “Open letter to our Male Colleagues of the Media World, from Khabar Lahariya, editors”.

b. “Sarpanch, Woodcutter, Handpump Mechanic: Dalit Women in UP tell Women@Work Stories”. (<http://theladiesfinger.com/woodcutter-sarpanch-handpump-mechanic-dalit-women-work-stories>. May 02, 2018. Accessed on 05.05.2018).

(Practicals as applicable to unit)

Week 9 -- Unit 3 contd

Week 10 -- Unit 3 contd

Week 11 -- Unit 4 -- Gender as represented in film (fiction and nonfiction/documentary)

Topics:

- Narrative time available to male/female/trans subjects; use of normative heterosexuality and gender privilege in plots, casting, narrative development and marketing of films; the Bechdel test: the importance of clearing it and the implications for mainstream narrativization consistently failing the test; documentary films for presentation of alternative narratives.

Readings and viewings

a. View and discuss *any one* of the feature films: *Dangal* or *Chak De* or *Pink*.

b. View and discuss the documentary films *Unlimited Girls* and *Newborns*.

c. Siddiqui, Gohar. "Behind her Laughter is Fear: Domestic violence and transnational feminism".

For visually challenged students:

a. (*Dangal* and *Pink* movies) **replaced with** Phadke, Shilpa, Sameera Khan, and Shilpa Ranade. Why Loiter? Women and Risk on Mumbai Streets. Pp. 65—106.

b. (documentaries *Unlimited Girls* and *Newborns*) **replaced with**

Agnihotri, Anita. "The Peacock." *Seventeen*. New Delhi: Zubaan, 2011.69-79 **and** Paromita Vohra's "Interview with Veena Mazumdar, part 1" and "Interview with Veena Mazumdar, part 2". *Unlimited Girls* footage. Point of View. <https://pad.ma/MH/info> and (<https://pad.ma/NC/info>. Accessed on 05.05.2018).

Week 12 -- Unit 4 contd

Week 13 -- Unit 4 contd

Week 14 -- Conclusions

For entire course: Practical work done by students is to be shared in class to enable dissemination of knowledge produced.

Keywords

Femininities

Masculinities

Heteronormativity

Heteropatriarchy

Social Reproduction

Intersections

Resistance

Examination Scheme for all SEC Papers

Internal Assessment 25 marks

Portfolio 25 marks

Examination 50 marks

For the examination paper:

Question 1 – 10 marks x 2

Question 2 – 15 marks x 2

The questions should be application based, and NOT based on definitions.

B. A. & B. COM. PROGRAMME

CORE ENGLISH LANGUAGE

General Course Statement

1. The course will retain streaming. The structure of three graded levels of English language learning is required in a diverse central university like Delhi University to address the differential learning levels of students and achieve the desired competence.

2. The existing English A, B, and C will be renamed as English Language through Literature, English Fluency and English Proficiency respectively. This will remove any discriminatory, hierarchical attributes in the existing nomenclature and refocus the pedagogic exercise on the respective objectives of the three streams in an academically thorough and non-hierarchical way.

3. The existing criteria for streaming was discussed thoroughly in the context of the almost complete collapse of English B and English C classes across colleges. This structural collapse has led to severely compromised language acquisition opportunities for BA & BCom students. At present 98% of BA& BCom programme applicants are from boards where English is offered as a subject in class XII. Currently in Delhi University, a student with minimum pass marks in English in Class XII will do the same English course as a student scoring above 90%. Such guaranteed variance in competences and standards in the classroom is a huge pedagogic challenge that stalls the aim of achieving any tangible proficiency in the language over two semesters.

In order to address this reality, which was further aggravated by the reduction in the language teaching span in CBCS to two semesters, the committee concluded that it is imperative to have additional streaming criteria (NOT eligibility or admission criteria) to benefit the students in the classroom and in their careers. A hugely participative student feedback survey was conducted online. Thousands of BA & BCom Delhi University students responded to the detailed questionnaire and helped us to our conclusions.

Based on these findings and the consensus in our meetings the BA/BCom Programme Cluster Subcommittee proposes the following:

As 98% of the BA & BCom Programme students have done English in class 12, streaming will be now based on their Class XII marks in English. There will be three streams:

1. 80% and above: **ENGLISH LANGUAGE THROUGH LITERATURE**
2. 60% and above up to 80%: **ENGLISH FLUENCY**
3. Less than 60%: **ENGLISH PROFICIENCY**

- We have retained the present Delhi University Rule of streaming students who have done English up to Class X and Class VIII to ENGLISH FLUENCY and ENGLISH PROFICIENCY respectively to take care of the 2% who may not have done English up to Class XII
- We have provided a 10% relaxation in Class XII English marks while streaming for students who have studied English Elective in class XII

This proposal is the most academically sound non-hierarchical and inclusive one we could arrive at that successfully addresses the pedagogical and learning imperatives in English language teaching.

The revised syllabus proposed here is in sync with the CBCS outline. Additionally, this syllabus works out the specifics of language learning required to enable the students of Delhi University in the process of language acquisition and proficiency, as it integrates critical thinking, reading, writing, and speaking capabilities, without compartmentalising any one or two as the expected focus or outcome of language study. For this purpose, a compiled list of suggested readings collated by the Department of English Delhi University can be finalised .

The detailed syllabus with suggested readings, **Teaching Plans**, testing/evaluation pattern and learning outcomes for two semesters under CBCS is as follows:

ENGLISH LANGUAGE THROUGH LITERATURE I & II
ENGLISH FLUENCY I & II
ENGLISH PROFICIENCY I & II

COURSE CONTENT FOR SEMESTERS III / IV

Unit 1

Understanding Life Narratives

Giving students the skills to document their own lives meaningfully; journals, memoirs, and autobiographical writings can be excellent tools for personal reflection and growth, therapeutic as well as a method for organising one's own thoughts in a fashion that helps one live meaningfully

Reading sections from life narratives, biographies, autobiographies and diary entries

Writing a statement of purpose for university applications; CV/resume; daily/weekly journal

Speaking to your class to persuade them to do something public speech

Listening to public speeches like convocation addresses, political speeches, TED Talks to trace structure of argument and worldview; to observe the use of description, persuasion, and argument

Grammar/Vocabulary: Action Verbs
Active and Passive voice

Suggested Readings:

Das, Kamala. 'The Park Street Home' *My Story* Kottayam: DC Books, 2009.

Singh, Mayank 'Mayank Austen Soofi'. Selected extracts from 'I Had Come Too Far' *Nobody Can Love You More* Delhi: Penguin Books, 2014.

Bhattacharjee, Kishalay. 'Back To Where I Never Belonged' *First Proof: The Penguin Book of New Writing From India* Delhi: Penguin Books India, 2005.

Issacson, Walter. Selected extracts from *Steve Jobs* New York: Simon and Schuster, 2011.

Unit 2

Exploring Poetry

Here, students are trained to use the techniques of poetry to write in poetic form; they understand how the concept of beauty works through access to aesthetic forms; they learn how to express the same thought in different ways and observe how form impacts meaning; these skills can become tools for personal confidence in linguistic use

Reading: Using context to read effectively; identifying elements of poetics in different forms of poetry prose poems / slam poetry

Writing slam poetry; writing a critical response to a poem

Listening: Reciting/performing poetry; listening to audio/video clips of poets reading their poetry to appreciate the significance of pauses, rhythm etc

Grammar/Vocabulary: Denotation/Connotation

Suggested Readings:

Nair, Rukmini Bhaya. 'Gargi's Silence' *Yellow Hibiscus: New and Selected Poems* Delhi: Penguin, 2004.

Nongkynrih, Kynpham Sing. 'Light-In-The-Night (For Amanda)'

Seth, Vikram. 'Part One' *The Golden Gate* London: Faber and Faber, 1999.

Charara, Hayan. 'Usage' *Something Sinister* Pittsburgh: Carnegie Mellon University Press, 2016.

Unit 3

Exploring Drama

To highlight the rhetorical possibilities of drama through an understanding of its form and mechanics; students learn how to handle conflict, how to have meaningful conversations, and, above all, learn how one's words and gestures impact others.

Reading a one-act/ longer play to understand the interaction of dramatic forms/elements and social context

Writing a critical response to the dramatic text; writing the script for a skit/short play, keeping in mind formal features like characterisation, plot development, stage directions, etc

Speaking: Students learn to use their voices and bodies to perform/enact skits in groups

Listening to a radio play to appreciate the aural elements of drama

Grammar/Vocabulary: Direct/ Indirect Speech
Phrases and Idioms
Tone and Register

Suggested Readings:

Sarkar, Badal. 'Beyond the Land of Hattamala' *Beyond the Land of Hattamala and Scandal in Fairyland* Calcutta: Seagull Books, 1992.

Unit 4

Exploring Fiction - Novella

Narrative texts can be seen as a tool for exploring reality including contests of what should be accepted as real. Students will learn how to write narrative and through narrative to examine their own responses to issues confronting them.

Read a longer piece of fiction to discern narrative voice, narrative structure, character development, while locating the text in its socio-historical context

Write your own short story/novella; speculative fiction can be particularly useful as young people are often in positions of contest with the social reality afforded to them; read and review short stories/novellas/novels

Speak: Initiate discussion about a novella, drawing upon the critical reading skills developed by students in the previous semester; focus will be on broadening their repertoire of reading: texts chosen and responded to for personal pleasure

Listen to audio clips/ videos of writers talking about what writing means to them; audio clips of books being read aloud to enable discussion of reading styles, pauses, punctuation etc

Grammar/Vocabulary: Punctuation, pauses, manner of reading/speaking/crafting complex sentences

Suggested Reading:

Cisneros, Sandra. *The House on Mango Street* New York: Knopf Doubleday Publishing Group, 2013.

Unit 5

Writing your own academic essay / paper for the classroom

Using language skills learned over the course, students are to create academic documents such as term papers, reports and assignments. They should examine and revisit earlier such submissions to learn how to improve and edit these better; to learn to identify and cite the right sources to avoid plagiarism; to recognise and rectify bias in their own writing: biases such as those of class/caste/race/gender/sexuality/religion can be discussed in class.

Writing, revising and formatting drafts of essays analysing the coherence of arguments; perspectives on a topic; balance of presentation; students can test their ability to choose between various forms of information/fact/opinion; they can create questionnaires, conducting surveys; edit and create bibliographies and checklists.

Speaking: Students should be able to tell the class what their core idea is in the essay / paper, and why they have chosen a particular topic or idea; they should be able to debate various points of view on the same topic.

Listening to others' views and being able to figure out which arguments are key and why; examining ideology and location of speakers.

Grammar/Vocabulary: Paragraphs
Topic sentences and transitions

Suggested Readings:

Patel, Raj and Moore, Jason W. 'How the chicken nugget became the true symbol of our era' *The Guardian*, 8 May 2018

<https://www.theguardian.com/news/2018/may/08/how-the-chicken-nugget-became-the-true-symbol-of-our-era> Accessed 4 June 2018

Latest editions of the MLA and APA style sheets

TESTING AND EVALUATION

Internal Assessment: Of 20 marks, 10 marks are to be allocated for assessment of reading and writing assignments and 10 marks for assessment of speaking and listening test.

Semester III/ IV Final Examination 75 marks

Reading and Writing skills:

- Unseen comprehension passage 750 words to test reading comprehension critical thinking and vocabulary skills 15 marks
- Questions related to suggested literary texts: to test awareness of literary form and context through comprehension testing 2 x 15 = 30 marks
- Questions testing composition skills: essay statement-of-purpose essay / argumentative / personal / descriptive ; diary/journal; questionnaire; dramatise story/write short scene etc 2 x 10 = 20 marks
- Question testing academic writing formats via exercise of correcting citation or bibliographical entry 5 marks

Grammar: Different grammar topics to be tested via exercise of editing/rewriting a given passage 5 marks

Teaching Plan

Week 1 – Introduction & Unit 6 -- Understanding Life Narratives

Week 2 – Unit 6 contd

Week 3 – Unit 6 contd

Week 4 – Unit 7 -- Exploring Poetry

Week 5 – Unit 7 contd

Week 6 – Unit 8 -- Exploring Drama

Week 7 – Unit 8 contd

Week 8 – Unit 8 contd

Week 9 – Unit 9 -- Exploring Fiction - Novella

Week 10 – Unit 9 contd

Week 11 – Unit contd

Week 12 – Unit 10 --Writing your own academic essay / paper for the classroom

Week 13 – Unit 10 contd

Week 14 – Unit 10 contd& Summing Up

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Keywords

Language through literature

Verbal and written texts

Social and ethical frameworks

Listening

Reading

Comprehension

Argumentation
Descriptive writing
Narrative writing

BA/ B COM PROGRAMME CORE ENGLISH LANGUAGE:

B -- ENGLISH FLUENCY

Course Objectives

This course is intended for students who possess basic grammatical and vocabulary skills in English but may not be able to effectively communicate in their everyday contexts. The course aims to equip them with skills that will help them interact with people around their personal, institutional and social spaces. The course will help students to

- describe or express their opinions on topics of personal interest such as their experiences of events, their hopes and ambitions
- read and understand information on topical matters and explain the advantages and disadvantages of a situation
- write formal letters, personal notes, blogs, reports, and texts on familiar matters
- comprehend and analyse texts in English
- organise and write paragraphs and short essays in a variety of rhetorical styles

COURSE CONTENTS FOR SEMESTER III / IV

Unit 1

In the University II

Elements of debate/ Academic writing
Argument and Textual evidence

- Prepare a presentation on a topic you have seen debated on television; delineate the arguments and textual evidence used by both sides
- Write a paragraph on any topic you are studying in any of your courses at present; cite all sources of information you use

Suggested Readings:

Peeradina, Saleem. 'Sisters', *Group Portrait*. Madras: OUP. pp. 21-22.

<https://kafila.online/2016/09/20/the-radical-significance-of-the-du-photocopy-case-for-global-copyright/> Accessed on 19 September 2019

Unit 2

In the domestic sphere II

Informal/ Epistolary writing

Descriptive & Expository writing

- Write a letter to your daughter -- in your own mother's voice; use a text you have read in class as a sample
- Prepare a presentation on a fictional place as though you have visited it

Suggested Readings:

"To Jyotiba, From Savitribai Phule: These Aren't Love Letters, But Tell You What Love Is All About". 2016. *Scroll.In*.

<https://scroll.in/article/801848/to-jyotiba-from-savitribai-phule-these-arent-love-letters-but-tell-you-what-love-is-all-about> Accessed on 19 September 2019

Payne, Karen. *Between Ourselves: Letters Between Mothers and Daughters* 1750-1982, Virago 1994.

Unit 3

In public places II

Dialogue: Conversation/ Interview between fictional characters

Narrative logic; connectives & transitions

- Group exercise: Prepare an interview between a refugee and her prospective landlord
- Write a conversation you have overheard in a public place recently

Suggested Readings:

<https://www.businessinsider.com/a-12-year-old-syrian-refugee-wrote-this-heartbreaking-letter-to-the-king-of-sweden-2016-2?IR=T> Accessed on 19 September 2019

‘We Sinful Women’ by KishwarNaheed from *We Sinful Women: Contemporary Urdu Feminist Poetry*. Translated and edited by Rukhsana Ahmed. The Women’s Press, 1991.

Unit 4

In the State II

Paragraph writing

Brainstorming planning/outline rough drafts editing

- Work in groups to brainstorm ideas for a paragraph on any social topic

- Prepare individual outlines and rough drafts
- Peer review and edit each others' writing

Suggested Readings:

Sharma, Natasha. *Squiggle Takes a Walk: All About Punctuation*. Penguin/Young Zubaan and Puffin: 2014.

Lorde, Audre. 'The Transformation of Silence into Language and Action'. *Sister Outsider*. Random House: New York, 1984. pp. 40-44

Unit 5

Interface with technology II

Creative writing/ Social media presence

Affective & Poetic expression; rhetoric

- Write a Facebook post announcing a cultural event
- Write a poem of 140 characters to post on twitter
- Evaluate your favourite WhatsApp group's last 10 posts

Suggested Readings:

Extract from *Haroun and the Sea of Stories*: Salman Rushdie. Penguin Books, New Delhi, 1991. pp. 15-23.

Evaluation:

Internal assessment (25 marks)

Reading & Writing assignment(10 marks)

Oral listening & speaking test(10 marks)

Attendance: 5 marks

FINAL EXAM 75 marks

Semester III/IV

Literature review(15 marks)

Comprehension passage(15 marks)

Debate(15 marks)

Job application(10 marks)

Informal letter(10 marks)

Proofreading/Punctuation passage(5 marks)

Paragraph writing(5 marks)

Teaching Plan

Week 1 – Introduction & Unit 1 - In the University

Week 2 – Unit 1contd

Week 3 – Unit 2 - In the domestic sphere

Week 4 – Unit 2contd

Week 5 – Unit 2contd

Week 6 – Unit 3: In public places

Week 7 – Unit 3 contd

Week 8 – Unit 3 contd

Week 9 – Unit 4: In the State

Week 10 – Unit 4 contd

Week 11 – Unit 4 contd

Week 12 – Unit 5: Interface with Technology

Week 13 – Unit 5 contd

Week 14 – Unit 5 contd& Summing Up

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Keywords

Effective communication

Listening

Speaking

Reading

Writing

Communicative tasks and activities

Familiar context
Personal communication
Professional communication
Social communication

BA/ B COM PROGRAMME CORE ENGLISH LANGUAGE:

C ENGLISH PROFICIENCY

Course Objectives

The English Proficiency course is intended for students who have had inadequate exposure to English and hence exhibit a very low level of proficiency in the language – difficulty in comprehending simple texts, limited vocabulary, a poor grasp of basic syntactical structures, and an inability to speak or write the language with confidence. The course that is spread over two semesters aims to redress these issues and aims to

- enhance comprehension skills and enrich vocabulary through the reading of short and simple passages with suitable tasks built around these
- introduce simple syntactical structures and basic grammar to students through contextualized settings and ample practice exercises so that they can engage in short independent compositions
- introduce the sounds of the language and the essentials of English pronunciation to students in order to remove the inhibitions experienced by them while speaking English
- acquaint students with social formulae used to perform various everyday functions so that they can converse in English in simple situations

COURSE CONTENT FOR SEMESTER III / IV

Building on the contents of the introductory semester, the focus in this semester is to further develop the language skills of the learners in all the core areas. The approach is to develop these skills in an integrated way through an intense engagement with the prescribed texts. In each unit, teachers are to eschew a narrow focus and ensure that all the activities in the prescribed sections are attempted by the learners

UNIT 1

Reading & Comprehending - II

This section involves reading and comprehending passages of greater length and complexity, using the prescribed texts that develop and test these skills through a variety of tasks: re-ordering, true / false sentence completion, fill in the blanks, short comprehension questions, etc.

Learners are to be encouraged to explore the texts listed below beyond the prescribed sections. The comprehension of an unseen passage will be a part of the end-semester written examination.

Suggested Readings:

A Foundation English Course for Undergraduates: Book II, Delhi: University of Delhi, 1992. pp. 1 - 7 Units 1 & 2; pp. 19 - 21 Unit 6; pp. 47 - 49 Unit 13; pp. 61 - 63 Unit 16 & pp. 75 - 79 Unit 19

Everyday English 2, Delhi: Foundation Books, 2006. pp. 14 - 29 Units 3 - 5; pp. 91 - 101 Units 16 - 17 & pp. 121 - 128 Unit 21

UNIT 2

Basic Grammar Rules - II

Questions, negatives, and question tags; conditionals; more on articles, prepositions, tenses, simple present, present continuous, present perfect, simple past, past continuous, past perfect, modals and linking words.

Relevant sections from all the recommended books are to be used in addition to the specific reading prescribed for this unit.

Suggested Readings:

Developing Language Skills I Delhi: Manohar, 1997. pp. 183 - 186 & pp. 209 - 216 Units 1, 6 & 7 of 'Grammar'

UNIT 3

Conversing - II

Understanding word stress and features of connected speech; conversational formulae for getting and giving permission agreeing and disagreeing warning and persuading inviting suggesting accepting and refusing expressing likes and dislikes regulating speech and ending a conversation.

Suggested Readings:

English at the Workplace II, Delhi: Oxford University Press, 2007. pp. 10 - 13 Unit 3 & pp. 38 - 45 Unit 9

Developing Language Skills I, Delhi: Manohar, 1997. pp. 26 - 45 Units 6 - 10 of 'Oral Communication: Speech Patterns'

UNIT 4

Writing Skills - II

Writing short paragraphs of up to 150 words independently including describing people places events; giving directions; short application letters

Suggested Readings:

A Foundation English Course for Undergraduates: Workbook I, Delhi: Oxford University Press, 1991. pp. 32 - 63 Units VI - X

UNIT 5

Applying for a Job

Learning to present oneself at job interviews; writing simple job applications

Suggested Readings:

English at the Workplace, Delhi: Macmillan, 2006. pp. 67 - 75 Unit 11

Everyday English 2, Delhi: Foundation Books, 2006. pp. 121 - 128 Unit 21

References

A Foundation English Course for Undergraduates: Book II, Delhi: University of Delhi, 1992. pp. 1 – 7 Units 1 & 2; pp. 19 – 21 Unit 6; pp. 47 – 49 Unit 13; pp. 61 – 63 Unit 16 & pp. 75 – 79 Unit 19

Everyday English 2, Delhi: Foundation Books, 2006. pp.14 – 29 Units 3 – 5; pp. 91 – 101 Units 16 – 17 & pp.121 – 128 Unit 21

A Foundation English Course for Undergraduates: Workbook I Delhi: Oxford University Press, 1991. pp. 32 – 63 Units VI – X

Developing Language Skills I Delhi: Manohar, 1997. pp 26 – 45 Units 6 – 10 of ‘Oral Communication: Speech Patterns’; pp.183 – 186 & pp. 209 – 216 Units 1, 6 & 7 of ‘Grammar’

Internal Assessment:

Simple conversations in pairs; short oral presentations

End-semester evaluation pattern:

Reading comprehension	20 marks
Vocabulary	10 marks
Grammar	15 marks
Written composition	20 marks
Oral communication	10 marks

Teaching Plan

Teaching Learning Process

Since language skills can only be learnt and mastered through the use of the teaching-learning process, the course needs to be learner-centric. The class time is to be taken up with hands-on activities by learners, involving reading aloud / silently, speaking, listening, and writing. Peer and group work should be used extensively. The teacher is to act as a facilitator, setting up and overseeing learner tasks and providing stimulus, encouragement, and corrective inputs as and when necessary. Teachers are also expected to source additional related material and activities pitched at an appropriate level of difficulty, to plug in gaps in the prescribed readings as well as to extend the knowledge of the learners and hone their skills.

Teaching Plan for Semester III / IV

Week 1 – Introduction; *A Foundation English Course for Undergraduates: Book II*, pp. 1 – 7 Units 1 & 2

Week 2 – *Everyday English 2*, pp 14 – 29 Units 3 – 5

Week 3 – *A Foundation English Course for Undergraduates: Workbook I*, pp 32 – 36 Unit VI; *A Foundation English Course for Undergraduates: Book II*, pp 19 – 21 Unit 6

Week 4 – *A Foundation English Course for Undergraduates: Book II*, pp 47 – 49 Unit 13; *Developing Language Skills I*, pp 183 – 186 Unit 1 of ‘Grammar’

Week 5 – *A Foundation English Course for Undergraduates: Book II*, pp 61 – 63 Unit 16 75 – 79 Unit 19

Week 6 – *Developing Language Skills I*, pp 209 – 216 Units 6 & 7 of ‘Grammar’; *Everyday English 2*, pp 91 – 94 Unit 16

Week 7 – *A Foundation English Course for Undergraduates: Workbook I*, pp 37 – 42 Unit VII; *Everyday English 2*, pp 95 – 101 Unit 17

Week 8 – *A Foundation English Course for Undergraduates: Workbook I*, pp 43 – 47 Unit VIII; *Developing Language Skills I*, pp 26 – 31 Unit 6 of ‘Oral Communication: Speech Patterns’

Week 9 – *A Foundation English Course for Undergraduates: Workbook I*, pp 48 – 51 Unit IX; *Developing Language Skills I*, pp 31 – 34 Unit 7 of ‘Oral Communication: Speech Patterns’

Week 10 – *A Foundation English Course for Undergraduates: Workbook I*, pp 52 – 57 Unit X; *Developing Language Skills I*, pp 35 – 37 Unit 8 of ‘Oral Communication: Speech Patterns’

Week 11 – *Developing Language Skills I*, pp 37 - 45 Units 9 – 10 of ‘Oral Communication: Speech Patterns’

Week 12 – *English at the Workplace II*, pp 38 - 45 Unit 9

Week 13 – *English at the Workplace*, pp 67 - 75 Unit 11

Week 14 – *Everyday English 2*, pp 121 - 128 Unit 21

General Template for Facilitating the Achievement of Course Learning Outcomes

Course Learning Outcomes	Teaching	and	Assessment Tasks
--------------------------	----------	-----	------------------

	Learning Activity	
Understanding concepts	Interactive discussions in small groups in Tutorial classes	Reading material together in small groups initiating discussion topics participation in discussions
Expressing concepts through writing	How to think critically and write with clarity	Writing essay length assignments
Demonstrating conceptual and textual understanding in tests and exams	Discussing exam questions and answering techniques	Class tests

Practical

The entire course is practical in nature. The prescribed readings are rich in tasks and activities that aim at developing essential language skills. Working their way through these tasks will give the learners hands-on practice in the use of these skills.

References

A Foundation English Course for Undergraduates: Reader I. Delhi: Oxford University Press, 1991

A Foundation English Course for Undergraduates: Workbook I. Delhi: Oxford University Press, 1991

Everyday English Delhi: Pearson, 2005

Developing Language Skills I Delhi: Manohar, 1997

Additional Resources:

English at the Workplace Delhi: Macmillan, 2006

Assessment Methods

Since the class is conceived as learner-centric and built around tasks that require learners to actively use various language skills, formative assessment can and should be used extensively. The focus here could be on skills and activities that are harder to test in a written evaluation, such as speaking and listening skills, dictionary work, etc. Oral presentations, peer interviews, and group tasks can be used for this purpose. The end-semester written examination will test all the areas targeted in the course – reading, comprehension, vocabulary, grammar, composition, and oral communication. The proposed weightage for these sections in the end-semester exam is as follows:

Reading Comprehension - 25 marks

- Vocabulary - 15 marks
- Grammar - 15 marks
- Written composition - 10 marks
- Oral communication - 10 marks

Keywords

English proficiency

Reading

Writing

Speaking

Listening

Pronunciation

Comprehension

Vocabulary

Syntax

Grammar

Composition

Conversational formulae

General Note

No part of 'Fluency in English II' is proposed as suggested reading in this syllabus.

Discipline English (BA Programme) under CBCS

Course Statement

The English Discipline-centric papers are designed to give students a broad yet deep understanding of English Literatures, both through canonical and translated literary texts and anthologies. It draws on current issues and ideas to familiarize students of writings in the West and in the Asian subcontinent. Different genres are introduced to give the students knowledge of cultural motifs and ideologies that would help in their understanding of the world. Starting with the 'Individual and Society' anthology that introduces them to significant contemporary issues like Caste and Globalization, the papers move on to texts from the European Renaissance, Victorian and Modern poetry and ends with some optional papers that a student may choose out of his/her interest. They include a paper on Modern Drama, Children's Literature, Postcolonial Literature and Popular Literature.

Course Objectives

- * The course offers the BA Programme student an opportunity to study three years of English Discipline papers that enable them to go for further studies in English if they so desire
- * The course attributes to the students a working knowledge of how to read literary texts and enables them to use such knowledge to enhance and augment their professional job opportunities
- * The course introduces students to contemporary literary ideas and issues in an increasingly complex world
- *The course allows the student a familiarity with literary texts through different genres and time periods

Course Contents

Semester 3

DSC 1C

British Literature: Poetry and a Play, selections from *Living Literatures: An Anthology of Prose and Poetry*

1. Renaissance Poetry (sonnets and love lyrics): 6 poems

Wyatt, 'Whoso List to Hunt'

Spenser, 'Amoretti LXXV'

Shakespeare, (i) 'Sonnet LX', (ii) 'Sonnet CXXX'

Donne, 'The Sunne Rising'

Milton, 'On His Blindness'

2. Poetry of the Eighteenth Century and the Romantic Age: 7 poems

Swift, 'A Beautiful Young Nymph Going to Bed'

Blake, (i) 'The Garden of Love', (ii) 'London'

Wordsworth, (i) 'Composed Upon Westminster Bridge', (ii) 'It Is a Beauteous Evening'

Coleridge, 'Frost at Midnight'

Keats, 'To Autumn'

3. Play

William Shakespeare, *Othello*

Keywords: Renaissance, Humanism, The Sonnet Tradition, the Poet and Society, Courtly Love tradition, Race, Class, Gender, The Globe Theatre

Teaching Plan:

Weeks 1- 4: Renaissance Poetry

Weeks 5-8: 18th Century and Romantic poetry

Weeks 9-14: Shakespeare

Semester 4

DSC 1D

Literary Crosscurrents: Selections from *Living Literatures: An Anthology of Prose and Poetry*

1. Victorian and Modern Poetry: 8 poems

Browning: 'My Last Duchess'

Tennyson: 'The Lady of Shalott'

Emily Dickinson: 341 'After Great Pain', 754 'My Life Had Stood'

Thomas Hardy: 'Neutral Tones'

W. H. Auden: 'Musee des Beaux Arts'

T. S. Eliot: 'Preludes'

Sylvia Plath: 'The Moon and the Yew Tree'

2. Story

Mahasweta Devi: 'The Hunt'

3. Novel

Charlotte Bronte, *Jane Eyre*

Keywords: Faith and Doubt, Dramatic Monologue, Modernism, Gender, The Subaltern, Race, Colonialism

Teaching Plan:

Weeks 1-4: Poetry

Week 5: Short Story

Weeks 6-14: Novel

दिल्लीविश्वविद्यालय
UNIVERSITY OF DELHI

Bachelor of Arts (Hons.) History

(Effective from Academic Year 2019-20)



Revised Syllabus as approved by

Academic Council

Date:

No:

Executive Council

Date:

No:

**Applicable for students registered with Regular Colleges, Non Collegiate Women's Education Board
and School of Open Learning**

List of Contents

Page No.

Preamble	3
1. Introduction to the Honours Programme of the History Department	4
2. Learning Outcome-based Curriculum Framework in B.A. (Hons.) in History	4
2.1. Nature and Extent of the Programme in B.A. (Hons.) History	5
2.2. Aims of Bachelor Degree Programme in B.A. (Hons.) History	5
3. Graduate Attributes in B.A. (Hons.) History	6
4. Qualification Descriptors for Graduates B.A. (Hons.) History	7
5. Programme Learning Outcomes for in B.A. (Hons.) History	7
6. Structure of B.A. (Hons.) History Programme	8
6.1. Credit Distribution for B.A. (Hons.) History	9
6.2. Semester-wise Distribution of Courses.	12
7. Courses for B.A. (Hons.) History Programme	13
7.1. Course Learning Objective	15
7.2. Course Learning Outcomes	16
7.3. Course Teaching-Learning Process	18
7.4. Assessment Methods	19
8. Keywords	20

Preamble

The objective of any programme at Higher Education Institute is to prepare their students for the society at large. The University of Delhi envisions all its programmes in the best interest of their students and in this endeavour it offers a new vision to all its Under-Graduate courses. It imbibes a Learning Outcome-based Curriculum Framework (LOCF) for all its Under Graduate programmes.

The LOCF approach is envisioned to provide a focused, outcome-based syllabus at the undergraduate level with an agenda to structure the teaching-learning experiences in a more student-centric manner. The LOCF approach has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice. The Under-Graduate Programmes will prepare the students for both, academia and employability.

Each programme vividly elaborates its nature and promises the outcomes that are to be accomplished by studying the courses. The programmes also state the attributes that it offers to inculcate at the graduation level. The graduate attributes encompass values related to well-being, emotional stability, critical thinking, social justice and also skills for employability. In short, each programme prepares students for sustainability and life-long learning.

The new curriculum of B.A. History (Hons.) offers students access to cutting edge scholarship organised in a pedagogical form that is accessible and interesting. It is structured for students who are new to the discipline, as well as those who already have an introduction and provides them with a cumulative process of learning. It is structured to enhance their analytical and intellectual abilities as they mature during the three year Undergraduate programme. The courses range in time and space and across themes. There are reading and writing exercises, field work expeditions, cinema, documentaries and on-line materials that consolidate and develop in-class instruction. Students have an array of choices to tailor their instruction according to their interests.

The University of Delhi hopes the LOCF approach of the programme B.A. (Hons.) History will help students in making an informed decision regarding the goals that they wish to pursue in further higher education and more generally in life.

1 Introduction to BA History Honours Programme:

The Department of History is one of the founding departments of the University of Delhi and its Honours and Programme courses are regarded as the strongest in the country. Our colleagues in the Colleges and the Department of History together comprise the largest body of specialists in the World working in one institution on Indian History. It is a source of some pride that almost all reputed Departments of History in the World have teachers and students that received instruction in History at some time in their career in the University of Delhi.

We believe that History is a discipline which instructs students on how to read and process information on people, societies, cultures, events and places that are far removed in time and space from our own experience. Knowledge of this past is critical in understanding the ways in which our world is connected and responds to its history in sometimes overt and at other times more complex ways that is missed by most people.

2. Learning Outcome based Curriculum Framework in BA Honours History

The BA Honours History Programme is organised to provide the greatest flexibility to its students. There are Core Disciplinary papers that provide the fundamental knowledge in the discipline of history and in the study of the History of India and the World. The programme is otherwise envisaged to provide a large amount of choice so that students can tailor their education on the basis of their interests. These provide not just skills in history but also vital skills in other disciplines. The BA Honours History programme is interdisciplinary keeping in mind that specialisation in History is the key to access cognate skills from other disciplines.

Through the three years of the Honours programme we build systematically, upon the learning outcomes of courses covered each semester. Each term students are introduced to courses that are temporally and spatially distinct. We continue to reinforce already

covered subjects in our thematic based courses even as our students mature through their assignments and more complex readings.

2.1 Nature and Extent of the Programme:

The duration of the BA History Honours Programme is three academic years. Each academic year is divided into two semesters. The History Honours Programme therefore spans six semesters. Each semester is for the duration of sixteen weeks.

The teaching and learning modalities in the Honours programme will involve theory classes (lectures) of one hour each and tutorial classes. The curriculum will be taught through formal lectures with the aid, wherever the teacher feels the need, of power-point presentations, audio and video tools. There are additional requirements in certain courses for documentaries, cinema, field and archival work, visits to museums, class reports, discussions and project work. These are built into the teaching and assessment of many courses.

2.2 Aims of Bachelor Degree Programme in BA Honours History

At a general level, our courses are structured with the **objective** of giving requisite information about different aspects of the past to students, to teach them how to parse this information, instruct them on how historians research, frame an argument and debate details that have significance to how we understand the past and the present. The expected **outcome** is to provide students with a sense of how interconnected our present is with the past and how learning about the past provides them with the skills to understand the present. To facilitate this understanding, our courses, class room instruction and assignments give students the ability to think and reach their own conclusions. Our tutorial discussions, written assignments, class room presentations, field-work projects, consolidate their ability to analyse, research and process information.

3. Graduate Attributes in BA Honours History:

On completion of the course students are expected to have acquired the skills of critical thinking, rational enquiry, effective communication, and exploring the relationship between past, present and historiography. The attributes expected from the graduates of B.A. Honours in History are:

- 1) Knowledge of multiple perspectives through which significant developments in the history of the Indian subcontinent from earliest times up to the period after independence.
- 2) Familiarity with the significant patterns of development in certain parts of the modern and early modern world as well as certain non-Indian ancient societies.
- 3) Ability to carefully read a complex historical narrative, evaluate its deployment of evidence, and understand its argument as well as critically analyse the same
- 4) Ability to identify patterns of change and continuity with regards to issues of contemporary significance over long durations as well as across diverse geo-cultural zones
- 5) Greater ability to distinguish between that which is historical -- that is time-place-context driven, hence changeable and challengeable -- from that which is not.
- 6) Sensitivity to gender and social inequities as well as acquaintance with the historical trajectories of these issues
- 7) Greater respect for basic human values and ideals of equality, freedom, respect for diversity, and other constitutional values

- 8) Skill of picking up disparate sets of information from varied sources and weaving them into a coherent argument with a view to reveal identifiable patterns of development
- 9) Capability to assume leadership roles and apply the above mentioned analytical abilities in various other non-familiar contexts.
- 10) Possess knowledge of the values and beliefs of multiple cultures so as to effectively engage in a multi cultural society and interact with diverse groups.

4. Qualification Descriptors for Graduates in BA Honours History:

Upon successful completion of the course, students receive a degree of B.A. Honours (History). This includes majors in fourteen Core Courses (CCs), four Discipline Specific Courses (DSEs) and four Inter-disciplinary General Elective Courses offered by cognate disciplines. Each of these twenty-two courses carries six credits. The curriculum also includes minors in two discipline-centred Skill Enhancement Courses and two Ability Enhancement Compulsory Courses, with each of these four courses carrying four credits.

It is a comprehensive, wide-ranging and rigorous programmed and, therefore, truly an undergraduate degree with 'honours'. It initiates students into the essentials of the discipline of history while exposing her/him to the rigours of two cognate disciplines of her/his choice as well.

5. Programme Learning Outcomes for Graduates in BA Honours History

Graduates of this department are expected to branch out into different paths seeking spheres of knowledge and domains of professional work that they find fulfilling. After graduating with History Honours from the University of Delhi, they will be able to demonstrate comprehensive knowledge of scholarly research and professional literature relating to the discipline. This will establish a platform from which the student can pursue higher studies in History. It is expected that besides the skills specific to the disci-

pline, these wider life skills of argumentation and communication, attitudes and temperaments, and general values inherent in a discipline that studies human beings in their social context, in all its complexity, will ultimately enable learners to live rich, productive and meaningful lives. The list below provides a synoptic overview of possible career paths provided by the undergraduate training in history from the University of Delhi:

Teaching	Administration
Research	Social Work
Politics	Law
Journalism	Management
Media	Policy Making
Performing Arts	Human Resource Development
International Relations	

6 Structure of BA Honours History:

The programme consists of six and four credit courses. The six credit course will comprise of theory classes (five credits) and tutorials (one credit). The four credit courses will comprise solely of theory classes. Each credit is equivalent to one hour of classroom instruction per week

To acquire a degree in BA History Honours a student must study **fourteen Core Courses (CC)** – two each in semesters 1 and 2; three each in semesters 3 and 4; and two each in semesters 5 and 6. These are compulsory courses of six credits each.

The student also needs to take **four Discipline Specific Elective Courses (DSE)**. DSE papers are elective and out of the fourteen courses offered, students have to select any four – two each in semesters 5 and 6. These are all of six credits each.

Students are also required to take **four interdisciplinary General Elective Courses (GE)**. GE papers are elective, and students can take any four courses offered in cognate disciplines by **different** departments in their colleges. They have to opt for one course in each of the semesters 1, 2, 3 and 4. The Department of History lists nine GE papers in its Honours curriculum. These are of six credits each and open to enrolment for Honours students from other disciplines.

Students are expected to take two discipline centred **Skill Enhancement Courses (SEC)**. There are six SEC courses offered by the Department of History in semesters 3 and 4. Students are required to opt for one SEC paper in each of these semesters. These are of four credits each.

Additionally they must also take two Ability Enhancement Compulsory Courses (AECC), one each in semesters 1 and 2. The AECC courses are of four credit each. Please note that AECC courses are not in history. The two courses are: AECC 1, English/ Hindi/ MIL Communication and AECC 2, Environmental Sciences.

6.1 Credit distribution for BA Honours History

CORE COURSES			
Semester	Course Code	Name of the Course	Credits
I		History of India – I	5+1
		Social Formations and Cultural Patterns of the Ancient World –I	5+1
II		History of India – II	5+1
		Social Formations and Cultural Patterns of the Ancient and Medieval World – II	5+1
III		History of India – III (c. 750-1200 CE)	5+1
		Rise of the Modern West – I	5+1
		History of India – IV (c. 1200-1500)	5+1

CORE COURSES			
IV		Rise of the Modern West – II	5+1
		History of India – V (c. 1500-1600)	5+1
		History of India – VI (c. 1750-1857)	5+1
V		History of Modern Europe – I	5+1
		History of India – VII (c.1600-1750)	5+1
VI		History of India – VIII (c.1857-1950)	5+1
		History of Modern Europe – II	5+1

DSE PAPERS			
Semester	Course Code	Name of the Course	Credits
V DSE I		History of the USA: Independence to Civil War Or	5+1
		History of the USSR: From Revolution to World War. 1917-1945 Or	
		History of Africa, (c. 1500-1960) Or	
		Gender in Indian History up to 1500 CE	
V DSE I		History of Modern China (c. 1840-1950s) Or	5+1
		The Making of pre-Colonial Southeast Asia Or	
		Global Ecological Histories	
VI DSE III		History of the USA: Reconstruction to New Age Politics Or	5+1
		History of the USSR: The Soviet Experience (c. 1945-1991) Or	
		History of Latin America (c. 1500-1960s) Or	

DSE PAPERS			
		Gender in Indian History (c. 1500-1950)	
VI DSE IV		History of Modern Japan (c. 1868-1950s) Or	5+1
		History of Southeast Asia: Colonial to the Post Colonial Or	
		The Making of Contemporary India (c. 1950-1990s)	

GE PAPERS			
Semester	Course Code	Name of the Course	Credits
I GE I		Delhi Through the Ages: The Mak- ing of its early Modern History Or	5+1
		Science, Technologies and Humans: Contested Histories	
II GE II		Delhi Through the Ages: From Colonial to Contemporary Times Or	5 +1
		The World After 1945 Or	
		History and Culture: Representations in Texts, Objects & Performance	
III GE III		Politics of Nature Or	5+1
		Making of Post-Colonial India (c. 1950-1990)	
IV GE IV		Religion and Religiosity Or	5+1
		Inequality and Difference	

SEC PAPERS			
Semester	Course Code	Name of the Course	Credits
III SEC I		Understanding Heritage Or	4
		Archives and Museums Or	
		Historian's Craft	
IV SEC II		Indian Art and Architecture Or	4
		Understanding Popular Culture Or	
		History, Sociology and Anthropology	

AECC PAPERS			
Semester	Course Code	Name of the Course	Credits
I AECC I		English / Hindi/ MIL Communication Or Environmental Sciences	4
II AECC II		English / Hindi/ MIL Communication Or Environmental Sciences	4

6.2 Semester-wise Distribution of Courses

Semester	Core Courses	Discipline Specific Courses	Gener-icElec-tive	Skill Enhancement Courses	Ability Enhancement Courses
1	History of India I		GE I		English / MIL Or Environmental Sciences
	Social Formations and Cultural Patterns of the Ancient World-I				
2	History of India II		GE II		English / MIL Or

	Social Formations and Cultural Patterns of the Ancient and Medieval World-II				Environmental Sciences
3	History of India III – (c. 750-1200 CE)		GE III	SEC I	
	Rise of the Modern West – I				
	History of India IV (c. 1200-1500)				
4	Rise of the Modern West – II		GE IV	SEC II	
	History of India V (c. 1500-1600)				
	History of India VI (c. 1750-1857)				
5	History of Modern Europe – I	DSE I and DSE II			
	History of India VII (c.1600-1750)				
6	History of India VIII (c.1857-1950)	DSE III and DSE IV			
	History of Modern Europe – II				

7. Courses for BA Honours History Programme

Core Courses:

CC I: History of India-I

CC II: Social Formations and Cultural Patterns of the Ancient World-I

CC III: History of India-II

CC IV: Social Formations and Cultural Patterns of the Ancient and Medieval World-II

CC V: History of India-III (c. 750 -1200)

CC VI: Rise of the Modern West- I

CC VII: History of India- IV (c. 1200 - 1500)

CC VIII: Rise of the Modern West- II

CC IX: History of India-V (c. 1500-1600)

CC X: History of India-VI (c. 1750-1857)

CC XI: History of Modern Europe - I

CC XII: History of India- VII (c. 1600-1750)

CC XIII: History of India- VIII (c. 1857-1950)

CC XIV: History of Modern Europe- II

Discipline Specific Courses:

DSE I: History of the USA: Independence to Civil War

DSE II: History of the USSR: From Revolution to World War II (c. 1917 -1945)

DSE III: History of Africa, c.1500-1960s

DSE IV: Gender in Indian History up to 1500 CE

DSE V: History of the USA: Reconstruction to New Age Politics

DSE VI: History of the USSR: The Soviet Experience (c. 1945-1991)

DSE VII: History of Latin America, c.1500-c.1960s

DSE VIII: Gender in Indian History, c. 1500-1950

DSE IX: History of Modern China (c. 1840s-1950s)

DSE X: The Making of pre-Colonial Southeast Asia

DSE XI: Global Ecological Histories

DSE XII: History of Modern Japan (c. 1868-1950s)

DSE XIII: History of Southeast Asia: Colonial to the Post Colonial

DSE XIV: The Making of Contemporary India (c. 1950-1990s)

Generic Electives:

GE I: Delhi through the Ages: The Making of its Early Modern History

GE II: Science, Technologies and Humans: Contested Histories

GE III: The World After 1945

GE IV: History and Culture: Representations in Texts, Objects & Performance

GE V: Politics of Nature

GE VI: Making of Post Colonial India

GE VII: Religion and Religiosity

GE VIII: Inequality and Difference

GE IX: Delhi through the Ages: From Colonial to Contemporary Times

Skill Enhancement Courses:

SEC I: Understanding Heritage

SEC II: Archives and Museums

SEC III: Indian Art and Architecture

SEC IV: Understanding Popular Culture

SEC V: Historian's Craft

SEC VI: History, Sociology and Anthropology

7.1 Course Learning Objective

The three year undergraduate programme with honours offered by the Department of History in various colleges of the University of Delhi aims to familiarise students with significant developments in the history of South Asia and certain other parts of the world, through different time periods. While the primary focus remains on the Indian subcontinent, students also study about other parts of the world, European as well as non-European. The course aims to make the students challenge the idea of history as seamless, or historical knowledge as a fixed/finished product that the textbooks at the school level create. It seeks to expose students to various problems and conflicts that are an inherent part of the historical exercise of reconstructing the past. The purpose is to sensitize students to the existence and desirability of multiple perspectives through which knowledge about the past is constructed. Probably the most important goal is to enable students to cultivate a historically sensitive way of thinking with due regard to time, place, context and roles of human agencies involved. Thus, the students are encouraged to think critically, analyse different perspectives and actively process information about the past rather than become passive recipients of singular historical knowledge. In the process of helping them achieve the above goals, we hope to enable them to engage critically with the extant historical scholarship in the field, available in the form of secondary texts. By the end of the three years of the undergraduate programme, the students would have obtained elementary ideas of some of the more important issues that crop up in a historian's reading and interpretation of primary sources. Certain thematic courses like those on gender and environment are designed to sensitise students to contemporary concerns and equip them with the theoretical foundations so that they can formulate and pose relevant questions to the sources.

In the course of their engagement with historical material, we also aim to equip students with an 'appropriate' vocabulary of the discipline, while sensitising them to the importance of specific terminology, such that they may be able to articulate their own complex ideas regarding various themes in History. The objective is that they should be able to do this through their written work – essays, projects, research papers, etc. as well as in the

oral form – presentations, debates and discussions. It is also intended that while doing so students should be able to formulate cogent arguments, presenting the necessary evidence to establish these, all based on a training in the rigorous methods of the discipline of History.

Besides these objectives regarding the intellectual development of the pupil, the larger goals of this programme are those that are common to any other educational programme, particularly in the field of humanities and social sciences. These are goals such as developing a sense of active citizenship, making responsible political choices and democratic conduct in public life. The programme also aims to enable them to intervene meaningfully in debates regarding matters of public concern, while developing the ability to generate public opinion on the same. The objective is also to inculcate a humanitarian spirit within learners, such that they may develop empathy and compassion, while being discerning critical thinkers, all at the same time.

Graduates of the department do often branch out to different spheres of knowledge, and domains of professional work, besides pursuing higher studies within the discipline. It is expected that besides the skills specific to the discipline, these wider life skills of argumentation and communication, attitudes and temperaments, would ultimately enable learners to live rich, productive and meaningful lives.

7.2 Course Learning Outcomes

After completing the undergraduate programme in History, the student is expected to:

A. Construct historical narratives

- Describe significant developments within the historical contexts, covered in the syllabus,
- Identify and analyse the significance of historical changes that take place within a society or culture,
- Explain the patterns of such transitions,

- Assess patterns of continuities within such historical contexts.

B. Formulate arguments based on a historiographical engagement

- Formulate, sustain, and justify a historical argument,
- Support and establish such arguments with historical evidence drawn mainly from secondary sources and wherever possible also from primary sources,
- Situate historical arguments within a larger scholarly narrative,
- Explain that while chronology and knowledge of the basic facts of history are necessary, the study of history involves critical evaluation and processing of those facts to arrive at coherent interpretations of the past,
- Exhibit a familiarity with “the historian’s craft” – methods and rigours of the discipline.

C. Engage with scholarly writings and presentations

Abstract the main arguments/concepts/ideas embedded in scholarly writings in History,

Comprehend, and explain the structure of arguments and claims made in such writings,

Note the empirical evidence used to establish such claims.

D. Answer questions, write essays and research papers

Access and identify reliable and appropriate source materials,

Evaluate source materials,

Incorporate ideas from these sources,

Synthesize arguments and facts culled from scholarly writings,

Articulate a persuasive and well-structured historical argument on the basis of such synthesis,

Employ multiple forms of evidence in this historical argument,

Formulate relevant and meaningful historical questions,

Read and interpret primary sources, at least at an elementary level, wherever there is an opportunity or requirement,

Interpret appropriately and answer questions based on the above,

Write clear, cogent, and well – researched essays and academic papers, to make an argument based on appropriate evidence about a selected topic or question in history (evidence could include secondary and/or primary sources), avoiding plagiarism,

Use proper citations and footnotes within formal written assignments,

Deliver presentations based on such well – researched material orally as well,

Participate in debates and other forms of verbal historical discussion.

E. Work collaboratively

Make presentations,

Listen attentively to presentations made by peers,

Participate in discussion and ask thoughtful questions,

Provide formal feedback to peers in the course of such discussion,

Learn the formal protocol of academic engagement in a seminar and conference.

7.3 Course Teaching-Learning Process

The pedagogic methods adopted for the History (Honours) programme involves direct lectures, tutorial discussions, as well as technology-supported presentations. We believe that education is interactive and all sessions between students and teachers are based upon reciprocity and respect.

1) The lectures (of one hour each) delivered to one whole class at a time systematically deal with the themes of the syllabus. This constitutes the core of the teaching-learning process. The students are provided with bibliographic references and encouraged to go through at least some readings so that they could be more interactive and ask more relevant questions in the class.

2) For tutorials, the class is divided up into smaller groups of eight to ten students who interact with the respective teacher once every week for each course. Teaching in the tutorial sessions is customized to the specific needs of the individual students, where the

latter can raise a series of questions ranging from what s/he could not follow in the class, the everyday implications of what the teacher said in the lectures or what the student read in a prescribed reading, and so forth. Indeed, tutorial discussions are a crucial and indispensable part of the teaching learning process of History Honours in colleges. This is the site where the teachers and students are able to establish a more relaxed relationship that go a long way in creating the ideal atmosphere for free and fearless exchange of ideas and information. Tutorials are also the place where a teacher may also keep an eye over the social dynamics among the students and ensure that nobody feels marginalized or side-lined in the class due to gender, region, class or any other reason.

3) Wherever needed, teachers use audio-video based technological devices (e.g. Power Point) to make their presentations more effective. Some courses require that students see a documentary or feature film and course themes are structured so that discussions of these will further nuance the critical engagement of students with ideas introduced in their textual materials.

7.4 Assessment Methods

Graded assessment of all papers is broadly carried out in two forms:

- a) There is an end of semester [theory] examination which covers the entire syllabus. Students are asked eight questions in Core, DSE, GE and SEC papers and are required to answer four in three hours. The end of semester examination comprises 75% of the final grade.
- b) The second assessment is through internal evaluation of term papers, presentations, exams, and project work which is carried out throughout the term and comprises 25% of the final grade.

8. Keywords

Pleistocene, Hominines, Hunter-gatherers, Palaeolithic, Prehistoric art, Holocene, Mesolithic, Neolithic Revolution, Complex Society, Food-production, Lithic technologies,

Urban Revolution, State, Kingship, Bronze Age, *Itihas-Purana* tradition, History, Civilization, Culture, Aryan, Social Stratification, Megaliths, Urbanization, Early Historical Period, Early-Medieval Period, Second Urbanization, *Mahajanapada*, *Ganasangha*, *Dhamma*, *Tinai*, *Varna*, *Jati*, Untouchability, *Varnasankara*, *Sreni*, Buddhism, Jainism, *Stupa*, *Dravida*, *Nagara*, Gandhara art, Mathura Art, Indian feudalism, Integrative Model, *Brahmadeya*, Puranic Hinduism, Patronage, Inscriptions, Ghaznavids, Cholas, Rajputs, Agriculture, Maritime Trade, Architecture, Bhakti, Sufis, Polis, Roman Empire, Slavery, Three orders, Chivalry, Church, Serfdom, Seigniorial authority, Crisis of feudalism, Rise of Islam, Ummayyads, Abbasids, Caliphate, Muhammad, Eurocentrism, Colonialism, Renaissance, Humanism, Reformation, Commercial Revolution, *Ta'rikh*, Delhi Sultans, Kakatiyas, Vijayanagara, Agricultural Production, Modern Science, Mercantilism, Enlightenment, Industrial Revolution, Divergence debate, Unification of Germany and Italy, Balkan Nationalism, Tsarist Russia, Russian Revolution, Imperialism, Fascism, Nazi, New public Sphere, Art, Anthropology, Psychology, Russian Revolutions 1917, Peasants, Literature, Bolsheviks, Soviet System, Nationalities Question, Gender, household, power, politics, literary representations, Capitalism, Populism, Progressivism, New Deal, Civil Rights Movement, Korea, Cuba, Mining, Labour, Slavery, Trans Atlantic Commerce, Christianity, Social Hierarchies, Race, Sports, Haram, Masculinities, Sexualities, Class, Caste, Love, Popular Culture, Partition, China, Nationalism, Canton, Opium, Communism, Mao, KMT, CCP, Peasantry, Reform, Revolt, Revolution, Sun Yat-sen, Imperialism, Confucianism, Great divergence, Warlords, Peasant nationalism, Soviets, Pagan Srivijaya, Indian Ocean, Art, Architecture, Energy Regimes, Industrialisation, Urban Landscapes, Anthropocene, Ecological Histories, Constitution, Nation, Linguistic Reorganisation, Economic Development, Five Year Plans, Foreign Policy, Congress Party, Left Parties, Naxalbari, J.P. Movement, Regional Politics, Mandal Commission, Women, Jan Sangh, BJP, Popular Movements, Northeast, Judiciary, Media, Progressive Artist Group, Sports, Indian National Congress, Myth, history, settlements, cityscape, morphology, Delhi, hegemony, De-colonisation, Cold War, Apartheid, Environment, Feminism, Welfare State, Student Movements, Arab Spring, Cinema, Sports, Food, *Bhand*, *Vidushak*, *Kullu*, Masks, Puppets, *Tolu BommaluKattu*, Scrolls, *Patikam-Patuvar*, Muharram, Kathakali, Fossil, Ecological Imperialism, Inequalities, Anthropol-

cene, Capitalocene, the Emergency, Mandal, Judicial activism, popular cinema, Manuscripts, National Archives, Cataloguing, Artefacts, Indian Art, Sculpture, Gandhara, Mathura, Chola Bronze, Architecture, Sanchi, Dravida and Nagara, Jama Masjid, Humayun's Tomb, Dargahs Paintings, Murals, Ajanta, Miniature, Mughal, Kangra, Raja Ravi Verma, Amrita Sher-Gil, M.F. Husain, Oral Traditions, Ritual Practices, Religion, Environment

Discipline Core Courses

Core Course I

History of India- I

Course Objectives:

Being the first paper of the History Honours course, it intends to provide an extensive survey of early Indian history to the students and familiarise them with the tools of studying ancient Indian history. The inter-disciplinary approach of the course provides the students a point of beginning from where they can build an understanding of the discipline of history. Spanning a very long period of India's ancient past – from pre-historic times to the end of Vedic cultures in India – the course dwells upon major landmarks of ancient Indian history from the beginning of early human hunter gatherers to food producers. This course will equip the students with adequate expertise to analyse the further development of Indian culture which resulted in an advanced Harappan civilization. In course of time students will learn about the processes of cultural development and regional variations.

Learning Outcomes:

After completing the course the students will be able to:

- Discuss the landscape and environmental variations in Indian subcontinent and their impact on the making of India's history.
- Describe main features of prehistoric and proto-historic cultures.
- List the sources and evidence for reconstructing the history of Ancient India
- Analyse the way earlier historians interpreted the history of India and while doing so they can write the alternative ways of looking at the past.
- List the main tools made by prehistoric and proto- historic humans in India along with their find spots.
- Interpret the prehistoric art and mortuary practices.
- Discuss the beginning and the significance of food production.
- Analyse the factors responsible for the origins and decline of Harappan Civilization.
- Discuss various aspects of society, economy, polity and religious practices that are reflected in the Early Vedic and Later Vedic texts.
- Describe the main features of the megalithic cultures of the Central India, Deccan and South India.

Course Content:

Unit I: Reconstructing ancient Indian history

- [a] The Indian subcontinent: landscapes and environments
- [b] Sources of historical reconstruction (up to 600 BCE)
- [c] Changing historiography
- [d] Early Indian notions of history

Unit II: Prehistoric hunter-gatherers

- [a] Palaeolithic cultures: sequence and distribution; Tool typology and technology and subsistence pattern
- [b] Mesolithic cultures: regional and chronological distribution; new developments in technology and economy
- [c] The prehistoric mind: funerary practices and art

Unit III: The advent of food production

The regional and chronological distribution of the Neolithic and Chalcolithic cultures; subsistence; patterns of interaction and exchange

Unit IV: The Harappan civilization

Origins; settlement patterns and town planning; agrarian base; craft production and trade; social and political organization; religious beliefs and practices; art; the problem of urban decline and the late/post-Harappan traditions

Unit V: Cultures in transition up to c. 600 BCE

Settlement patterns; technological and economic developments; social stratification; political relations; religion and philosophy; the Aryan question; megaliths

- a) North India
- b) Central India, the Deccan and South India

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I: This unit aims to familiarise students with the varied sources for, divergent landscapes of and the various approaches to the history of ancient India. **(Teaching Time: 2weeks Approx.)**

- Allchin, B., and R. Allchin.(1997).*Origins of a Civilization: The Prehistory and Early Archaeology of South Asia*. New Delhi: Viking. (Chapters- 1 & 2.)

- Arunachalam, B. (2013). “Geography and Environment” in *Prehistory of India, A Comprehensive History of India*, vol. 1, Part 1. New Delhi: Manohar Publishers. (Chapter 1, pp. 21-28.)
- Singh, Upinder. (2008). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. Delhi: Pearson Longman. (Introduction and Chapter 1.) (Available in Hindi)
- Thapar, Romila. (2013). *The Past Before Us; Historical Traditions of Early India*, Delhi: Permanent Black, Part 1, pp. 3-84.

Unit II: This unit aims to familiarise students with the distribution of as well as the economic and technological patterns in the Palaeolithic and Mesolithic cultures of the Indian subcontinent. It also enables students to describe some of their cultural practices especially with regard to their art and funerary practices. **(Teaching Time: 3 weeks Approx.)**

- Allchin, B., and R. Allchin. (1997). *Origins of a Civilization: The Prehistory and Early Archaeology of South Asia*. Delhi: Viking. (Chapters 3, 4 & 5.)
- Chattopadhyaya, U. C. (1996). “Settlement Pattern and the Spatial Organization of Subsistence and Mortuary Practices in the Mesolithic Ganges Valley, North-Central India, *World Archaeology*, vol. 27(3), pp. 461-476
- Singh, Upinder. (2008). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. Delhi: Pearson Longman. (Chapter 2, pp. 58-93.) (Available in Hindi)
- Neumayer, Erwin. (2014). “Rock Paintings of the Mesolithic Period” in Shonaleeka Kaul (Ed.). *Cultural History of Early South Asia: A Reader*. Delhi: Orient Blackswan. Pp. 55-88.

Unit III. This unit seeks to understand the beginnings of organized food production in the pre-historic times in the Indian subcontinent. It also explains the ways in which that could leave its impact on other aspects of the life of the Neolithic and Chalcolithic men and women. **(Teaching Time: 3 weeks Approx.)**

- Allchin, B., and R. Allchin. (1997). *Origins of a Civilization: The Prehistory and Early Archaeology of South Asia*. New Delhi: Viking. (Chapter 5.)
- Chakrabarti, D.K. (1999). *India: An archaeological History, Palaeolithic Beginnings to Early Historic Foundations*. Delhi: Oxford University Press. PP. 41-116.
- Singh, Upinder. (2008). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. Delhi: Pearson Longman. (Chapter 3, pp. 94- 131.) (Available in Hindi)

Unit IV. At the end of this unit, students shall be familiar with various aspects of Harappan Civilization as well as the varied ways in which the archaeological remains of Harappa and related sites have been interpreted and studied. **(Teaching Time: 3 weeks Approx.)**

- Allchin, B., and R. Allchin.(1997).*Origins of a Civilization: The Prehistory and Early Archaeology of South Asia*. New Delhi: Viking. (Chapters 6,7,8,9 & 10, pp. 113- 222)
- Chakrabarti, D.K. (1999). *India: An Archaeological History*. Delhi: Oxford University Press. (Chapters V and VI. pp.151-261)
- Lahiri, Nayanjot, ed. (2000).*The Decline and Fall of the Indus Civilization*, Delhi: Permanent Black. ('Introduction', pp.1-33.)
- Ratnagar, Shereen. (2001).*Understanding Harappa: Civilization in the Greater Indus Valley*. Delhi: Tulika, pp. Pp. 6-42, 103-115, 122-152.
- Singh, Upinder. (2008).*A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. Delhi: Pearson Longman.(Chapter 4, pp. 132- 181.) (Available in Hindi)
- Thaplyal, K. K. and Sankata Prasad Shukla.(2003). *Sindhu Sabhyata* (सिंधु सभ्यता). Lucknow: Uttar Pradesh Hindi Sansthan. (In Hindi) PP. 25-107, 157- 226, 262-276, 292- 315, 354-363

Unit V. This unit seeks to understand the post-Harappan patterns of settlement and civilisation up to 600 BC in the Indian subcontinent. It should equip students with the ability to explain the patterns of development in the religio-philosophical, political and technological spheres, and would familiarise them with social, economic, and cultural life of people during this period.**(Teaching Time: 3 weeks Approx.)**

- Allchin, Bridget and Raymond.(1982).*The Rise of Civilization in India and Pakistan*. Cambridge: Cambridge University Press, Part III. Pp. 229- 346.
- Sahu, B.P. (ed.). (2006). *Iron and Social Change in Early India*. Delhi: Oxford University Press. (Introduction pp.1-31.)
- Sharma, R.S. (1996).*Aspects of Political Ideas and Institutions in Ancient India*. Delhi: Motilal Banarsidas. (Chapters VII-XIV pp.87-196 and XXII pp. 349-370) (Also available in Hindi)
- Sharma, R.S. (1983).*Material Culture and Social Formations in Ancient India*, Macmillan India, Delhi. (Chapters 2, 3, 4 and 5. Pp. 22- 88) (Also available in Hindi)
- Singh, Upinder.(2008).*A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. Delhi: Pearson Longman. (Chapter V, pp. 182-255.) (Also available in Hindi)
- Thapar, Romila.(1984).*From Lineage to State: Social Formations in the Mid-First Millennium B. C. In the Ganga Valley*. Delhi: Oxford University Press. (Chapter 2, pp. 21-69.) (Also available in Hindi).
- Trautmann, T.R. (ed.) (2005). *The Aryan Debate*. New Delhi: Oxford University Press. (PP. xi – xliii.)

Suggested Readings:

- Allchin, F.R. *et al.* (1995). *The Archaeology of Early Historic South Asia: The Emergence of Cities and States*. Cambridge: Cambridge University Press. (Chapter 6.)
- Chakrabarti, D.K. (2006). *The Oxford Companion to Indian Archaeology: The Archaeological Foundations of Ancient India*. Delhi: Oxford University Press.
- Dhavalikar, M. K. (ed.) (2013). *Prehistory of India: A Comprehensive History of India*, vol. 1, Part 1. Delhi: Manohar.
- Habib, Irfan & Faiz Habib. (2012). *Atlas of Ancient Indian History*. Delhi: Oxford University Press.
- Habib, Irfan. (2001). *Prehistory*, Delhi: Tulika. (Available in Hindi Also)
- Habib, Irfan. (2002). *The Indus Civilization*. Delhi: Tulika.
- Jain, V. K. (2006). *Prehistory and Protohistory of India: An Appraisal*. Delhi: Printworld. (in Hindi Also)
- Kenoyer, J. Mark. (1998). *Ancient Cities of the Indus Valley Civilization*. Karachi: Oxford University Press.
- Kosambi, D.D. (1956). *An Introduction to the Study of Indian History*. Bombay: Popular Prakashan.
- Moorti, U.S. (1994). *Megalithic Culture of South India: Socio-economic Perspectives*. Varanasi: Ganga Kaveri Publishing House.
- Neumayer, E. (1993). *Lines on Stone: The Prehistoric Rock Art of India*. Delhi: Manohar.
- Pathak, V. S. (1966). *Ancient Historians of India: A Study in Historical Biographies*. Bombay: Asia Publishing House.
- Possehl, Gregory L. (2002). *The Indus Civilization: A Contemporary Perspective*. Delhi: Vistaar Publications.
- Ratnagar, Shereen. (2015). *Harappan Archaeology: Early State Perspectives*, Delhi: Primus.
- Subbarao, Bendapudi. (1958). *The Personality of India: Pre and Proto-Historic Foundations of India and Pakistan*. Baroda: University of Baroda.
- Thapar, Romila. (2000). *Cultural Pasts: Essays in Early Indian History*. Delhi: Oxford University Press. (Chapters 7, 8 and 16.)
- Wright, Rita P. (2010). *The Ancient Indus: Urbanism, Economy, and Society*. Cambridge: Cambridge University Press.

Teaching Learning Process:

Classroom lecture and discussion method, problem solving method, question - answer method, group discussion method and discussion following student presentations in class and/or in tutorial classes will form the basis of teaching learning process. Presentations shall focus either on important themes covered in the class lectures, or around specific readings. Supporting audio-visual aids like documentaries and power point presentations will be used wherever necessary in order to augment the effectiveness of the methods used in classrooms. Overall, the Teaching Learning

Process shall emphasise the interconnectedness of themes within the different rubrics to build a holistic view of the time period/region under study. The process shall consistently underline the ways in which various macro and micro-level developments/phenomena can be historicised.

Assessment Methods:

Students will be regularly assessed for their grasp on themes through debates and discussions covered in class. Two written assignments and at least one presentation will be used for final grading of the students. Students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, i.e. being able to explain important historical trends and trace historiographical changes reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Itihas-Purana tradition, Changing Historical Interpretations, Hunting-gathering Stage, Tool Technologies, Food production, Civilization, Culture, Aryan, Social Stratification, Megaliths, Urbanization.

Core Course II

Social Formations and Cultural Patterns of the Ancient World-I

Course Objectives:

The Course aims to introduce students to significant developments in world history that have shaped the complexity of human existence. To begin with, it offers a historical survey of human evolution. It details the transition from the hunting-gathering subsistence pattern to a more advanced adaptations to a sedentary farming economy. The course content is based on the premise that the pace and nature of change differed in different parts of the world. Further, changes in social formations that facilitated the emergence of socially stratified and state-ordered societies are explained through a study of some of the early Bronze Age Civilizations. The impact of specific ecological conditions on different trajectories of growth, higher population density and social complexity, the emergence of the city and newer crafts and trade and the unfolding of cultural patterns in the early civilizations are concerns that are central to this course. This therefore, provides a sound foundation in the historical discipline, and helps in engaging in a variety of subject matters of history – social relations, economics, political formations, religion, and culture from a global perspective. Understanding the dissimilar but interlinked history of humanity is therefore the prime objective of this Course.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Trace long term changes in the relationship of humans to their landscapes, to resources and to social groups.
- Discuss that human history is the consequence of choices made in ecological and biological contexts, and that these choices are not only forced by external forces like environmental change but are also enabled by changes in technology and systems of cultural cognition.
- Delineate the significance of early food production and the beginning of social complexity.
- Analyse the process of state formation and urbanism in the early Bronze Age Civilizations.
- Correlate the ancient past and its connected histories, the ways in which it is reconstructed, and begin to understand the fundamentals of historical methods and approaches.

Course Content:

Unit-I: Evolution of humankind and Palaeolithic cultures

- a. Comprehending prehistory and history: issues and interpretative frameworks
- b. Environmental context of human evolution

- c. Biological evolution of hominins
- d. Social and cultural adaptations: mobility and migration; development of lithic and other technologies; changes in the hunting gathering economy; social organization; art and graves.

Unit-II: Understanding the Mesolithic

- a. Mesolithic as a transitional stage in prehistory
- b. Ecological change and changes in subsistence strategies based on case studies from West Asia, Europe and Meso-America: seasonal and broad-spectrum exploitation of resources, food storage, tools, semi-sedentism and features of social complexity

Unit-III: The Neolithic

- a. Debating the origins of food production – climate change; population pressure; ecological choices; cognitive reorientations
- b. Features of the Neolithic based on sites from West Asia, Europe and China: nature and size of settlements; tool-kits, artefacts and pottery; family and household
- c. Features of social complexity in late Neolithic communities; ceremonial sites and structures

Unit-IV: The Bronze Age

Note: Rubrics b, c and d are to be based on any one case study:

Ancient Mesopotamia (Sumerian and Akkadian period)/Egypt (Old Kingdom)/China (Shang dynasty).

- a. Concepts: 'Bronze Age', 'Civilization' 'Urban Revolution' and 'State'
- b. Ecological context of early civilizations
- c. Aspects of social complexity: class, gender and economic specialization
- d. Forms of kingship, religion and state

Unit V: Nomadic Pastoralism: Concept of Pastoralism; Emergence in West Asia and interaction with urban-state societies between the third and second millennium

Unit-VI: The Advent of Iron: Spread of iron technology and complex technological and economic changes

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: This Unit introduces students to the basic aspects of world prehistory particularly with reference to the debate on the biological and cultural evolution of Hominines. **(Teaching Time: 3 weeks Approx.)**

- Bogucki, P. (1999). *The Origins of Human Society*. Wiley-Blackwell 1999, Chapter 2, pp. 29-77.
- Carr, E.H. (1961/1991). "The Historian and his facts", in E.H. Carr, *What is History?* Penguin Modern Classics (2ndEdn.), pp.7-30.
- Childe, V.G. (1942/1971). "Archaeology and History", Chapter 1, in V.G. Childe, *What Happened in History?* Great Britain: Pelican, 1942, reprint 1971, pp. 13-32.
- Fagan, B.M. and N. Durrani. eds. (2019). *The People of the Earth: An Introduction to World Pre-history*. (15thedn.). New York: Routledge, Chapters 2-5, pp. 22-134.
- Website: www.humanorigins.si.edu (website of the Smithsonian Museum)
- कार, E.H.(1976). 'इतिहासकर और उसके तथ्य', E.H. कार, इतिहास क्या है? में अध्याय 1, मेकमिलन पब्लिकेशन (हिन्दी अनुवाद, 1976).
- चाइल्ड, V.गॉर्डन, इतिहास का इतिहास, राजकमल प्रकाशन, अध्याय 1.
- चाइल्ड, V.गॉर्डन. (2019) औजारों का इतिहास (अनुवाद सुशील कुमार), दिल्ली: गार्गी प्रकाशन.
- फ़ारुकी, A. (2015). प्राचीन और मध्यकालीन सामाजिक संरचनाएँ और संस्कृतियाँ, दिल्ली: मानक प्रकाशन.
- मजूमदार, D.N तथा गोपाल शरण, प्रागितिहास, दिल्ली विश्वविद्यालय, हिन्दी माध्यम कार्यान्वयन निर्देशलय.

Unit II. This Unit will familiarise students with a significant stage in prehistory called the Mesolithic when advanced Hunter-Gatherer communities responded to environmental changes with greater sedentism and newer ways of exploiting plants and animals. **(Teaching Time: 3 weeks Approx.)**

- Bogucki, P. (1999). *The Origins of Human Society*. Massachusetts: Blackwell, pp. 127-159.
- Price, T.D. (1991). "The Mesolithic of Northern Europe", *Annual Review of Anthropology*, Vol. 20, pp.211-233.
- Shea, J. J. and D.E. Lieberman. (2009). eds. *Transitions in Prehistory. Essays in Honour of Ofer Bar-Yosef*. Oxbow Books, pp. 185-222
- Zvelebil, M. (1989). "Economic Intensification and Postglacial Hunter-Gatherers in North Temperate Europe." in C. Bonsall, (Ed). *The Mesolithic in Europe*. Edinburgh: University of Edinburgh Press 1989, pp. 80-88.
- फ़ारुकी, A. (2015). प्राचीन और मध्यकालीन सामाजिक संरचनाएँ और संस्कृतियाँ, दिल्ली: मानक प्रकाशन.

Unit III. This Unit deals with the debate on the beginning of agriculture and related changes in the subsistence pattern and ways of life. **(Teaching Time: 3 weeks Approx.)**

- Cohen M. (2009). 'Introduction. Rethinking the Origins of Agriculture'. October 2009, *Current Anthropology*. 50 (5), pp.591-595.
- Fagan, B.M. and N. Durrani. (2019). *The People of the Earth: An Introduction to World Pre-history*. New York: Routledge (15th Ed.), Chapters 8, 9, 10, 12, pp. 178-218, 228-245.

- Hodder, I. (2007). "Catalhoyuk in the context of Middle Eastern Neolithic", *Annual Review of Anthropology*, Vol. 36, 2007, pp. 105-120.
- Price, T.D. and O. Bar-Yosef.(2011). "The Origins of Agriculture: New Data, New Ideas", An Introduction to Supplement 4. *Current Anthropology*, Vol. 52, No. S4, October 2011, pp. S163-S174.
- Wenke, R.J. and D. Olzewski. (2007). *Patterns in Prehistory: Humankind's First Three Million Years*. New York: Oxford University Press, pp. 228-268.
- फ़ारूकी, A. (2015). प्राचीन और मध्यकालीन सामाजिक संरचनाएँ और संस्कृतियाँ, दिल्ली: मानक प्रकाशन.

Unit IV. This Unit will enable students to contextualize the beginning of urban settlements, appearance of complex society and state with reference to some of the early civilisations of the world. **(Teaching Time: 3 weeks Approx.)**

- Childe, G. (1950). "The Urban Revolution, " *The Town Planning Review*, Vol. 21, No. 1, April 1950, pp. 3-17.
- Redman, C.L. (1978). *The Rise of Civilisations. From Early Farmers to Urban Society in the Ancient Near East*. San Francisco: W.H. Freeman, Chapter 2, 6, 7, pp. 16-49; 188-213; 214-243.
- Scarre, Christopher and Brian M. Fagan. (2008). *Ancient Civilizations* (3rdedn.), New Jersey: Pearson/Prentice Hall, pp. 3-12, and pp. 26-47.
- Whitehouse, R. (1977). *The First Civilizations*. Oxford: Phaidon, Chapters 1 and 9, pp 7-15 and 177-199.
- फ़ारूकी, A. (2015). प्राचीन और मध्यकालीन सामाजिक संरचनाएँ और संस्कृतियाँ, दिल्ली: मानक प्रकाशन.

Mesopotamia

- Nissen, H.J. (2003). *The Early History of the Ancient Near East, 9000-2000 B.C.* Oxford and Victoria: Blackwell.
- Redman, C.L. (1978). *The Rise of Civilisations. From Early Farmers to Urban Society in the Ancient near East*. San Francisco: W.H. Freeman, Chapters 8, pp. 244-322.
- Roux, Georges (1992). *Ancient Iraq*, UK: Penguin, Chapters 1, 5, 6, 8, 9; pp. 1-16; pp. 66-103; 122-160.
- Whitehouse, R. (1977). *The First Civilizations*, Oxford: Phaidon, Chapters 3, 4, 5, pp 33-115.

OR

China

- Chang, K.C. (1987). *Shang Civilization*. New Haven, Conn: Yale University Press, pp. 263-288.
- Feng, Li. (2013). *Early China*, Cambridge: Cambridge University Press, pp. 1-111.

- Keightly, D.N. (1999). "The Shang. China's First Historical Dynasty" in Michael Loewe and Edward L. Shaughnessey. (Ed.). *The Cambridge History of Ancient China. From the origins of Civilization to 221 B.C.* Cambridge: Cambridge University Press, 1999.
- Thorp, R. L. (2006). *China in the Early Bronze Age. Shang Civilization.* Pennsylvania: University of Pennsylvania Press.

OR

Egypt

- Hawkes, J. (1973). "Egypt: the beginnings and the Old Kingdom" in *The First Great Civilisations: Life in Mesopotamia, the Indus Valley and Egypt*, New York: Knopf/Random House, pp. 285-299.
- Trigger, B.G., B.J. Kemp, D. O'Connor and A.B. Lloyd. (1983). *Ancient Egypt A Social History.* Cambridge: Cambridge University Press, Chapters 1 & 2, pp. 1-43.
- Wilkinson, T. (2010). *The Rise and Fall of Ancient Egypt: The History of a Civilisation from 30,000 BC to Cleopatra.* London: Bloomsbury Publishing, pp. 13-114.
- Silverman, D. P. (Ed.). (2003). *Ancient Egypt.* New York: Oxford University Press (Ed.) pp. 10 - 27.

Unit V. This unit will discuss pastoralism as a conceptual social category and enlarge on its evolution in Western Asia. The unit will also discuss the relationship of pastoralism with sedentary regimes and urban-state societies in the third and second Millenium BCE. **(Teaching Time: 1 week Approx.)**

- Sherratt, A. "Sedentary Agriculture and nomadic pastoral populations." in *History of Humanity: from the third millennium to the seventh century BCE, vol. II*, (Ed.) S.J. de Laet. London: Routledge, pp. 37-43.
- Lees, S. And D.G. Bates. (April 1974), "The Emergence of Specialised Nomadic Pastoralism: A Systemic model," *American Antiquity*, Vol. 39, No. 2, pp. 187-193.

Unit VI: This Unit highlights the discussion on the introduction of iron technology and the impact that it had on parts of West Asia and Europe. **(Teaching Time: 1 week Approx.)**

- Villard, P. (1996). "The beginning of the Iron Age and its Consequences", in *History of Humanity (Scientific and Cultural Developments) Vol. II. From the Third Millennium to the Seventh Century B.C.* Paris, London: Routledge: UNESCO.
- Maddin, R., J.D. Muhly, T.S. Wheeler (1977). "How the Iron Age Began", *Scientific American*, Vol. 237, No. 4, Oct. 1977, pp. 122-131.

- Cotterell, A. (1985). "The Coming of Iron", in A.Cotterell, *Origins of European Civilization*, London: Michael Joseph/ Rainbird, pp. 118-140.

SUGGESTED READINGS:

- Bar-Yosef, O, and F. Valla. (1990). "The Natufian culture and the origins of the Neolithic in the Levant", *Current Anthropology*, Vol. 31, No. 4, Aug-Oct, pp. 433-436
- Binford, L.R. (1968). 'Post-Pleistocene adaptations' in L. R. Binford and S. R. Binford, eds. *New perspectives in Archaeology*. Chicago: Aldine, pp. 313-342.
- Chang, K.C. (1986). *The Archaeology of Ancient China*, New Haven, Conn: Yale University Press, pp. 234-294.
- Clark, G. (1977). *World Prehistory in New Perspective*, Cambridge: Cambridge University Press (3rd edn.) pp. 1- 61.
- Darwin, C. (1859, 2003). *On the Origin of Species by Means of Natural Selection*, Joseph Carroll Ed. Canada: Broadview Press (2003 edn.) Chapters 1-5/
- Flannery, K.V. (1973). "Origins of Food Production", *Annual Review of Anthropology*, 2 (1973), pp.271- 310.
- Fried, M. (1978). "The State, the Chicken, and the Egg; or, What Came First" in R. Cohen and E. Service Ed. *Origins of the State: The Anthropology of Political Evolution* (Institute for the Study of Human Issues, 1978), pp. 3-47.
- James, T.G.H. (1979, 2005). *The British Museum's Concise Introduction to Ancient Egypt* British Museum Publications, Michigan: University of Michigan Press.
- Johnson, A. W. and Timothy Earle (2000). *The Evolution of Human Societies: From Foraging Group to Agrarian State*, Stanford: Stanford University Press.
- Kemp, B. (1989). *Ancient Egypt. Anatomy of a Civilisation*. London: Routledge.
- Kumar, R. (2018). *Ancient and Medieval World: From Evolution of Humans to the Crisis of Feudalism*, New Delhi: Sage.
- Lamberg-Karlovsky, C.C. and J.A. Sabloff. (1979). *Ancient Civilizations, The Near East and Mesoamerica*. California: Benjamin-Cummings Publishing Company.
- Leakey, R. (1981). *The Making of Mankind*. London: Michael Joseph Limited, 1981, pp. 9 – 183.
- Lerner, G. (1986). *The Creation of Patriarchy*. Oxford University Press, pp. 54-76.
- Lewin, R. (2005). *Evolution: An Illustrated Introduction*. (5th edn.) USA, UK, Australia: Blackwell Publishing, pp. 1-29, 39-55, 60-66, 95-127, 131-156, 159-175, 179-235.
- Lewis-Williams. D. (2002). *The Mind in the Cave: Consciousness and the Origins of Art*, London: Thames and Hudson.
- Maisels, C. K. (1987). "Models of Social Evolution: Trajectories from the Neolithic to the State", *Man*, New Series, Col. 22, No. 2, June, pp. 331-359.
- McAdams, Robert. (1966). *The Evolution of Urban Society: Early Mesopotamia and Prehispanic Mexico*. New Brunswick (USA) and London: Aldine Transaction (Second Reprint 2007).

- Postgate, J.N. (1992). *Early Mesopotamia. Society and Economy at the dawn of history*. London and New York: Routledge, pp. 1- 154.
- Service, E. (1973). *Origins of the State and Civilization. The Process of Cultural Evolutions*: W.W. Norton & Co.
- Sherratt, A. (1996) "Sedentary Agricultural and nomadic pastoral populations' in *History of Humanity: From the third millennium to the seventh century B.C.* vol. II, edited by S. J. de Laet, 37-43, Paris, London: Routledge, UNESCO, pp. 37– 43.
- Starr, H. (2005). "Subsistence Models and metaphors for the Transition to Agriculture in North western Europe", MDIA, Issue Title: Subsistence and Sustenance, Vol.15, no. 1, 2005Ann Arbor, Publishing, University of Michigan Library
[url:http://hdl.handle.net/2027/spo.0522508.0015.103](http://hdl.handle.net/2027/spo.0522508.0015.103).
- Website: www.bradshawfoundation.com
- Wright, G. A. (1992). "Origins of Food Production in Southwestern Asia: A Survey of Ideas", *Current Anthropology, Supplement: Inquiry and Debate in Human Sciences: Contributions from Current Anthropology, 1960-1990*, Vol.33, No. 1, Feb., 1992, pp. 109-139.
- Yoffee, Norman. (2004). *Myths of the Archaic State: Evolution of the Earliest Cities, States and Civilisation*, New York: Cambridge University Press, Chapter 3, pp. 44-90.
- कोरोवकिन, пьотдор. (2019). प्राचीन विश्व इतिहास का परिचय, Delhi: Medha Publishing House.
- राय, U.N. (2017). विश्व सभ्यता का इतिहास, दिल्ली: राजकमल प्रकाशन

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Students shall also be encouraged to participate in talks/seminar presentations by specialists in the field. Since this is a history of a region/s relatively unfamiliar to students, adequate attention shall be given to background introductory lectures and discussions. Overall, the Teaching Learning Process shall emphasise the interconnectedness of themes within the different rubrics to build a holistic view of the time period/region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. Students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Human Evolution, Pleistocene, Hominines, Hunter-gatherers, bands, Palaeolithic, Prehistoric art, Holocene, Mesolithic, Domestication, Neolithic Revolution, Complex Society, Food-production, Lithic technologies, Urban Revolution, 'State', Kingship, Bronze Age.

Core Course III

History of India- II

Course Objectives:

This course is about early historical and early medieval periods of Indian history. It explores the transition from proto-historical to early medieval phase highlighting major changes that shaped the character of the Indian civilization. Highlighting the features of early historic times, the course tries to trace the emergence of state system from tribal stage to 'early-state' stage and at the same time seeks to underline the important developments in the arena of economy, society and culture. The purpose of this course is to familiarise the students with the ways in which historians work with the sources of various kinds and reach at conclusions.

Learning Outcomes:

After completing this course, the students will be able to

- Discuss various kinds of sources that the historians utilize to write the history of early historical and early medieval India.
- Analyse the processes and the stages of development of various types of state systems like monarchy, republican and centralized states as well as the formation of large empires.
- Discuss the ways in which historians have questioned the characterization of the Mauryan state.
- Delineate the changes in the fields of agriculture, technology, trade, urbanization and society and the major points of changes during the entire period.
- Describe the factors responsible for the rise of a good number of heterodox religious systems and adjustments and readjustments by various belief systems.
- Trace the processes of urbanization and de-urbanization & monetization and monetary crisis in early India.
- Analyse critically the changes in the *varna*/caste systems and changing nature of gender relations and property rights.
- Write and undertake projects related to literature, science, art and architecture.

Course Content:

Unit: I. Introducing the early historical: Sources (600 BCE onwards) and historiographical trends

Unit: II. Changing political formations (c. 600 BCE to c. 300 CE)

- [a] The *mahajanapadas*; monarchies and *ganas/sanghas*
- [b] The Mauryan empire: political structure; the nature of *dhamma*
- [c] Post-Mauryan polities with special reference to the Kushanas and the Satavahanas
- [d] Tamilakam

Unit: III. Economy and society (c. 600 BCE to c. 300 CE)

- [a] Expansion of agrarian economy and production relations
- [b] Urban growth: north India, central India, the Deccan and south India; craft production; trade interactions across India, Asia and beyond
- [c] Social stratification: class; *varna*; *jati*; untouchability; gender; marriage and property relations

Unit: IV. Towards early medieval India (c. 4th century to 750 CE)

- [a] Introducing the early medieval: changing perspectives
- [b] The nature of polities: the Gupta empire and its contemporaries; post-Gupta polities -- Pallavas, Chalukyas and Vardhanas
- [c] Agrarian expansion; land grants; changing production relations; graded land rights and peasantry
- [d] Urban patterns; trade and currency
- [e] *Varna*; the proliferation of *jatis*; changing norms of marriage and inheritance

Unit: V. Religion, philosophy and society (c. 600 BCE – 750 CE)

- [a] Shramanic traditions with special reference to Buddhism and Jainism
- [b] Consolidation of the Brahmanical tradition
- [c] Puranic Hinduism

Unit: VI. Cultural developments (c. 600 BCE – 750 CE)

- [a] A brief survey of creative literature; scientific and technical treatises
- [b] Art and architecture; forms of patronage

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I: This unit seeks to take stock of the nature of sources and the historiography for the period between 600 BC to 750 CE. **(Teaching Time: 1week Approx.)**

- Allchin, F. R, *et al.* (1995). *The Archaeology of Early Historic South Asia: The Emergence of Cities and States*. Cambridge: Cambridge University Press. (Chapter 2 pp. 10-25 & chapter 5 pp. 54-72.)
- Chattopadhyaya, B. D. (1994). *The Making of Early Medieval India*, Delhi: Oxford University Press. (Introduction, pp. 1-37.)

- Sharma, R. S. (1995). *Perspectives in Social and Economic History of Early India*. Delhi: Munshiram Manoharlal. (Second edition. See especially, Chapters 16 and 18.)
- Salomon, Richard. (1998). *Indian Epigraphy: A Guide to the Study of Inscriptions in Sanskrit, Prakrit, and the other Indo-Aryan Languages*. New York: Oxford University Press. Chapters 4(pp. 7-71) and 7(226-251).
- Thapar, Romila. (2002). *Reading History from Inscriptions: Professor D. C. Sircar Memorial Lecture Delivered at the University of North Bengal*. Kolkata: K. P. Baghchi. Pp. 1-17

Unit II. This unit would enable students to trace the history of changing political formations in India from the mahajanapadas to the Mauryan and the post-Mauryan states. **(Teaching Time: 3 weeks Approx.)**

- Alcock, Susan E. (et. al.) (2001). *Empires: Perspectives from Archaeology and History*, Cambridge: Cambridge University Press. (Chapter 6, pp. 155- 178.)
- Allchin, F. R. (et al.)(1995). *The Archaeology of Early Historic South Asia: The Emergence of Cities and States*. Cambridge: Cambridge University Press. Chapter 6 (pp.73-98) & Chapter 10 (pp. 185- 221).
- Chattopadhyaya, B.D. (2003). *Studying Early India: Archaeology, Texts, and Historical Issues*. Delhi: Permanent Black. Chapter 3 (pp.39-47).
- Gurukkal, Rajan.(2010). *Social Formations of Early South India*. Delhi: Oxford University Press. (Chapters 6 and 7 pp.136-165.)
- Sharma, R.S. (1996). *Aspects of Political Ideas and Institutions in Ancient India*. Delhi: Motilal Banarsidas. (Chapters XV(pp.197-232), XVIII (pp. 275-290), XIX (pp.291-310), XX (pp. 311-320, XXIII (pp.371-402) (Available in Hindi also)
- Singh, Upinder.(2008). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. Delhi: Pearson Longman. (More relevant parts are Chapters 6, 7 and 8) (Also available in Hindi)
- Thapar, Romila. (1987). *Mauryas Revisited*. In Romila Thapar, *Cultural Pasts: Essays in Early Indian History*. Delhi: OUP. PP. 462-488.(Available in Hindi also)
- Thapar, Romila. (2012). *Asoka and the Decline of the Mauryas*. Delhi: Oxford University Press. PP. 119-227.(Also available in Hindi)

Unit III. This unit will apprise students of the socio-economic developments up to 300 CE, with particular attention to agrarian relations and production as well as varna, jati, gender and class relations. **(Teaching Time: 3 weeks Approx.)**

- Allchin, F.R. et al. (1995). *The Archaeology of Early Historic South Asia: The Emergence of Cities and States*. Cambridge: Cambridge University Press. (Chapters 5,6,7 & 8 PP. 54-151)
- Chakravarti, Uma. (1996). *The Social Dimensions of Early Buddhism*. Delhi: Munshiram-Manoharlal.(Chapters 2,3,4 and 5.pp. 7-149)

- Champakalakshmi, R. (1996). *Trade, Ideology and Urbanization: South India 300BC to AD 1300*. Delhi: Oxford University Press. (Chapters 1 and 2. pp. 24-154)
- Jaiswal, Suvira. (1998). *Caste: Origin, Function and Dimensions of Change*, Delhi: Manohar. (pp.1-131.) (available in Hindi also)
- Sahu, B. P. (2006). *Iron and Social Change in Early India*. Delhi: Oxford University Press. (pp.1-31).
- Sharma, R. S. (1983). *Material Culture and Social Formations in Ancient India*. Delhi: Macmillan. (pp.89-116.) (available in Hindi also).
- Sharma, R. S. (1990). *Sudras in Ancient India: A Social History of the Lower Order Down to circa. A. D. 600*. Delhi: Motilal Banarsidas. (pp. 90-254) (Available in Hindi also).
- Singh, Upinder. (2008). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. Delhi: Pearson Longman. (Chapters 6 and 8.) (Available in Hindi also).

Unit IV. This unit introduces students to the varied perspectives on the early medieval India with regard to the nature of polities, agrarian expansion as well as social and urban processes. **(Teaching Time: 2 weeks Approx.)**

- Chattopadhyaya, B. D. (1994). *The Making of Early Medieval India*. Delhi: Oxford University Press. (Chapters 7 & 8.)
- Roy, Kumkum. (ed.) (2001). *Women in Early Indian Societies*. Delhi: Manohar. (Introduction and pp. 113-122.)
- Sharma, R. S. (1990). *Sudras in Ancient India: A Social History of the Lower Order Down to circa. A. D. 600*. Delhi: Motilal Banarsidas. (pp. 245-326.) (Available in Hindi also)
- Sharma, R.S. (1980). *Indian Feudalism*. Madras: Macmillan. (Chapter 1.) (Also available in Hindi).
- Sharma, R.S. (1996). *Aspects of Political Ideas and Institutions in Ancient India*, Delhi: Motilal Banarsidas. (Chapters XXI, pp.321-348 and XXIII (III, pp. 386-392) (Available in Hindi)
- Singh, Upinder. (2008). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. Delhi: Pearson Longman. (Chapters 9 and 10.) (Available in Hindi also)

Unit V. This unit traces the religious and philosophical developments in the period of study especially with regard to the emergence of the Shramanic traditions and the consolidation of the Puranic tradition. **(Teaching Time: 3 weeks Approx.)**

- Brockington, J.L. (1997). *The Sacred Thread: A Short History of Hinduism*. Delhi: Oxford University Press. (2nd edition). PP.1-129
- Jaiswal, Suvira. (1981). *The Origin and Development of Vaisnavism: Vaisnavism from 200 BC to AD 500*. Delhi: Munshiram Manoharlal. (Chapters 3 (pp.32-115), 6 (pp. 167-228) and 7 (pp. 229-235). (available in Hindi also)

- Shrimali, K. M. (2017). *Prachin Bhartiya Dharmon ka Itihas* (प्राचीन भारतीय धर्मों का इतिहास). Delhi: Granth Shilpi. (In Hindi). PP. 1-80.
- Singh, Upinder. (2008). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. Delhi: Pearson Longman. (Chapters 6,8, 9& 10) (Available in Hindi also)

Unit VI. This unit aims at familiarising students with the salient developments during the period of study in the field of art and literature as well as science and technology. **(Teaching Time: 2 weeks Approx.)**

- Huntington, S. (1985). *The Art of Ancient India: Buddhist, Hindu, Jain*. New Delhi: Weather Hill. (pp. 41-321)
- Basham, A.L. (1954). *The Wonder that was India: A survey of the history and culture of the Indian subcontinent before the coming of the Muslims*. Calcutta: Rupa. pp. 348-507. (Available in Hindi also)
- Singh, Upinder. (2008). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. Delhi: Pearson Longman. (Chapters 7 (pp. 356-366), 8 (pp. 445-471), and 9 (pp. 526- 545) (Available in Hindi also)

SUGGESTED READINGS:

- Chakravarti, R. (2010). *Exploring Early India up to c. AD 1300*. Delhi: Primus. (2016, 3rd edition). [Also available in Hindi]
- Desai, D. (2013). *Art and Icon: Essays on Early Indian Art*. Delhi: Aryan Books International.
- Gethin, Rupert. (1998). *The Foundations of Buddhism*. Oxford: Oxford University Press.
- Habib, Irfan and Faiz Habib. (2012). *Atlas of Ancient Indian History*. Delhi: Oxford University Press.
- Jaini, Padmanabh S. (1979). *The Jaina Path of Purification*. Berkeley: University of California Press.
- Jha, D.N. (ed.) (2003). *The Feudal Order: State, Society and Ideology in Early Medieval India*. New Delhi: Manohar.
- Karashima, N. (ed.) (2000). *A Concise History of South India: Issues and Interpretations*. New Delhi: Oxford University Press.
- Kosambi, D. D. (1956). *An Introduction to the Study of Indian History*. Bombay: Popular Prakashan. (Available in Hindi also)
- Lahiri, Nayanjot. 2015. *Ashoka in Ancient India*. Delhi: Permanent Black.
- Mukherjee, B.N. (1989). *Rise and Fall of the Kushana Empire*. Calcutta: Firma K.L. Mukhopadhyay.

- Olivelle, P. (ed.) (2006). *Between the Empires: Society in India 300 BCE to 400 CE*. New York: Oxford University Press.
- Olivelle, P., J. Leoshko and H.P. Ray. (Eds.) (2012). *Reimagining Asoka: Memory and History*. New Delhi: Oxford University Press.
- Pandey, G. C. (1990). *Bauddha Dharma ke Vikas ka Itihas* (बौद्ध धर्म के विकास का इतिहास) .Lucknow: Uttar Pradesh Hindi Sansthan. (3rd edition)
- Pollock, Sheldon. (2007). *The Language of the Gods in the World of Men: Sanskrit, Culture, and Power in Premodern India*, Delhi: Permanent Black.
- Ray, H.P. (1994). *The Winds of Change: Buddhism and the Maritime Links of Early South Asia*. Delhi: Oxford University Press.
- Ray, H.P. (1986). *Monastery and Guild: Commerce under the Satavahanas*. Delhi: Oxford University Press.
- Roy, Kumkum. (2010). *The Power of Gender & the Gender of Power: Explorations in Early Indian History*. Delhi: Oxford University Press.
- Sahu, B. P. (2015). *Society and Culture in Post-Mauryan India: c. 200 BC- AD 300*. Delhi: Tulika.
- Sharma, R. S. (1987). *Urban Decay in India c.300- c. 1000*. Delhi: Munshiram Manoharlal. (Available in Hindi also).
- Shrimali, K.M. (2007). *The Age of Iron and the Religious Revolution*. Delhi: Tulika.
- Singh, Upinder. (2016). *The Idea of Ancient India: Essays on Religion, Politics, and Archaeology*. Delhi: Sage.
- Thapar, R. (2003). *Early India: From the Origins to AD 1300*. Delhi: Penguin. [Also available in Hindi]
- Thapar, Romila. (1998). *Recent Perspectives of Early Indian History*. Bombay: Popular Prakashan.

Teaching Learning Process:

Classroom lecture method, group discussion,, student presentations in class and/or in tutorials, assignments. Supporting audio-visual aids like documentaries and power point presentations will be used wherever necessary. Overall, the Teaching Learning Process shall emphasise the interconnectedness of themes within the different rubrics to build a holistic view of the time period/region under study. The process shall consistently underline how various macro and micro-level developments/phenomena can be historicised.

Assessment Methods:

Students will be regularly assessed for their grasp through debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the

students. Students will be assessed on their ability to engage with a sizeable corpus of readings assigned to them for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Early Historical Period, Early-Medieval Period, Second Urbanization, *Mahajanapada*, *Ganasangha*, *Dhamma*, *Tinai*, *Varna*, *Jati*, Untouchability, *Varnasankara*, *Sreni*, Buddhism, Jainism, *Stupa*, *Dravida*, *Nagara*, Gandhara art, Mathura Art, Indian feudalism, Integrative Model, Brahmadeya, Puranic Hinduism, Patronage.

Core Course IV
Social Formations and Cultural Patterns of the Ancient and Medieval World-II

Course Objectives:

The Course seeks to develop a historical understanding of the major developments in some parts of the Ancient and Medieval world. These include the process of colonisation undertaken by the Greek city-states (polis) and by Rome and the far-reaching political experiments undertaken here. The Course provides a scope for understanding the subject of slavery in its varied dimensions in the Ancient world and this in turn prepares the students to understand historically the concepts of freedom and bondage as also the larger process of ordering and reordering of society through coercion, consent and revolts. One of the objectives of the course is to highlight the interconnectedness of Greek and Roman religion, culture and society. We discuss the Medieval world in the Course by analysing the nature of European 'feudal' society and economy of the 8th to the 14th centuries. As different sections of society forged newer military and economic ties, the medieval institutions, particularly the Church played an important role in the confirmation of these ties. The European social world shaped into an intricate structure comprising powerful institutions like monarchy and the Church. The Course provides a scope to understand the medieval economy of Western Europe, particularly through its agrarian dimensions and relatively newer labour systems like serfdom. And finally, the Course allows an undergraduate student to reflect on questions related to the emergence and spread of Islam. An enquiry into the role that it played in the transformation of a tribal identity to a Caliphal State in West Asia from the 7th to the 9th centuries widens the quest for 'training' students to understand the long-term historical processes.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Identify the main historical developments in Ancient Greece and Rome.
- Gain an understanding of the restructuring of state and society from tribe-based polities to those based on territorial identity and citizenship.
- Trace the emergence and institutionalisation of social hierarchies and marginalisation of dissent.
- Explain the trends in the medieval economy.
- Analyse the rise of Islam and the move towards state formation in West Asia.
- Understand the role of religion and other cultural practices in community organisation.

Course Content

Unit 1: Ancient Greece and Rome:

- [a] Evolution of the 'polis' and changing political formations in ancient Greece: Athens and Sparta.
- [b] Rome from Republic to Principate (c. 500 BCE- 200 CE)
 - i) Conflict of the Orders: Imperial expansion and social tensions in the Republic
 - ii) The Augustan experiment – the Principate and the crisis in the Empire.
- [c] Slavery in the Ancient Greek and Roman world (emergence, expansion, role and features in Greek society; its role in Roman economy and society).
- [d] Culture and religion in Ancient Greece and Rome

Unit 2: Feudal societies in medieval Europe (8th – 14 centuries)

- [a] The emergence of medieval monarchies, aristocracies and nobilities
- [b] Growth of seigneurial authority: a dependent peasantry and transitions from Colonate to serfdom.
- [c] Early feudal state and the Church
- [d] Cultural Patterns in medieval Europe
- [e] Transitions in the feudal economy from 11th – 14th centuries
 - (i) Agriculture: changes in *serfdom* and *seigneurie*
 - (ii) Growth of trade and towns and their impact
 - (iii) Onset of 'feudal crisis' in 13th and 14th centuries

Unit 3: Early Islamic Societies in West Asia: Transition from tribe to state

- [a] Pre-Islamic tribal society in Arabia
- [b] The Prophet and the *Ummah*
- [c] State formation: The Caliphate – Rashidun, Ummayyads and early Abbasids (c.632 CE to c. 800CE)
- [d] Cultural transformations: *Adab*, literature and the urban tradition

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit 1: This Unit will be disaggregated and taught in sequence, first Greece then Rome. In the context of Greece it will provide an understanding of the changing cultural, social, economic and political trends in Ancient Greece. It will then focus on Roman military expansion and its impact on social conflict, institutionalisation of slavery, and shaping of Roman law and religion. **(Teaching Time: 7 weeks Approx.)**

- Anderson, P. (1988). *Passages from Antiquity to Feudalism*. London and New York: Verso, (Greece) Part One/I/ Chapters 1, 2, pp. 18-44; (Rome) Part One/I/ Chapters 1, 4 (pp. 18-28 and 53-103).
- Finley, M.I. (1963/1991). *The Ancient Greeks*, London: Penguin (1991 reprint), Chapters 1-4, pp.15-94.
- Finley, M.I. (1973). "Masters and Slaves," in M.I. Finley, *The Ancient Economy*. Berkeley and Los Angeles: University of California Press, pp. 62-94.
- Green, P. (1973). *A Concise History of Ancient Greece to the close of Classical era*, London: Thames and Hudson Ltd., Chapters 1-5, pp. 9-172.
- Scarre, C. and B. Fagan. (2008). *Ancient Civilisations*. New Jersey: Pearson, (on Greece) Chapters 9, 10, pp. 223-277; (on Rome) Chapter 11, pp. 278-303.
- Bradley, K. (1994). *Slavery and Society at Rome*, Cambridge: Cambridge University Press, Chapter 2, pp. 10-30.
- Brunt, P.A. (1966). "The Roman Mob," *Past and Present*, No. 35, Dec. 1966, pp. 3-27
- Hopkins, K. (1978). *Conquerors and Slaves*. Cambridge: Cambridge University Press, 1978, Chapter 2, pp. 99-132.
- Joshel, S. R. (2010). *Slavery in the Roman World*, Cambridge: Cambridge University Press, Chapters 1, 2 and 5, pp.18-76 and 161-214.
- फ़ारूकी, A. (2015). प्राचीन और मध्यकालीन सामाजिक संरचनाएँ और संस्कृतियाँ, दिल्ली: मानक प्रकाशन.

Unit 2: This Unit will provide a detailed understanding of European feudalism and shifts in medieval society and economy. **(Teaching Time: 3 weeks Approx.)**

- Anderson, P. (1988). *Passages from Antiquity to Feudalism*. London and New York: Verso, Part One/II/ Chapters 1, 2, 3 (pp. 107-142), Part Two/I/Chapters 1, 4 (pp. 147-153, 182-196).
- Bloch M. (1973). "The Seigneurie down to the crisis of the fourteenth and fifteenth centuries", Chapter 3 in Marc Bloch, *French Rural History: An Essay on its Basic Characteristics*. Berkeley: University of California, pp. 64-101.
- Cipolla, C. (Ed.) (1972). *The Fontana Economic History of Europe Volume I, The Middle Ages*, Collins/Fontana Books, Chapter 2, pp. 71-98; Chapter 4, pp. 143-174; Chapter 5, pp. 175-220.
- Duby, G. (1978). *The Early Growth of the European Economy: Warriors and Peasants from the Seventh to the Twelfth century*, Cornell: Cornell University Press, 1978, Chapter 6, pp. 157-180.
- Georges Duby, (1977). "Lineage, Nobility and Knighthood: the Macconnais in the twelfth century – a revision", "Youth in Aristocratic Society", in *Chivalrous Society*, trans. Cynthia Postan. Berkeley: University of California Press, pp. 59-80, 112-122
- Hilton, R.H. (1976). "Introduction" in R.H. Hilton, *Peasants, Knights and Heretics: Studies in Medieval English Social History*. Cambridge: Cambridge University Press, pp. 1-10.

- IGNOU Study Material in Hindi, MAH, प्राचीन और मध्ययुगीन समाज, MHI-01 ब्लॉक 6, 'सामंतवाद' यूनिट 20, 21, 22, 23. (website: [www. egyankosh.ac.in](http://www.egyankosh.ac.in)) <http://www.egyankosh.ac.in/handle/123456789/44611>
- Le Goff, J. (2000). "Introduction" and "Medieval Western Europe" in *History of Humanity: Scientific and Cultural Development, Volume IV, From the Seventh to the Sixteenth Century*, UNESCO, pp. 207-220.
- Merrington, J. (1978) "Town and Country in the Transition to Capitalism", in R.H. Hilton (Ed.), *The Transition from Feudalism to Capitalism*. London: Verso, 1978, Aakar, Delhi, 2006.
- फ़ारुकी, A. (2015). प्राचीन और मध्यकालीन सामाजिक संरचनाएँ और संस्कृतियाँ, दिल्ली: मानक प्रकाशन.
- ब्लॉक, M. (2002). 'सामंती समाज', भाग-1, नई दिल्ली: ग्रंथशिल्पी

Unit 3: This Unit will enable students to engage with the question of emergence and spread of Islam and its impact on the shaping of political authority in West Asia. **(Teaching Time: 4 weeks Approx.)**

- Berkey, J. (2002). *The Formation of Islam. Religion and Society in the Near East, 600–1800*. Cambridge: Cambridge University Press, Chapters 5-12, pp.55-123.
- Bosworth, C. E. (2000). "The Formation of Early Islamic Polity and Society: General Characteristics" in *History of Humanity: Scientific and Cultural Development, Volume IV, From the Seventh to the Sixteenth Century*, UNESCO, pp. 271-273.
- Crone, P. (1999). "The Rise of Islam in the World." in Francis Robinson and Ira M. Lapidus (Ed.), *The Cambridge Illustrated History of the Islamic World*, Cambridge: Cambridge University Press, pp. 2-31.
- Duri, A.A. (2000). "The Rise of Islam," in *History of Humanity: Scientific and Cultural Development, Volume IV, From the Seventh to the Sixteenth Century*, UNESCO, pp. 264-267.
- Lapidus, I.M. (1988/2002). *A History of Islamic Societies*, Cambridge: Cambridge University Press (2002edn.), Chapters 1-5, pp. 10-77.
- इंजीनियर, A. A. (2018). इस्लाम का जन्म और विकास. दिल्ली: राजकमल प्रकाशन
- फ़ारुकी, A. (2015). प्राचीन और मध्यकालीन सामाजिक संरचनाएँ और संस्कृतियाँ, दिल्ली: मानक प्रकाशन.

SUGGESTED READINGS:

- Bloch, M. (1961). *Feudal Society* Vol. I, Chicago: University of Chicago Press.
- Bloch, M. (1966). "The Rise of Dependent Cultivation and Seigniorial Institutions." in M.M. Postan (Ed.), *The Cambridge Economic History of Europe*, Volume 1. Cambridge: Cambridge University Press.

- Boardman, J., J. Griffin, O. Murray (Eds.) (2001). *The Oxford History of Greece and the Hellenistic World*. Oxford: Oxford University Press.
- Brunt, P.A. (1971). *Social Conflicts in the Roman Republic*. London: Chatto and Windus.
- Dobb, M. (1950) *Studies in the Development of Capitalism*, London: Routledge and Kegan Paul.
- Donner, F.M. (2010). *Muhammad and the Believers at the Origins of Islam*. Harvard: Harvard University Press.
- Donner, F.M. ed. (2016). *The Expansion of the Early Islamic State*, London and New York: Routledge.
- Duby, G. (1978). *The Early Growth of the European Economy: Warriors and Peasants from the Seventh to the Twelfth century*. Cornell: Cornell University Press.
- Ehrenberg, V. (1990). *From Solon to Socrates: Greek History and Civilisation during the 5th and the 6th centuries BC*, London: Routledge, Chapters 1-4, and 6-7, pp. 1-97, 154-265.
- Finley, M.I. (1980). *Ancient Slavery Modern Ideology*. London: Chatto and Windus.
- Finley, M.I. (1983). *Politics in the Ancient World*. Cambridge: Cambridge University Press.
- Hilton, R. (1973). *Bond Men Made Free: Medieval Peasant Movements and the English Rising of 1381*. London: Routledge.
- Hodgson, M.G.S. (1974). *The Venture of Islam, Volume 1: The Classical Age of Islam*, Chicago: University of Chicago Press, pp. 101-314; and pp. 444-472.
- Kumar, R. (2018). *Ancient and Medieval World: From Evolution of Humans to the Crisis of Feudalism*, New Delhi: Sage.
- Le Goff, J. (1992) *Medieval Civilisation, 400-1500*, (translated by Julia Barrow), Oxford UK & Cambridge USA: Blackwell.
- Matthews, J. (2006) "Roman Law and Roman History" in D. S. Potter (Ed.), *A Companion to the Roman Empire*, USA, UK, Australia: Blackwell Publishing, pp. 477-491.
- Potter, D. S. (Ed.), (2006). *A Companion to the Roman Empire*, USA, UK, Australia: Blackwell Publishing.
- Serjeant, R.B. (1990). "Meccan Trade and the Rise of Islam: Misconceptions and flawed polemics," *Journal of the American Oriental Society*, Vol. 110, No. 3 (Jul-Sep., 1990), pp. 472-486.
- Temin, P. (2004), "The Labor Market of the Early Roman Empire," *Journal of Interdisciplinary History*, Vol. 34, No. 4, pp. 513-538.
- Watt, W.M. (1970/2000). "Muhammad" in P.M. Holt, A.K.S. Lambton, B. Lewis (Eds.), *The Cambridge History of Islam*, Volume IA, Cambridge: Cambridge University Press, Part I, Chapter 2, pp. 30-56.
- Wood, E. M. (1988/2015), *Peasant-Citizen and Slave: The Foundations of Athenian Democracy*, London, New York: Verso
- कोरोवकिन, фьодор. (2019). *प्राचीन विश्व इतिहास का परिचय*, Medha Publishing House.
- गोयल, S. R. (2011). *विश्व की प्राचीन सभ्यताएँ, बनारस: विश्वविद्यालय प्रकाशन*.

- राय, U.N. (2017). विश्व सभ्यता का इतिहास. दिल्ली: राजकमल प्रकाशन

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Students shall also be encouraged to participate in talks/seminar presentations by specialists in the field. Since this is history of a region/s less familiar to students, adequate attention shall be given to background introductory lectures and discussions. Overall, the Teaching Learning Process shall emphasise the interconnectedness of themes within the different rubrics to build a holistic view of the time period/region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. Students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Polis, Hellenic society, Roman Empire, Slavery, Feudalism, Three orders, Chivalry, Church, state, Serfdom, Seigniorial authority, Crisis of feudalism, Rise of Islam, Caliphate, *Ummah*, Ummayyads, Abbasids

Core Course V

History of India- III (c. 750-1200)

Course Objective:

This course is designed to make students trace the patterns of change and continuities in the economic, political, social and cultural aspects of life during the 'early medieval period' (c. A.D. 750 – A.D. 1200) of Indian history. With its focus on multiple historiographical approaches to various issues of historical significance during this period, the course will also apprise students of the divergent ways in which historians approach, read and interpret their sources.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Critically assess the major debates among scholars about various changes that took place with the onset of early medieval period in India.
- Explain, in an interconnected manner, the processes of state formation, agrarian expansion, proliferation of caste and urban as well as commercial processes.
- Discuss the major currents of development in the cultural sphere, namely bhakti movement, Puranic Hinduism, Tantricism, architecture and art as well as the emergence of a number 'regional' languages.

Course Content:

Unit I: Studying early medieval India

- [a] Dynamic and divergent topographies
- [b] Sources: texts; inscriptions; coins
- [c] Debates on the early medieval

Unit II: Political structures and processes

- [a] Evolution of political structures: Rajput polities; Chola state; Odisha
- [b] Symbols of political power: Brahmanas and temples; sacred spaces and conflicts; courtly cultures
- [c] Issue of 'Foreign and Indian': Arabs and Ghaznavids in the north-west, Cholas in Southeast Asia

Unit III: Social and economic processes

- [a] Agricultural expansion; forest-dwellers, peasants and landlords
- [b] Expansion of varna-jati order and brahmanization

- [c] Forms of exchange; inter-regional and maritime trade
- [d] Processes of urbanization

Unit IV: Religious, literary and visual cultures

- [a] Bhakti: Alvars and Nayanars
- [b] Puranic Hinduism; Tantra; Buddhism and Jainism
- [c] Sanskrit and regional languages: interactions
- [d] Art and architecture: temples – regional styles

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I: This unit seeks to familiarise students with the nature of historical geography and the range of sources available for the early medieval period of Indian history. Most importantly, students will engage with the debates and varied scholarly views on the nature of early medieval Indian social formation and the most important aspects and factors of change therein. **(Teaching Time: 4 weeks Approx.)**

- Saloman, Richard. (1998). *Indian Epigraphy: A Guide to the Study of Inscriptions in Sanskrit, Prakrit and the Other Indo-Aryan Languages*. New York: Oxford University Press. (The relevant portions are: Chapter I: 'The Scope and Significance of Epigraphy in Indological Studies', pp. 3-6; Chapter VII: 'Epigraphy as a Source for the Study of Indian Culture', pp. 226-51.)
- Schwartzberg, J. (1993). *Historical Atlas of South Asia*. New York: Oxford University Press. (To be used mostly as a reference book)
- Jha, D.N. (2000). 'Introduction', *The Feudal Order: State, Society and Ideology in Early Medieval India*, (ed.), D.N.Jha, Delhi: Manohar, pp. 1-60. [Also available in Hindi]
- Sharma, R.S. (1958). 'Origins of Feudalism in India'. *Journal of the Economic and Social History of the Orient*, vol. 1, pp. 297-328.
- Mukhia, H. (1981). 'Was there Feudalism in Indian History?' *The Journal of Peasant Studies*, vol. 8, pp. 273-310. Also reproduced in *The State in India, 1000-1700*, ed., H.Kulke, pp. 86-133. New Delhi: Oxford University Press, 1995. Paperback edition, 1997.
- Sharma, R.S. (1982). 'The Kali Age: A Period of Social Crisis' in *The Feudal Order: State, Society and Ideology in Early Medieval India*, ed., D.N.Jha, Delhi: Manohar, pp. 61-77. (Originally published in S.N.Mukherjea, ed., *India: History and Thought*. Essays in Honour of Professor A.L.Basham.)
- Chattopadhyaya, B.D. (1983). 'Political Processes and the Structure of Polity in Early Medieval India: Problems of Perspective'. Presidential Address, Ancient India Section, Indian History Congress, 44th Session. This is also reproduced in *The State in India, 1000-1700*, ed., H.Kulke, Delhi: Oxford University Press pp. 195-232. Paperback edition, 1997.

- सिंह, उपिन्दर. (2017). प्राचीन एवं पूर्व-मध्यकालीन भारत का इतिहास: पाषाण-काल से 12वीं शताब्दी तक. नई दिल्ली: पीयर्सन इंडिया एजुकेशन. प्रासंगिक भाग है, अध्याय 10: 'उभरता क्षेत्रीय विन्यास', पृ. सं. 588-689.
- झा, द्विजेन्द्रनारायण (सं.) (2007). भारतीय सामंतवाद: राज्य, समाज और विचारधारा. नई दिल्ली: ग्रंथशिल्पी.
- शर्मा, रामशरण. (1993). भारतीय सामंतवाद. नई दिल्ली: राजकमल प्रकाशन.
- मुखिया, हरबंस. (1998). 'क्या भारतीय इतिहास में फ्यूडलिज़्म रहा है?', फ्यूडलिज़्म और गैर-यूरोपीय समाज, (सं.), हरबंस मुखिया. नई दिल्ली: ग्रंथशिल्पी, पृ. सं. 1-49.
- स्टाइन, बर्टन. (1998). 'मध्यकालीन भारत में राजनीति, किसान और फ्यूडलिज़्म का विखंडन', फ्यूडलिज़्म और गैर-यूरोपीय समाज, (सं.), हरबंस मुखिया. नई दिल्ली: ग्रंथशिल्पी, पृ. सं. 183-226.

Unit II: This unit aims to apprise students of the dynamic nature of political structures and the varied perspectives from which scholars study them. **(Teaching Time: 3 weeks Approx.)**

- Sharma, R.S. (1965). *Indian Feudalism, c.300-1200*. Delhi: Macmillan (2nd edition, 1980) (Especially relevant are, pp. 63-90.).
- Chattopadhyaya, B.D. (1983). 'Political Processes and the Structure of Polity in Early Medieval India: Problems of Perspective', Presidential Address, Ancient India Section, Indian History Congress, 44th Session. This is also reproduced in *The State in India, 1000-1700*, ed., H.Kulke, pp. 195-232.
- Kulke, Hermann. (1995). 'The Early and the Imperial Kingdom: A Processual Model of Integrative State Formation in Early Medieval India'. In *The State in India, 1000-1700*, ed., Kulke, New Delhi: Oxford University Press. 233-262. Paperback edition, 1997.
- Chattopadhyaya, B.D. (1976). 'Origin of the Rajputs: The Political, Economic and Social Processes in Early Medieval Rajasthan', *Indian Historical Review*, vol. 3, no. 1. Also reproduced in B.D.Chattopadhyaya, *The Making of Early Medieval India*, Delhi: Oxford University Press, pp. 1-37. Paperback edition, 1997.
- Stein, Burton. (1977). 'The Segmentary State in South Indian History'. In *Realm and Region in Traditional India*, ed., Richard Fox, New Delhi: Vikas, pp. 3-51. Stein's views might also be accessed in another article by him, more easily accessible: Stein, Burton. 1995. The Segmentary State: Interim Reflections. In *The State in India*, ed., Kulke, 134-161. New Delhi: Oxford University Press. Paperback edition, 1997. Originally published in *Purusartha*, vol. 13 (1991): 217-88.
- Heitzman, James. (1987). 'State Formation in South India, 850-1280', *Indian Economic and Social History Review*, 24, no. 1, pp. 35-61. Also reproduced in *The State in India: 1000-1700*, ed. H.Kulke, pp. 162-94.
- Ali, Daud. (2004). *Courtly Culture and Political Life in Early Medieval India*. New Delhi: Cambridge University Press, 2006. (Especially useful is Chapter 2: 'The Culture of the Court', pp. 69-102.)

- Davis, Richard. (1999). *Lives of Indian Images*. New Delhi: Motilal Banarsidas Publishers, pp. 88-112 and pp. 186-221.
- Chattopadhyaya, B.D. (2017). 'The Concept of Bharatavarsha and Its Historiographical Implications', in B. D. Chattopadhyaya, *The Concept of Bharatavarsha and Other Essays*. New Delhi: Permanent Black, pp. 1-30.
- Maclean, Derryl N. (1989). *Religion and Society in Arab Sind*. Leiden: E.J.Brill. (Chapter II: 'Conquest and Conversion', pp. 22-82).
- Habib, Mohammad. (1927). 'Sultan Mahmud of Ghaznin', in *Politics and Society during the Early Medieval Period, Collected Works of Professor Habib*, vol. 2, (Ed.) K.A.Nizami, New Delhi: People's Publishing House, pp. 36-104. Reprint, 1981.
- Kulke, Hermann, Kesavapany & Sakhuja, (Eds.) (2009). *Nagapattinam to Suvarnavdipa: Reflections on the Chola Naval Expeditions to Southeast Asia*, Singapore: Institute of South-east Asian Studies.
- शर्मा, रामशरण. (1998). 'भारतीय सामंतवाद कितना सामंती?', फ्यूडलिज्म और गैर-यूरोपीय समाज, (सं.), हरबंस मुखिया. नई दिल्ली: ग्रंथशिल्पी, पृ. सं. 50-86.
- मुखिया, हरबंस. (1998). 'कृषक उत्पादन और मध्यकालीन भारतीय समाज', फ्यूडलिज्म और गैर-यूरोपीय समाज, (सं.), हरबंस मुखिया. नई दिल्ली: ग्रंथशिल्पी, पृ. सं. 310-339.
- चट्टोपाध्याय, ब्रजदुलाल. (2000). 'राजपूतों की उत्पत्ति: पूर्व-मध्ययुगीन राजस्थान में राजनैतिक, आर्थिक एवं सामाजिक प्रक्रियाएं', प्राचीन भारत, पृ. सं. 136-153.
- हबीब, मोहम्मद. (1992). 'महमूद के कार्यों का चरित्र और मूल्य', मध्यकालीन भारत, अंक - 4, (सं.) इरफ़ान हबीब, नई दिल्ली: राजकमल प्रकाशन, पृ. सं. 9-23.
- थापर, रोमिला. (2000). 'सोमनाथ और महमूद', सहमत मुक्तनाद, वर्ष 2, अंक 1-2, पृ. सं. 37-44.
- थापर, रोमिला. (2015). सोमनाथ: इतिहास एक, स्वर अनेक. नयी दिल्ली: ग्रंथशिल्पी.
- हबीब, इरफ़ान. (1999). 'भारतीय राष्ट्र के निर्माण की प्रक्रिया और अवधारणा: ऐतिहासिक परिप्रेक्ष्य', सहमत मुक्तनाद, वर्ष 1, अंक 3, पृ. सं. 26-30.
- चट्टोपाध्याय, ब्रजदुलाल. (2012). 'आक्रमकों और शासकों की छवियाँ', मध्यकालीन भारत का सांस्कृतिक इतिहास, (सं.), मीनाक्षी खन्ना. नयी दिल्ली: ओरियंट ब्लैकस्वॉन, पृ. सं. 107-33.
- शास्त्री, नीलकंठ. 1979. चोलवंश. नयी दिल्ली: मैकमिलन.

Unit III: This unit will familiarise students with social and economic processes of the early medieval period in Indian history. The diverse ways in which these have been studied will be the chief focus. **(Teaching Time: 4 weeks Approx.)**

- Sharma, R.S. (1987). *Urban Decay in India c. 300 – c. 1000*. New Delhi: Munshiram Manoharlal. (Especially important parts are, Chapter 2: 'Urban Growth and Decay in the North', pp. 10-27; Chapter 8: 'Explaining the Urban Eclipse', pp. 132-42; and Chapter 10: 'Agrarian Expansion', pp. 168-77.)

- Champakalakshmi, R. (1995). 'State and Economy: South India, c. A.D. 400-1300', in Romila Thapar (ed.), *Recent Perspectives of Early Medieval India*. Delhi: Popular Prakashan in association with Book Review Trust, pp. 275-317.
- Yadava, B.N.S. (1997). 'Immobility and Subjection of Indian Peasantry', in B.P.Sahu (Ed.), *Land System and Rural Society in Early India*. Delhi: Manohar, pp. 329-42.
- Sharma, R.S. (1969). *Social Changes in Early Medieval India*. The first Devraj Chanana Memorial Lecture. New Delhi: People's Publishing House. Also reproduced (with slight changes) in *Early Medieval Indian Society* (2001) R.S.Sharma, (Ed.) Kolkata: Orient Longman, pp. 186-213.
- Chattopadhyaya, B.D. (1994). *The Making of Early Medieval India*. Relevant parts are, Chapter 4: 'Markets and Merchants in Early Medieval Rajasthan', pp. 89-119; Chapter 6: 'Trade and Urban Centres in Early Medieval North India', pp. 130-54; Chapter 7: 'Urban Centres in Early Medieval India: An Overview', pp. 155-182. New Delhi: Oxford University Press. Paperback edition, 1997.
- Bhandare, Shailendra. (2015). 'Evaluating the Paucity of Metallic Currency in Medieval India', in Himanshu Prabha Ray, ed., *Negotiating Cultural Identity: Landscapes in Early Medieval South Asian History*, Delhi: Routledge, pp. 159-202.
- Chakravarti, Ranabir. (2004). 'Introduction' to *Trade in Early India*, ed. Ranabir Chakravarti, pp. 72-101. Delhi: Oxford University Press.
- Malik, Anjali. (1998). *Merchants and Merchandise in Early Medieval Northern India, A.D. 600-1000*. Delhi: Manohar. Relevant sections are, 'Introduction', pp. 15-33; Chapter 4: 'The Changing Patterns of Trade', pp. 89-109.
- शर्मा, रामशरण. (2000). भारत के प्राचीन नगरों का पतन. राजकमल प्रकाशन, नयी दिल्ली. विशेष महत्वपूर्ण व प्रासंगिक हिस्से इस प्रकार हैं: अध्याय 2: 'उत्तर में शहरी विकास और पतन', पृ.सं. 25-47; अध्याय 8: 'शहरी पतन की व्याख्या', पृ.सं. 173-84; अध्याय 10: 'कृषि का प्रसार', पृ.सं. 213-23.
- शर्मा, रामशरण. (1995). पूर्व-मध्यकालीन भारत में सामाजिक परिवर्तन, नयी दिल्ली.
- यादव, बी.एन.एस. (1981). 'प्रारंभिक-मध्यकालीन व्यवस्था में भारतीय किसान वर्ग की अगतिशीलता और दासता', मध्यकालीन भारत, अंक 1, (सं.), इरफ़ान हबीब, नई दिल्ली: राजकमल प्रकाशन, पृ.सं. 3-12.

Unit IV: The focus of this unit will be on the religious, literary and visual cultures of the early medieval period in the Indian subcontinent. Having done this unit, students will be able to trace the patterns of change in these spheres of life. **(Teaching Time: 3 weeks Approx.)**

- Champakalakshmi, R. (1996). 'From Devotion and Dissent to Dominance: The Bhakti of the Tamil Alvars and Nayanars', in *Tradition, Dissent and Ideology*, ed. R. Champakalakshmi & S. Gopal, pp. 135-63. New Delhi: Oxford University Press.
- Narayanan, M.G.S. and K. Veluthat. (2000). 'Bhakti Movement in South India', in *The Feudal Order: State, Society and Ideology in Early Medieval India*, ed. D.N. Jha, pp. 385-410.

New Delhi: Manohar. The essay was originally published in *Indian Movements: Some Aspects of Dissent, Protest and Reform*, ed. S.C. Malik. Simla: Indian Institute of Advanced Study, 1978. The same was also reproduced in *Feudal Social Formation in Early India*, ed. D.N. Jha. Delhi: Chanakya Publications, 1987.

- Mahalakshmi, R. (2000). 'Outside the Norm, Within the Tradition: Karaikkal Ammaiyar and the Ideology of Tamil Bhakti', *Studies in History*, 16, no. 1, pp. 17-40.
- Chakrabarti, Kunal. (1996). 'Texts and Traditions: The Making of the Bengal Puranas', in *Tradition, Dissent and Ideology*, ed. R. Champakalakshmi & S. Gopal, pp. 55-88. New Delhi: Oxford University Press.
- Stein, Burton. (1968). 'Social Mobility and Medieval South Indian Hindu Sects', in *Social Mobility in the Caste System in India: An Interdisciplinary Symposium*, ed. James Silverberg, pp. 78-94. The Hague: Mouton. The article is also reproduced in *Religious Movements in South Asia 600-1800*, ed. David N. Lorenzen, pp. 81-101. New Delhi: Oxford University Press, 2004. Paperback edition, 2005.
- Majumdar, R.C. n.d. ed. *History and Culture of the Indian People: The Struggle for Empire*. Bombay: Bharatiya Vidya Bhawan. Relevant part is Chapter XV ('Language and Literature'), pp. 297-397.
- Pollock, Sheldon. (1998). 'India in the Vernacular Millennium: Literary Culture and Polity, 1000-1500', in *Early Modernities*, ed. Shmuel Eisenstadt, Wolfgang Schluchter and Bjorn Wittrock, special issue of *Daedalus*, 127 (3), pp. 41-74.
- Desai, Devangana. (1989). 'Social Dimensions of Art in Early India', *Presidential Address (Ancient India), Proceeding of the Indian History Congress, 50th session, Gorakhpur*, pp. 21-56.
- Patel, Alka. (2008). 'The Mosque in South Asia: Beginnings', in Finbarr B. Flood, ed., *Piety and Politics in the Early Indian Mosque*, Oxford: Oxford University Press, 2008.
- नंदी, रमेन्द्रनाथ. (1998). प्राचीन भारत में धर्म के सामाजिक आधार. नई दिल्ली: ग्रंथशिल्पी.
- सिंह, उपिन्द्र. (2017). प्राचीन एवं पूर्व-मध्यकालीन भारत का इतिहास: पाषाण-काल से 12वीं शताब्दी तक. नई दिल्ली: पीयर्सन इंडिया एजुकेशन. प्रासंगिक भाग है, अध्याय 10: 'उभरता क्षेत्रीय विन्यास', पृ. सं. 588-689.

SUGGESTED READINGS:

- Bosworth, C.E. (1966). 'Mahmud of Ghazna in Contemporary Eyes and in Later Persian literature', *Iran*, 4, pp. 85-92. (Alternatively, see Mahmud B. Sebuktigin, in *Encyclopaedia of Islam*, ed. H.A.R. Gibb et al. Leiden: E.J. Brill.)
- Chattopadhyaya, B.D. (1998). *Representing the Other? Sanskrit Sources and the Muslims (eight to fourteenth century)*. New Delhi: Manohar.
- Chattopadhyaya, B.D. (2003). 'The Study of Early India'. In *Studying Early India* by B.D. Chattopadhyaya, pp. 3-25. Delhi: Permanent Black.

- Desai, Devangana. (1974). 'Art under Feudalism in India (c. A.D. 500-1300)', *The Indian Historical Review*, 1, no. 1, pp. 10-17. Reprinted in Jha, *Feudal Social Formation in Early India*. 1987, pp. 391-401.
- Deyell, J.S. (1990). *Living Without Silver: The Monetary History of Early Medieval North India*. Delhi: Oxford University Press.
- Eaton, Richard M. (2002). 'Temple Desecration and Indo-Muslim States', in *Beyond Turk and Hindu: Rethinking Religious Identities in Islamicate South Asia*, ed. David Gilmartin and Bruce B. Lawrence, pp. 246-81. New Delhi: India Research Press. The article can also be accessed in Richard M. Eaton, *Essays on Islam and Indian History*, New Delhi: Oxford University Press, 2000.
- Huntington, Susan. (1985). *The Art of Ancient India: Buddhist, Hindu, Jain* New York and Tokyo: Weather Hill.
- Kulke, Hermann. (2001). 'Royal Temple Policy and the Structure of Medieval Hindu Kingdoms', in *Kings and Cults: State Formation and Legitimation in India and Southeast Asia*, by Kulke, pp. 1-16. Delhi: Manohar.
- H. Kulke and B. P. Sahu, (2018). *History of Precolonial India: Issues and Debates*, Delhi: Oxford University Press, Part II.
- Ramaswamy, Vijaya. (1982). 'Peasant, State and Society in Medieval South India: A Review Article', *Studies in History*, 4, pp. 307-19.
- Sahu, B.P. (1997). "Introduction", in *Land System and Rural Society in Early India*, (Ed.). B.P. Sahu. Delhi: Manohar, pp. 1-58.
- Sharma, R.S. (1985). 'How Feudal was Indian Feudalism', *The Journal of Peasant Studies*, vol. 12, no. 2/3, pp. 19-43. A revised and updated version of this article is to be found in, *The State in India, 1000-1700*, ed., H. Kulke, pp. 48-85. New Delhi: Oxford University Press, 1995. Paperback edition, 1997. The same essay is also reproduced in *The Feudalism Debate*, ed., H. Mukhia, pp. 82-111. Delhi: Manohar, 1999.
- Singh, Upinder. (2008). *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*. New Delhi: Pearson Education. Relevant part is, Chapter 10: Emerging Regional Configurations, c. 600-1200 CE, pp. 546-643.
- Spencer, G.W. (1969). 'Religious Networks and Royal Influence in Eleventh Century South India', *Journal of the Economic and Social History of the Orient*, 12, no. 1, pp. 42-56.
- Spencer, G.W. (1969). 'Religious Networks and Royal Influence in Eleventh Century South India', *Journal of the Economic and Social History of the Orient*, 12, no. 1, pp. 42-56.
- Subbarayalu, Y. (2011). *South India under the Cholas*. New Delhi: Oxford University Press. (Especially important are 'Introduction' and the last two sections on 'The Chola State' and 'Characterizing the Chola State'.)
- Veluthat, Kesavan. (2000). 'The Role of Nadu in the Socio-Political Structure of South India (c. AD 600-1200)' in *The Feudal Order: State, Society and Ideology in Medieval South India*, ed. D.N. Jha, pp. 179-96. Delhi: Manohar.

- Veluthat, Kesavan. (2000). 'The Role of Nadu in the Socio-Political Structure of South India (c.AD 600-1200)', in *The Feudal Order: State, Society and Ideology in Medieval South India*, ed. D.N.Jha, pp. 179-96. Delhi: Manohar.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. Supporting audio-visual aids like documentaries and power point presentations will be used where necessary. Overall, the Teaching Learning Process shall emphasise the interconnect- edness of themes within the different rubrics to build a holistic view of the time period/region under study. The process shall consistently underline how various macro and micro-level devel- opments/phenomena can be historicised.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the stu- dents. Students will be assessed on their ability to engage with a sizeable corpus of readings as- signed to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Feudalism, Inscriptions, Ghazanavids, Cholas, Rajputs, Agriculture, Maritime Trade, Urbaniza- tion, Religion, Architecture, Bhakti.

Core Course VI

Rise of the Modern West- I

Course Objectives:

The focus of the course is on transition from feudalism to capitalism in Europe. The paper familiarises the student with important transitions and transformations in the economy, polity, and socio-cultural life from late medieval period to 1600 in various parts of Europe. The course shall critically examine the dynamics of economic and political power within Europe, and contact with the New World. The processes by which Europe's economy benefited from colonial expansion and exploitation of indigenous and slave labour will be explained. Students shall also engage with continuities and changes in intellectual and artistic realms; the social and economic milieu which influenced developments in religion; trends in state formation; and the relationship between state and religion. Students will be introduced to the concept of Eurocentrism in our understanding of the Rise of the Modern West.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Outline important changes that took place in Europe from the medieval period.
- Acquire an integrated approach to the study of economic, social, political and cultural developments in Europe.
- Explain the processes by which major transitions unfolded in Europe's economy, state forms, social structure and cultural life. Examine elements of early modernity in these spheres.
- Critically analyse linkages between Europe's state system and trade and empire.

Course Content:

I. Transition from Feudalism to Capitalism

- [a] Issues and debates
- [b] Question of Eurocentrism

II. Early colonial expansion

- [a] Factors for colonization
- [b] Trade and Empire
- [c] Mines and plantations
- [d] Labour Systems - indigenous populations and African slaves

III. Renaissance

- [a] In Italy: its social roots
- [b] Humanism and its spread in Europe

[c] Art

IV. Origins, course, and results of the European Reformation in the 16th century.

V. Economic developments of the 16th century

[a] Shift of economic balance from the Mediterranean to the Atlantic

[b] Commercial Revolution

[c] Price Revolution

VI. Emergence of European State system: with two case studies (Spain, France, England, Russia).

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I: The Unit will give an overview to the paper through issues and debates related to transition from feudalism to capitalism in Europe. The concept of Eurocentrism will be introduced. **(Teaching Time: 3 WeeksApprox.)**

- Aston, T.H. and C.H.E. Philpin, (Ed.). (2005). *The Brenner Debate, Agrarian Class Structure and Economic Development in Pre-Industrial Europe*. Cambridge/Delhi: Cambridge University Press.
- Blaut, J.M., et.al. (1992). *1492 - The Debate on Colonialism, Eurocentrism, and History*. Trenton, N J: Africa World Press, Inc.
- Hilton, Rodney, (Ed.). (1985). *The Transition from Feudalism to Capitalism*. London: Verso.
- Sinha, Arvind. (2009). *Sankrantikaleen Europe* (संक्रान्ति कालीन यूरोप). New Delhi: Granth Shilpi. [and English edition].
- Wallerstein, Immanuel. (1974). *The Modern World System, Vol. I, Capitalist Agriculture and the Origins of the European World Economy in the Sixteenth Century*. New York: Academic Press.(Chpts: Introduction and 1)

Unit-II: The Unit discusses the process of early colonization, inter-linkages, and impact of trade and empire on Western Europe, the New World, West Africa and parts of Asia. **(Teaching Time: 2 weeks Approx.)**

- Braudel, Fernand. (1988). *Civilization and Capitalism, 15th to 18th Centuries, Vols. I, II, III*. London: Collins/Fontana Press.
- Burbank, Jane and Frederick Cooper. (2010). *Empires in World History - Power and Politics of Difference*. Princeton: Princeton University Press.

- Crosby, Alfred W. (2004). *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*. Cambridge: Cambridge University Press (2nd edition).
- Davis, Ralph. (1973). *The Rise of the Atlantic Economies*. London: Weidenfield and Nicolson.
- Waites, Bernard. (1999) *Europe and the Third World: From Colonisation to Decolonisation, c 1500-1998*. London: Palgrave Macmillan.

Unit- III: The Unit emphasizes social roots of Renaissance, elements of continuity and change in intellectual and cultural realms, and debates on Renaissance and Humanism. **(Teaching Time: 3 weeks Approx.)**

- Burke, Peter. (1999). *The Italian Renaissance, Culture and Society in Italy*. Princeton: Princeton University Press. (Chpts: Introduction, chpts: 1, 2, 3, 4 & 6)
- Kaborycha, Lisa. (2011). *A Short History of Renaissance Italy*. New York: Pearson.
- Mac Kenny, Richard. (2005). *Renaissances: The Cultures of Italy, 1300-1600*. London/New York: Palgrave Macmillan.
- Winks, Robin W. and Lee Palmer Wandel. (2003). *Europe in a Wider World, 1350-1650*. New York: Oxford University Press.
- Woolfson, Jonathan, (Ed.). (2004). *Palgrave Advances in Renaissance Historiography*. London: Palgrave Macmillan.

Unit-IV: The Unit outlines the economic, political, social and intellectual dimensions of Reformation and Reformation's impact on different regions of Europe. **(Teaching Time: 2 weeks- Approx.)**

- Dixon, C. Scott. (2002). *The Reformation in Germany*. Oxford: Blackwell Publishers Limited.
- Ferguson, Niall. (2011). *Civilization: The West and the Rest*. London: Allen Lane.
- Greengrass, Mark. (2015). *Christendom Destroyed, Europe 1517-1648*. London: Penguin Books.
- Parish, Helen L. (2018). *A Short History of the Reformation*. New York: I. B. Tauris.
- Mac Culloch, Diarmaid. (2004). *Reformation: Europe's House Divided, 1490-1700*. London: Penguin Books Ltd.

Unit- V: The Unit deals with European economy, decline of Mediterranean and rise of Atlantic regions, and the impact of Trans-Atlantic commerce on Europe. **(Teaching Time: 2 weeks Approx.)**

- Frankopan, Peter. (2015). *The Silk Roads: A New History of the World*. London: Bloomsbury.

- Heller, Henry. (2011). *Birth of Capitalism: a 21st Century Perspective*. London: Pluto Press. (Chpt- 4_
- Hill, Christopher. (1969). *Reformation to Industrial Revolution*. London: Penguin Books. (Chpt- 2: page 11 - 93)
- Kriedte, Peter. (1983). *Peasants, Landlords and Merchant Capitalists: Europe and the World Economy, 1500-1800*. Cambridge: Cambridge University Press. (Chpt- 1)
- Wiesner-Hanks, Merry E. (2006). *Early Modern Europe: 1450-1789*. Cambridge: Cambridge University Press.

Unit- VI: The Unit emphasizes the nature of the European state system and interconnections between economy, society, religion, and polity with case studies. **(Teaching Time: 2 weeks Approx.)**

- Anderson, Perry. (1979). *Lineages of the Absolutist State*. London: Verso Edition. (pp. 15-42, 60-84, 85-142, 195-220, 328-360).
- Cameron, Euan, (Ed.). (2001). *Early Modern Europe, An Oxford History*. Oxford: Oxford University Press.
- Cuttica, Cesare and Glenn Burgess, (Eds.). (2011). *Monarchism and Absolutism in Early Modern Europe*. London: Routledge.
- Ertman, Thomas. (1997). *Birth of the Leviathan: Building States and Regimes in the Medieval and Early Modern Europe*. Cambridge: Cambridge University Press.
- Kumin, Beat, (Ed.). (2013). *The European World 1500-1800: An Introduction to Early Modern History*. New York: Routledge.

SUGGESTED READINGS

- Cipolla, Carlo M., (Ed.). (1994), *Before the Industrial Revolution: European Society and Economy 1000-1700*. New York: WW Norton & Co.
- Cipolla, Carlo M., (Ed.). (1976). *Fontana Economic History of Europe*, Vols. II, III. New York: Barnes and Noble.
- Dickens, A.G. (1974). *German Nation and Martin Luther*. London: Edward Arnold.
- Dobb, Maurice. (1963). *Studies in the Development of Capitalism*. London: Routledge and Kegan Paul.
- Findlen, Paula, (Ed.). (2002). *The Italian Renaissance. The Essential Readings*. Oxford: Blackwell Publishers Ltd.
- हिल्टन, रोडनी (2007) सामंतवाद से पूंजीवाद में संक्रमण. New Delhi. Granth Shilpi.
- Kamen, Henry. (1996). *European Society, 1500-1700*. London: Routledge.
- Lee, Stephen. (1984). *Aspects of European History 1494-1789*. London: Methuen & Co. Ltd.

- Lynch, John. (1984). *Spain under the Habsburgs, Vol. I, Empire and Absolutism, 1516-1598*. New York: New York University Press.
- Parry, J. H. (1963). *Age of Reconnaissance*. London: Weidenfield & Nicolson.
- Scammell, G.V. (1989). *The First Imperial Age: European Overseas Expansion 1400-1715*. London/New York: Routledge.
- Tilly, Charles. (1992). *Coercion, Capital and European States, AD 990-1992*. Hoboken, NJ: Wiley-Blackwell.
- Verma, Lal Bahadur. (2008). *Europe ka Itihas*. Bhag 9. Delhi: Prakashan Sansthan.
- Wood, E.M. (2002). *The Origin of Capitalism: A Longer View*. London: Verso, (rev. ed.).

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Students shall also be encouraged to participate in talks/seminar presentations by specialists in the field. Since this history is of an unfamiliar region an overview of the feudal background will be provided to students. Overall, the teaching and learning process shall emphasise the interconnectedness of themes within the different rubrics to build a holistic view of the time period/region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. Students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

The Transition Debate, Eurocentrism, Colonialism, Renaissance, Humanism, Reformation, Commercial Revolution, European state system.

Core Course VII
History of India- IV (c. 1200–1500)

Course Objective:

This course seeks to engage students in an analytical understanding of the varied perspectives from which historians study the three centuries between the thirteenth and the fifteenth centuries. It provides them with a basic understanding of the political, economic and socio-cultural processes of the time especially with reference to Rajput polities, Gujarat sultanate, Vijayanagara state as well as the Delhi Sultanate. Sufism and major trends in bhakti ‘movement’ are explained to the students. Learners are also encouraged to engage with diverse corpus of sources available to historians for the period under study.

Learning Outcomes:

On completion of this course, the students shall be able to:

- Discuss different kinds of sources available for writing histories of various aspects of life during the thirteenth to the fifteenth centuries.
- Critically evaluate the multiple perspectives from which historians have studied the politics, cultural developments and economic trends in India during the period of study.
- Appreciate the ways in which technological changes, commercial developments and challenges to patriarchy by certain women shaped the times.

Course Content:

Unit I. Survey of sources

- [a] Persian *ta’rīkh* traditions: Barani and Mushtaqi
- [b] *Malfuzat* and *premakhyaṇs*; Persian, Sanskrit and Vernacular interactions
- [c] Inscriptions and regional identity: Kakatiyas
- [d] Architecture: the study of Hampi

Unit II. Political structures

- [a] Sultanates of Delhi: transitions in ruling elites, service cultures, iqtas
- [b] Articulating political authority: monuments and rituals
- [c] Consolidation of identities: Rajputs and other warrior lineages
- [d] Political cultures: Vijayanagara and Gujarat

Unit III. Society and economy

- [a] Ecological context; agricultural production
- [b] Technology and changes in society

[c] Monetization; market regulations; urban centres; trade and craft

Unit IV. Religion, society and cultures

[a] Sufi silsilas: Chishtis and Suhrawardis; doctrines and practices; social roles

[b] Bhakti; Sant tradition: Kabir and Nanak; cults: Jagannath and Warkari

[c] Gender roles: women bhaktas and rulers

[d] Terms of Identification: Modern Labels and Contingent Identities

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I: This unit will familiarise students with the range of sources available for the period of study in the paper. It also aims to apprise them of the varied ways in which historians interpret these sources. **(Teaching Time: 4 weeks Approx.)**

- Habib, Irfan. (1981). "Barani's Theory of the History of the Delhi Sultanate", *Indian Historical Review*, vol. 7, pp. 99-115.
- Alam, Muzaffar. (2004). *The Languages of Political Islam in India*, Delhi: Permanent Black. The sections most useful for our present topic can be found on pp. 1-98. Particularly important is the section on Zia Barani.
- Kumar, Sunil. (2007). Appendix: 'Persian Literary Traditions and Narrativizing the Delhi Sultanate'. In *The Emergence of the Delhi Sultanate 1192-1286*, by Sunil Kumar, Ranikhet: Permanent Black, pp. 362-77.
- Hardy, Peter. (1962). 'Some Studies in Pre-Mughal Muslim Historiography', in *Historians of India, Pakistan and Ceylon*, edited by C.H. Philips, pp. 115-27. (Alternatively, you may find Hardy's views in the relevant chapter in his book entitled *Historians of Medieval India*.)
- Shaikh RizqUllāhMushtāquī, (1993). *Waqi'at-e-Mushtaqi*, translated and edited by Iqtidar Husain Siddiqui, New Delhi: Indian Council of Historical Research and Northern Book Centre, pp. IX-XXXI (the "Introduction" by the translator which is particularly important).
- Digby, Simon. (2001). 'The Indo-Persian Historiography of the Lodi Sultans', in F. Grimal, ed., *Les Sources et le temps*, Pondicherry: École Française d'Extrême Orient, pp. 243-61, (pp. 243-251 provide a very rich account of Mushtaqi's *Waqi'at-i-Mushtaqi*).
- Anooshahr, Ali. (2012). 'Author of One's Fate: Fatalism and Agency in Indo-Persian Histories', *Indian Economic and Social History Review*, vol. 49, no. 2, pp. 197-224.
- Ernst, Carl W. (1992). *Eternal Garden: Mysticism, History and Politics at a South Asian Sufi Center*. Albany: State University of New York Press, 1992. The relevant portion is Chapter 4, entitled 'The Textual Formation of Oral Teachings in the Early Chishtī Order', pp. 62-84.
- Trivedi, Madhu. (2008). 'Images of Women from the Fourteenth to the Sixteenth century: A Study of Sufi Premakhyan'. In *Rethinking A Millennium: Perspectives on Indian History from Eighth to the Eighteenth Century*, edited by Rajat Datta, Delhi: Aakar Books, pp. 198-221.

- Behl, Aditya . 2012. *Love's Subtle Magic: An Indian Islamic Literary Tradition 1379–1545*, edited by Wendy Doniger, New York: Oxford University Press, pp. 286-338 (ch. 9-10: 'Hierarchies of Response' and 'The Story of Stories').
- Orsini, Francesca. (2012). 'How to Do Multilingual Literary History? Lessons from fifteenth- and sixteenth-century north India', *Indian Economic and Social History Review*, vol. 49 (2), pp. 225-46.
- Pollock, Sheldon. (1998). 'The Cosmopolitan Vernacular', *The Journal of Asian Studies*, vol. 57, no. 1, pp. 6-37.
- Talbot, Cynthia. (2001). *Precolonial India in Practice*, Delhi: Oxford University Press. See especially, 'Introduction: Medieval India, a history in transition', pp. 1-17 and 'Conclusion: Toward a New Model of Medieval India', pp. 208-215.
- Michell, George & John M.Fritz. (2001) *New Light on Hampi: Recent Research at Vijayanagara*, Mumbai: Marg.
- Vijaya Ramaswamy, *Walking Naked: Women, Society and Spirituality in South India*, IAS, Shimla, 1997.
- <http://www.vijayanagara.org/default.html> for the valuable website on excavations, survey and restoration work in Hampi, the capital of Vijayanagara.
- हबीब, मोहम्मद. (2014). 'सल्तनत काल की चिश्तिया सूफी दस्तावेज़ें', मध्यकालीन भारत, (सं.) इरफ़ान हबीब, अंक - 9, दिल्ली: राज कमल प्रकाशन, पृ.सं. 11-50.
- हबीब, मोहम्मद. (2000). दिल्ली सल्तनत का राजनीति क सिद्धांत: ज़ियाउद्दीन बरनी के फ़तवा-ए जहांदारी के अनुवाद सहित, दिल्ली: ग्रंथशिल्पी।
- रिज़वी, सैयदअतहरअब्बास. (1957). तुग़लक कालीन भारत, भाग 2, राज कमल प्रकाशन (प्रासंगिकभाग: 'अनूदितग्रंथोंकीसमीक्षा', पृ.सं. क-ढ़.
- बहल, आदित्य. (2012). 'मायावी मृगी: एकहिंदवीसूफीप्रेमाख्यान (1503 ई.)', मध्यकालीन भारत का सांस्कृतिक इतिहास, (सं.) मीनाक्षीखन्ना. ओरियंटब्लैकस्वॉन, पृ.सं. 185-218.

Unit II: Students will critically interact, in this unit, with the rather uneven historiography on political structures and cultures across different realms of the Rajputs, Delhi Sultanate and Vijayanagara. **(Teaching Time: 3weeks Approx.)**

- Habib, Irfan. (1992). 'Formation of the Sultanate Ruling Class of the Thirteenth Century', in *Medieval India: Researches in the History of India 1200-1750*, vol. I, edited by Irfan Habib, New Delhi: Oxford University Press, pp. 1-21.
- Kumar, Sunil. (1992). 'When Slaves were Nobles: The Shamsi *Bandagān* in the Early Delhi Sultanate', *Studies in History*, vol. 10, pp. 23-52.
- Kumar, Sunil. (2009). 'The Ignored Elites: Turks, Mongols and a Persian Secretarial Class in the Early Delhi Sultanates, 13th – 16th Centuries', *Modern Asian Studies*, vol. 43, no. 1, pp. 45-77.

- Kumar, Sunil.(2011). 'Courts, Capitals and Kingship: Delhi and its Sultans in the Thirteenth and Fourteenth Centuries CE', in *Court Cultures in the Muslim World: Seventh to Nineteenth Centuries*, edited by Albrecht Fuess and Jan Peter Hartung, London: Routledge, pp. 123-48.
- Kumar, Sunil. (2014). 'Bandagi and Naukari: Studying Transitions in Political Culture and Service under the North Indian Sultanates, 13th-16th Centuries', in *After Timur Left*, edited by Francesca Orsini and Samira Sheikh, Delhi: Oxford University Press, pp. 60-108.
- Ali, Athar. (1981). 'Nobility under Mohammad Tughlaq', *Proceedings of the Indian History Congress*, vol. 42, pp. 197-202.
- Habib, Irfan. (1982). 'Iqta', in *Cambridge Economic History of India*, vol. 2, edited by Tapan Raychaudhuri and Irfan Habib, Cambridge: Cambridge University Press, pp. 68-75. Note that the entire section on agrarian economy (pp. 48-75) should be read for a fuller understanding.
- Moreland, W.H. (1929). *Agrarian System of Moslem India: A Historical Essay with Appendices*, Allahabad: Central Book Depot. See especially Chapter 2 and Appendix B & C.
- Hardy, Peter. (1998). 'Growth of Authority over a Conquered Political Elite: Early Delhi Sultanate as a Possible Case Study', in *Kingship and Authority in South Asia*, edited by J. F. Richards, Delhi: Oxford University Press. (first published, 1978)
- Kumar, Sunil. (2001). 'Qutb and Modern Memory' in *Partitions of Memory: The Afterlife of the Division of India*, edited by Suvir Kaul. Delhi: Permanent Black, pp. 140-82. (Reprinted in Sunil Kumar's *The Present in Delhi's Pasts*, Delhi: Three Essays Press, 2002, pp. 1-61.)
- Sreenivasan, Ramya. (2014). 'Warrior Tales at Hinterland Courts in North India, c. 1370-1550', in *After Timur Left*, edited by Francesca Orsini and Samira Sheikh, Delhi: Oxford University Press, pp. 242-72.
- Kolff, Dirk H. A. (1990). *Naukar, Sepoy and Rajputs: The Ethnohistory of the Military Labour Market in Hindustan*, Cambridge: Cambridge University Press.
- Wagoner, Philip.(1996). 'Sultan among Hindu Kings: Dress, Titles, and the Islamicization of Hindu Culture at Vijayanagara', *Journal of Asian Studies*, vol. 55, no. 4, pp. 851-80.
- Sheikh, Samira. (2010). *Forging a Region: sultans, traders and pilgrims in Gujarat, 1200-1500*. Delhi: Oxford University Press.
- हबीब, इरफ़ान. 2007. '13वीं सदी में सल्तनत के शासक वर्ग का विकास', मध्यकालीन भारत, अंक - 7, (सं.) इरफ़ान हबीब, दिल्ली: राजकमलप्रकाशन.
- ईटन, रिचर्ड. 2012. 'मध्यकालीन दक्कन में इस्लामिक स्थान की अभिव्यक्ति'. **मध्यकालीन भारत का सांस्कृतिक इतिहास, (सं.) मीनाक्षीखन्ना. ओरियंट ब्लैकस्वॉन, पृ.सं. 134-53.**

Unit III: This unit will apprise students of the economic, ecological and technological changes during this period and explore the interlinkages between them.(Teaching Time: 3weeks Approx.)

- Habib, Muhammad. (1974). 'Introduction' to Elliot and Dowson's History of India vol. II. Reprinted in *Politics and Society during the Early Medieval Period: Collected Works of Professor Habib*, vol. 1, edited by K.A.Nizami. New Delhi: People's Publishing House, pp. 33-110.
- Moreland, W.H. (1988 reprint). 'Chapter 2: The Thirteenth and Fourteenth Centuries', in *Agrarian System of Moslem India*. Delhi: Kanti Publications. Reprint, pp. 21-66.
- Habib, Irfan. (1991). 'Agricultural Production', in *The Cambridge Economic History of India*, vol. I, edited by I. Habib and T. Raychaudhuri, 48-53. Delhi: Orient Longman reprint.
- Habib, Irfan. (1969). 'Technological Changes and Society, Thirteenth and Fourteenth Centuries', Presidential Address, Section II. *Proceedings of the Indian History Congress*, vol. 31, pp. 139-161.
- Siddiqui, I.H. (1992). 'Social Mobility in the Delhi Sultanate', in *Medieval India: Researches in the History of India 1200-1750*, edited by Irfan Habib. New Delhi: Oxford University Press, pp. 22-48.
- Habib, Irfan. (1984). 'Price Regulations of Alauddin Khalji – A Defence of Zia Barani', *Indian Economic and Social History Review*, vol. 21, no. 4, pp. 393-414. Also reprinted in *Money and the Market in India: 1100-1700*, edited by Sanjay Subrahmanyam, New Delhi: Oxford University Press, 1994, pp. 85-111.
- Habib, Irfan. (1978). "Economic History of the Delhi Sultanate – An Essay in Interpretation", *Indian Historical Review* Vol. 4, pp. 287-303
- Day, U.N. (1971). 'Chapter 4: Market Regulations of Alaud-din Khalji', in *Some Aspects of Medieval Indian History* by U.N.Day, New Delhi: Kumar Brothers, pp. 71-87.
- Sinopli, Carla. (2003). *Political Economy of Craft Production: Crafting Empire in South India, 1350-1650*. Cambridge: Cambridge University Press, pp. 156-294 (Chapters 6-7).
- Subrahmanyam, Sanjay. (1994). 'Introduction' to *Money and the Market in India 1100-1700*, edited by Sanjay Subrahmanyam, New Delhi: Oxford University Press, pp. 1-56.
- Digby, Simon. (1982). Chapter V: 'The Maritime Trade of India', in *Cambridge Economic History of India*, edited by Irfan Habib & Tapan Raychaudhuri, Hyderabad: Orient Longman, pp. 121-159.
- हबीब, इरफ़ान. (2016). मध्यकालीन भारत में प्राद्यौगिकी. नयीदिल्ली: राजकमल.
- हबीब, इरफ़ान. (2017). मध्यकालीन भारत का आर्थिक इतिहास: एक सर्वेक्षण. नयीदिल्ली: राजकमल.
- मिश्र, एस. सी. (2014.) 'मुगल पूर्व भारत में सामाजिक गतिशीलता', मध्यकालीन भारत, अंक - 9, (सं.) इरफ़ान हबीब, दिल्ली: राजकमल प्रकाशन, पृ.सं. 51-58.
- हबीब, इरफ़ान. (1999). उत्तर भारत में सामाजिक और आर्थिक परिवर्तन (1200-1500 ई.), भारतीय इतिहास में मध्यकाल, (सं.) इरफ़ान हबीब. नयीदिल्ली: सफ़दरहाशमी मेमोरियल ट्रस्ट, पृ.सं. 159-68.
- हबीब, इरफ़ान. (2016). 'दिल्ली सल्तनत का आर्थिक इतिहास: एक व्याख्यान', मध्यकालीन भारत, खण्ड 9, पृ.सं. 35-67.

- हबीब, मोहम्मद. (2014). 'उत्तरी भारत में नगरीय क्रांति', मध्यकालीन भारत, अंक - 3, (सं.) इरफ़ानहबीब, दिल्ली: राजकमलप्रकाशन, पृ.सं. 51-58.
- हबीब, इरफ़ान. (1992). 'अला उद्दीन खिलजी के मूल्यनि यत्रण के उपाय: ज़ियाबरनी के समर्थन में', मध्यकालीन भारत, अंक - 4, (सं.) इरफ़ानहबीब, दिल्ली: राजकमलप्रकाशन, पृ.सं. 24-46.

Unit IV: This unit is chiefly focussed on the religio-cultural sphere with regard especially to Sufi and Bhakti doctrines and practices, but also with regard to gender and cross-confessional interactions. **(Teaching Time: 4 weeks Approx.)**

- Rizvi, S.A.A. (1978). *A History of Sufism*, vol. 1. Delhi: Munshiram Manoharlal.
- Digby, Simon. (1986). 'The Sufi Shaykh as a Source of Authority in Medieval India', *Purushartha*, vol. 9, pp. 57-78. Reprinted in *India's Islamic Traditions, 711-1750*, edited by Richard M. Eaton, New Delhi: Oxford University Press, 2003, pp. 234-62.
- Digby, Simon. (1990). 'The Sufi Shaykh and the Sultan: A Conflict of Claims to Authority in Medieval India', *Iran*, vol. 28, pp. 71-81.
- Kumar, Sunil. (2000). 'Assertions of Authority: A Study of the Discursive Statements of Two Sultans of Delhi', in *The Making of Indo-Persian Culture: Indian and French Studies*, edited by Muzaffar Alam, N.Delvoye & Marc Gaborieau. Delhi: Manohar, pp. 37-65.
- Sharma, Krishna. (2002). *Bhakti and the Bhakti Movement: A New Perspective*. Delhi: Munshiram Manoharlal. Especially useful is 'Chapter I: Towards a New Perspective', pp. 1-38.
- Kulke, Hermann and Burkhard Schnepel. (2001). *Jagannath Revisited, Studying Society, Religion, and State in Orissa*, Delhi: Manohar Publishers.
- Grewal, J.S. (1993). *Contesting Interpretations of Sikh Tradition*. New Delhi: Manohar.
- Chattopadhyaya. B.D. (1998). *Representing the Other? Sanskrit Sources and the Muslims (eight to fourteenth century)*. New Delhi: Manohar.
- Amin, Shahid. (2002). 'On Retelling the Muslim Conquest of North India', in *History and the Present*, edited by Partha Chatterjee and Anjan Ghosh, Ranikhet: Permanent Black, pp. 24-43.
- Kumar, Sunil. (2008). 'Politics, the Muslim Community and Hindu-Muslim Relations Reconsidered: North India in the Early Thirteenth Century', in *Rethinking A Millennium: Perspectives on Indian History from Eighth to the Eighteenth Century*, edited by Rajat Datta, Delhi: Aakar Books, pp. 139-67.
- Romila Thapar, 'Tyranny of Labels', *Social Scientist*, vol. 24, no. 9/10 (1996), pp. 3-23.
- हबीब, इरफ़ान. (1999). 'मध्यकालीन लोकवादी एकेश्वरवाद का मानवीय स्वरूप और ऐतिहासिक परिवेश', भारतीय इतिहास में मध्यकाल, (सं.) इरफ़ानहबीब, दिल्ली: राजकमलप्रकाशन, पृ.सं. 145-58.
- चंद्र, सतीश. (1999). 'उत्तर भारत में भक्ति आंदोलन के उदय की ऐतिहासिक पृष्ठभूमि', मध्यकालीन भारत में इतिहास लेखन, धर्म और राज्य का स्वरूप, दिल्ली: ग्रंथशिल्पी, पृ.सं. 83-97.
- बहुगुणा, आर.पी. (2009). मध्यकालीन भारत में भक्ति और सूफी आंदोलन, दिल्ली: ग्रंथशिल्पी.

- लॉरेन्जन, डेविडएन. (2010). निर्गुण संतों के स्वप्न. दिल्ली: राजकमलप्रकाशन.

SUGGESTED READINGS

- Asher, C.B. and C. Talbot, eds. (2006). *India before Europe*. Cambridge: Cambridge University Press.
- Behl, Aditya. (2007). 'Presence and Absence in Bhakti', *International Journal of Hindu Studies*, vol. XI, no. 3, pp. 319-24.
- Behl, Aditya. (2009). 'The Path of True Feeling: On Translating Qutban's *Mrigavati*', New York.
- Eaton, R.M. (2000). *Essays on Islam and Indian History*. New Delhi: Oxford University Press
- Eaton, R.M. & P.B. Wagoner. (2014.) *Power, Memory and Architecture: Contested Sites on India's Deccan Plateau, 1300-1600*. New Delhi: Oxford University Press.
- Eaton, R.M., ed. (2003). *India's Islamic Traditions, 711-1750*. New Delhi: Oxford University Press.
- Flood, F.B., ed. (2008). *Piety and Politics in the Early Indian Mosque*. New Delhi: Oxford University Press.
- Habib, I. ed. (1992). *Medieval India I: Researches in the History of India 1200-1750*. New Delhi: Oxford University Press.
- Jackson, P. (1999). *The Delhi Sultanate: A Political and Military History*. Cambridge: Cambridge University Press.
- Jha, Pankaj. (2016). 'Literary Conduits for "Consent": Cultural Groundwork of the Mughal State in the Fifteenth Century', *Medieval History Journal*, vol. 19, no. 2, pp. 322-50.
- Juneja, M., ed. (2001). *Architecture in Medieval India: Forms, Contexts, Histories*. Delhi: Permanent Black.
- Karashima, N. (2002). *A Concordance of Nayakas: The Vijayanagara Inscriptions in South India*. Delhi: Oxford University Press.
- Kothiyal, Tanuja. (2016). *Nomadic Narratives: A History of Mobility and Identity in the Great Indian Desert*, Delhi: Cambridge University Press
- Kumar, Mayank. (2013). *Monsoon Ecologies: Irrigation, Agriculture and Settlement Patterns in Rajasthan during the Pre-Colonial Period*. New Delhi: Manohar.
- Kumar, Sunil. (2007). *The Emergence of the Delhi Sultanate, 1192-1286*. Ranikhet: Permanent Black.
- Kumar, Sunil. (Ed.). (2007). *Demolishing Myths or Mosques and Temples? Readings on History and Temple Desecration in Medieval India*. Delhi: Three Essays Collective.
- Kumar, Sunil. (2013). "The Ignored Elites: Turks, Mongols and a Persian Secretarial Class in the early Delhi Sultanate", in *Expanding Frontiers in South Asian and World History*, R.

- Eaton, M. Faruqui, et al. (Eds.), Delhi: Cambridge University Press, pp. 39-71, especially pp. 54-57.
- Lal, K.S. (1980). *Twilight of the Sultanate*. Delhi: Munshiram Manoharlal Publishers Pvt. Ltd.
 - Lorenzen, David N. (2004). *Religious Movements in South Asia 600-1800*. New Delhi: Oxford University Press. [Paperback edition, 2005]
 - Lorenzen, David N. (1978). "Warrior Ascetics in Indian History", *Journal of the American Oriental Society*, 98 (1): 61-75
 - Meister, Michael W. (1972). 'The Two-and-a-half-day Mosque', *Oriental Art*, vol. 18, pp. 57-63. Reproduced in *Architecture in Medieval India: Forms, Contexts, Histories*, edited by Monica Juneja, New Delhi: Permanent Black, 2001, pp. 303-314.
 - Prasad, P. (1990). *Sanskrit Inscriptions of Delhi Sultanate, 1191-1526*. Delhi: Oxford University Press.
 - Schomer, K. and W.H. McLeod, eds. (1987). *The Sants: Studies in a Devotional Tradition of India*. Delhi: Motilal Banarsidas Publishers.
 - Sharma, Sunil (2005). *Amir Khusraw: The Poet of Sultans and Sufis*. Oxford: One World.
 - Sreenivasan, Ramya. (2002). 'Alauddin Khalji Remembered: Conquest, Gender and Community in Medieval Rajput Narratives', *Studies in History*, vol. 18, no. 2, pp. 275-96.
 - Stein, B. (1980). *Peasant, State and Society in Medieval South India*. New Delhi: Oxford University Press.
 - Tod, James. (1920). *Annals and Antiquities of Rajasthan*, William Crooke (Ed.). London: Oxford University Press, 3 volumes.
 - Vaudeville, C. (1996). *Myths, Saints and Legends in Medieval India*. New Delhi: Oxford University Press.
 - ताराचंद. (2006). भारतीय संस्कृति पर इस्लाम का प्रभाव. नयी दिल्ली: ग्रंथशिल्पी.
 - हबीब, मोहम्मद और खलीक अहमद निज़ामी. (1998). (सं.) दिल्ली सल्तनत. दिल्ली, मैकमिलन.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. Supporting audio-visual aids like documentaries and power point presentations will be used where necessary. Overall, the Teaching Learning Process shall emphasise the interconnect-edness of themes within the different rubrics to build a holistic view of the time period/region under study. The process shall consistently underline how various macro and micro-level devel-opments/phenomena can be historicised.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. Students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Ta'rikh, Delhi Sultans, Kakatiyas, Vijayanagara, Agricultural Production, *Iqtas*, Monetization, Sufism, Bhakti.

Core Course VIII

Rise of the Modern West- II

Course Objectives:

This paper offers an in-depth historical analysis of economic, political and social transformations in Europe during the 17th and 18th centuries. Cyclical and secular trends in history, important political shifts, modern scientific views, and intellectual developments of the 17th and 18th centuries will be analysed closely. The paper will trace the development of socio-economic and technological forces which went into the making of the Industrial Revolution in late 18th century Britain. The role of trade and empire, colonial networks, and slavery will be examined to emphasize their contribution to industrial capitalism. The divergence debate will further help draw parallels and subsequent differences between Europe and Asia, and broaden our understanding of early modern Europe.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Explain major economic, social, political and intellectual developments in Europe during the 17th and 18th centuries.
- Contextualize elements of modernity in these realms.
- Discuss the features of Europe's economy and origins of the Industrial Revolution.
- Analyse the relationship between trade, empire, and slavery and industrial capitalism. Examine the divergence debate.

Course Content:

Unit 1: The 17th century European crisis: economic, social, and political dimensions.

Unit 2: The English Revolution (1603-1688)

[a] Major issues

[b] Political, economic and social implications

Unit 3: European society and Modern Science: the Renaissance to the 17th century.

Unit 4: Mercantilism and European economies: trade and empire -- 17th -- 18th centuries.

Unit 5: Enlightenment: ideas and impact

Unit 6: Origins of the Industrial Revolution: divergence debate

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: The Unit examines various aspects of the 17th century crisis and economic recovery in different parts of Europe. **(Teaching period: 3 weeksApprox.)**

- Benedict, Philip and Myron P. Gutmann, (Eds.). (2006) *Early Modern Europe: From Crisis to Stability*. Newark: University of Delaware Press.
- Black, Jeremy. (2002) *Europe and the World, 1650-1830*. New York: Routledge.
- Parker, G. and L.M. Smith, (Eds.). (1997). *The General Crisis of the Seventeenth Century*. London: Routledge. (Introduction ,Chapters: 2,4, 5 & 7)
- de Vries, Jan. (1976). *Economy of Europe in an Age of Crisis 1600-1750*. Cambridge: Cambridge University Press.
- Wallerstein, Immanuel. (1980). *The Modern World System, Vol. II, Mercantilism and the Consolidation of the European World Economy, 1600-1750*. New York: Academic Press.

Unit-II: The unit examines the social origins of the English Revolution. Important strands within the Revolution and their outcomes will be analysed. **(Teaching period: 2 weeksApprox.)**

- Gaunt, Peter, (Ed.). (2000). *The English Civil War: The Essential Readings*. Oxford: Blackwell Publishers Limited.
- Harris, Tim. (2006). *Restoration: Charles II and his Kingdoms, 1660-1685*. London: Penguin.
- Hill, Christopher. (1985). *The Collected Essays of Christopher Hill, Vol. 2, Religion and Politics in Seventeenth Century England*. Amherst: The University of Massachusetts Press.
- Hill, Christopher. (1986). *The Collected Essays of Christopher Hill, Vol. 3, People and Ideas in Seventeenth Century England*. Amherst: The University of Massachusetts Press.
- Kennedy, Geoff. (2008). *Diggers, Levellers, and Agrarian Capitalism: Radical Political Thought in Seventeenth Century England*. Lexington: Lexington Books.

Unit-III: The origins of modern science will be explained with its linkages to society, economy, and Enlightenment. Scientific advances and their relationship with the rise of Modern West will be highlighted.**(Teaching period: 2weeksApprox.)**

- Hellyer, Marcus, (Ed.) (2003). *The Scientific Revolution. The Essential Readings*. Oxford: Blackwell Publishers Limited.
- Henry, John. (2008). *The Scientific Revolution and the Origin of Modern Science*. London: Palgrave.
- Henry, John. (2011). *A Short History of Scientific Thought*. London. Macmillan International.

- Huff, Toby E. (2003). *The Rise of Early Modern Science: Islam, China and the West*. Cambridge: Cambridge University Press (2nd edition).

Unit-IV: The Unit will define the concept and features of Mercantilism. Trade and Empire and their impact on Europe and the periphery will be dealt with in detail. **(Teaching period: 2 weeks Approx.)**

- Stern, Philip J and Carl Wennerlind, (Eds.). (2013). *Mercantilism Reimagined: Political Economy in Early Modern Britain and its Empire*. Oxford: Oxford University Press.
- Solow, Barbara L. (Ed.). (1991). *Slavery and the Rise of the Atlantic System*. Cambridge: Cambridge University Press.
- Solow, Barbara L. and Stanley L. Engerman, (Eds.). (1987). *British Capitalism and Caribbean Slavery*. Cambridge: Cambridge University Press.
- Mintz, Sidney W. (1986). *Sweetness and Power: The Place of Sugar in Modern History*. New York: Penguin Books.
- Marshall, P. J. (Ed.). (1998). *The Oxford History of the British Empire, Vol. II, The Eighteenth Century*. Oxford: Oxford University Press.

Unit-V: The unit will define the phenomenon of Enlightenment. Main thinkers and their ideas, and connection between Enlightenment and modernity will be analysed. **(Teaching period: 2 weeks Approx.)**

- Conrad, Sebastian. (2012). *Enlightenment in Global History: A Historiographical Critique*. American Historical Review, Vol. 117, Issue 4, October, pp. 999-1027.
- Fitzpatrick, Martin, et. al. (Ed.). (2004). *The Enlightenment World*. London: Routledge.
- Jacob, Margaret C. (2016). *The Enlightenment: A Brief History with Documents*. New York: Bedford/St. Martins.
- Losonsky, Michael. (2001). *Enlightenment and Action from Descartes to Kant: Passionate Thought*. Cambridge: Cambridge University Press.
- Pagden, Anthony. (2013). *The Enlightenment: And Why it Still Matters*. Oxford: Oxford University Press. (Introduction and conclusion)

Unit-VI: The Unit will trace the causes of Industrial Revolution in Britain and the contribution of colonial networks, exploitation and slavery to industrial capitalism in Europe. The divergence debate will broaden the understanding of the path to industrialization. **(Teaching period: 3 weeks Approx.)**

- Deane, Phyllis. (1965). *The First Industrial Revolution*. Cambridge: Cambridge University Press.
- Hobsbawm, E. J.(1999). *Industry and Empire*. London: Penguin Books.

- Inikori, Joseph E. (2002). *Africans and Industrial Revolution in England - A Study in International Trade and Economic Development*. Cambridge: Cambridge University Press.
- Parthasarathi, Prasannan. (2011). *Why Europe Grew Rich and Asia Did Not: Global Economic Divergence, 1600-1800*. Cambridge: Cambridge University Press.
- Pomeranz, Kenneth. (2000). *The Great Divergence: China, Europe and the Making of the Modern World*. Princeton: Princeton University Press.

SUGGESTED READINGS

- Anderson, M. S. (1976). *Europe in the Eighteenth Century, 1713-1783*. Oxford: Oxford University Press.
- Canny, Nicholas. (Ed.). (1998). *The Oxford History of the British Empire, Vol. I, The Origins of Empire, British Overseas Enterprise to the Close of the Seventeenth Century*. Oxford: Oxford University Press.
- Coleman, D.C. (Ed.). (1969). *Revisions in Mercantilism*. London: Methuen Young Books.
- Floud, Roderick, and D.N. McCloskey (Eds.). (1997). *The Economic History of Britain Since 1700, Vol. I: 1700-1860*. Cambridge: Cambridge University Press.
- Hall, A.R. (1970). *From Galileo to Newton 1630-1720*. London: Fontana-Collins.
- Hill, Christopher. (1997). *Puritanism and Revolution: Studies in the Interpretation of the English Revolution of the 17th Century*. London/New York: Palgrave Macmillan.
- Mathias, Peter. (2001). *The First Industrial Nation*. London: Routledge.
- Stone, Lawrence. (2002). *The Causes of the English Revolution, 1529-1642*. New York: Routledge.
- Studer, Roman. (2015). *The Great Divergence Reconsidered - Europe, India, and the Rise to Global Economic Power*. Cambridge: Cambridge University Press.
- de Vries, Jan. (2008). *The Industrious Revolution: Consumer Behaviour and the Household Economy, 1650 to the Present*. Cambridge: Cambridge University Press.
- Williams, Eric. (1944). *Capitalism and Slavery*. Chapel Hill: University of North Carolina Press.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Students shall also be encouraged to participate in talks/seminar presentations by specialists in the field. Overall, the Teaching Learning Process shall emphasise the interconnectedness of themes within the different rubrics to build a holistic view of the time period/region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. Students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

17th century crisis, English Revolution, Modern Science, Mercantilism, Enlightenment, Origins of the Industrial Revolution, Divergence debate.

Core Course IX

History of India V (c. 1500-1600)

Course Objectives:

The course is intended to engage students into a critical discussion of political, institutional and cultural processes that led to the establishment and consolidation of the Mughal state in India. It also provides a basic understanding of major developments in other areas of the Indian subcontinent that were not ruled by the Mughals in the sixteenth century. The students would familiarise themselves with the nature and variety of sources as well as the diverse and uneven ways in which historians have treated and interpreted them.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Critically evaluate major sources available in Persian and vernacular languages for the period under study
- Compare, discuss and examine the varied scholarly perspectives on the issues of the establishment, consolidation and nature of the Mughal state.
- Explain the changes and continuities in agrarian relations, land revenue regimes, Bhakti and Sufi traditions
- Discuss how different means such as visual culture was used to articulate authority by the rulers
- Discern the nuances of the process of state formation in the areas beyond the direct control of the Mughal state.

Course Content:

I. Sources and Historiography

- a. Persian Literary traditions: *Tawarikh*, *Insha* and Translations
- b. Vernacular Literature: *Brajbhasha* and *Telugu/Tamil*

II. Establishment of Political authority: Mughals and Rajputs

- a. Historiographies on the nature of 16th century political formations.
- b. Contexts, Campaigns and Conquests: Military tactics and technology
- c. Chaghatayid notions of Kingship; Abu'l Fazl's interventions
- d. Rajputs and other warrior groups

III. Consolidation of Political authority: Mughals, Rajputs and Nayakas

- a. Evolution of Mughal administrative institutions: *Mansab*, *Jagir* Land Revenue Systems
- b. Agrarian and revenue relations: Zamindars and Peasants
- c. Rajput states (Mewar/Marwar/Amber)
- d. State formation under the Nayakas: Madurai, Thanjavur and Senji

IV. Articulation of authority

- a. Fatehpur Sikri
- b. Temples and Gopurams of the Nayakas

V. Political and Religious ideas

- a. *Akhlaqi* traditions; *sulh-i kull*
- b. Revivalist trends in Indian Islam: Shaikh Ahmad Sirhindi
- c. Vaishnava Bhakti Traditions of North India
- d. Deccan Sultanates, trans-regional links and Shia Ideology

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I. This unit introduces students to the available Persian and vernacular literary sources for the study of the period under study. It also provides an opportunity to the students to critically analyse these sources based on their modern historiographical interpretations. **(Teaching Time: 2 weeks Approx.)**

- Rizvi, S. A. A. (1975)- *Religious and Intellectual History of the Muslims During the Reign of Akbar (1556-1605)*, Delhi: Munshiram Manoharlal
- Mukhia, Harbans (1976). *Historians and Historiography during the Reign of Akbar*. Vikas: Publishing House
- Zilli, Ishtiyak Ahmad (2010). “Development of Insha literature to the End of Akbar’s Reign” in Meena Bhargava (ed.) *Exploring Medieval India: Sixteenth to Eighteenth Century, Vol. II*, New Delhi: Orient Black Swan, pp. 74-112
- Momin, Mohiuddin, (1971). *The Chancery and Persian Epistolography under the Mughals*, Calcutta, Iran Society.
- Ali, S Athar. (1992). “Translations of Sanskrit Works at Akbar’s Court” *Social Scientist*, vol. 20 no.9, pp, 38-45
- Truschke, Audrey (2011). “The Mughal Book of War: A Persian Translation of the Sanskrit Mahabharata” *Comparative Studies of South Asia, Africa and the Middle East*, 31, 506-20.
- Busch, Allison (2005), “Literary Responses to the Mughal Imperium: the Historical Poems of Kesavdas” in *South Asia Research*, Vol. 25, No.1, pp 31-54
- Busch, Allison (2010) “Hidden in Plain view: Brajbhasha poets at the Mughal Court” *Modern Asian Studies*. Vol. 44, No.2, pp 267-309

- Sharma, Sandhya (2011). *Literature, Culture and History in Mughal North India, 1550-1800*, Delhi: Primus
- Rao, V N, David Shulman and Sanjay Subrahmanyam (eds.) (2001). *Textures of Time: Writing History in South India 1600-1800*, Delhi: Permanent Black
- Zvelebil, Kamil (1974). *Tamil Literature (A History of Indian Literature X/I)*, Wiesbaden: Otto Harrassowitz

Unit II. This unit enables students to understand the various contexts and processes involved in the establishment of the Mughal state. Other than Mughal conquests, their warfare tactics and technology, it also discusses other political formations, some of considerable resilience and importance that complicated processes of imperial integration. These factors also inflected Mughal and other notions of kingship. To underline the variegated nature of politics of this period, the unit also studies the Nayaka state formation in South India.

(Teaching Time- 3weeks Approx.)

- Kolff, Dirk H.A. (1990). *Naukar, Rajput and Sepoy: the Ethnohistory of the military labour market in Hindustan, 1450-1850*. Cambridge: Cambridge University Press, pp. 1-116 (valuable for the social contexts of political and military expansion in the 16th century).
- Raziuddin Aquil. (2007). *Sufism, Culture and Politics: Afghans and Islam in Medieval North India*, Oxford: Oxford University Press.
- Tripathi, R P. (1959). *Some Aspects of Muslim Administration*. Allahabad: The Indian Press.
- Gommans, Jos J L. (2002). *Mughal Warfare: Indian Frontiers and Highroads to Empire, 1500-1700*, London and New York: Routledge
- Khan, Iqtidar Alam. (2004). *Gunpowder and Firearms: Warfare in Medieval India*, Delhi: Oxford University Press
- Streusand, Douglas E. (1989). *The Formation of the Mughal Empire*, Delhi: Oxford University Press
- Khan, I.A. (1972). "The Turko-Mongol Theory of Kingship", in K A Nizami (Ed.). *Medieval India-A Miscellany*, Vol. II, London: Asia Publishing House
- Mukhia, Harbans (2004). *The Mughals of India*, Oxford, United Kingdom: Wiley India, Blackwell Publishing
- Rizvi, S.A.A. (1975). *Religious and Intellectual History of the Muslims During the Reign of Akbar (1556-1605)*. New Delhi: Munshiram Manoharlal.
- Khan, Iqtidar Alam (1968). "The Nobility Under Akbar and the Development of his Religious Policy ,1560-80" , *Journal of Royal Asiatic Society*, No 1-2 , pp.29-36
- Richards, J F. (1998). "The Formulation of Imperial Authority under Akbar and Jahangir" in *Kingship and Authority in South Asia*, Delhi: Oxford University Press, pp. 285-326.
- Ziegler, Norman P (1998)- "Some Notes on Rajput Loyalties During the Mughal Period" in John F. Richards, (Ed.). *Kingship and Authority in South Asia*, Delhi: Oxford University Press, pp. 242-284.

- Zaidi, S Inayat A.(1997). “Akbar and Rajput Principalities- Integration into Empire” in Irfan Habib (ed.) *Akbar and His India*, Delhi: Oxford University Press
- Rao, V N, David Shulman and S. Subrahmanyam (1992). *Symbols of Substance: Court and State in Nayaka Period Tamilnadu*, Delhi: Oxford University Press
- Dirks, Nicholas B (2007). *The Hollow Crown. Ethnohistory of an Indian Kingdom*, Cambridge: Cambridge University Press
- Howes, Jennifer (2003). *The Courts of Pre-colonial South India*, London: Routledge
- Karashima, Noboru (1985). “Nayaka Rule in North and South Arcot Districts in South India During the 16th Century ”, *Acta Asiatica*, Vol. 48, pp. 1-25

Unit III: This unit will teach students about the key administrative institutions of the dominant political formation of the time, the Mughals, around whom there is now a rich historiography. Although centred around the Mughal state the readings and discussion will also enable students to explore questions relating to the medieval state formations and the social contexts of early modern administrative institutions. To provide a rounded picture of these developments the unit also discusses the histories of the emerging Rajput regimes. **(Teaching Time: 3 weeks Approx.)**

- Alam, M and S Subrahmanyam (eds.) (1998). *The Mughal State, 1526-1750*, Delhi: OUP
- Richards, J F. (1996). *The Mughal Empire*, Cambridge, Cambridge University Press
- Streusand, Douglas E. (1989). *The Formation of the Mughal Empire*, Delhi: Oxford University Press
- Malik, Z. U. (1990). “The core and periphery: A contribution to the debate on 18th century”, *Social Scientist*, Vol. 18 No.11/12, pp. 3-35
- Mayaram, Shail. (2004). *Against History, Against State*, Delhi: Orient Blackswan.
- Blake, S P (1979). “The Patrimonial-Bureaucratic State of the Mughals” *Journal of Asian Studies*, Vol. 19, No. 1, pp 77-94
- Ali, S Athar (Revised 1997) -*The Mughal Nobility Under Aurangzeb*, Delhi: Oxford University Press
- Richards, J F. (1996). *The Mughal Empire*, Cambridge, Cambridge University Press
- Moosvi, Shireen. (1981). “The Evolution of the Mansab System under Akbar until 1596-97”, *Journal of the Royal Asiatic Society of Great Britain & Ireland*, Vol. 113 No. 2, pp. 173-85,
- Ray, Aniruddha (1984). *Some Aspects of Mughal Administration*, New Delhi: Kalyani Publishers
- Kapur, N S. (2002). *State Formation in Rajasthan: Mewar During the Seventh-Fifteenth Centuries*, Delhi: Manohar, pp. 194-286.
- Sharma, G D. (1997). *Rajput Polity: A Study of Politics and Administration of the State of Marwar*, Delhi: Manohar
- Ziegler, Norman P. (2010). “Evolution of the Rathor State of Marwar: Horses, Structural Change and Warfare” in Meena Bhargava (ed.) *Exploring Medieval India. Sixteenth to Eighteenth Century, Vol. II*, Delhi: Orient BlackSwan

- Bhargav, V S. (1979). *Rise of the Kachhawas in Dhundhar (Jaipur): from the earliest times to the death of Sawai Jai Singh, 1743 AD*, Ajmer: Shabd Sanchar
- Chandra, Satish. (1993). *Mughal Religious Policies, The Rajputs and The Deccan*, Delhi: Vikas Publishing House.

UNIT IV: This unit focuses on the nuanced usage of visual culture (particularly architecture) as a means to articulate authority by rulers of different backgrounds and political ambitions. **(Teaching Time: 2 weeks Approx.)**

- Asher, Catherine B. (1992). *Architecture of Mughal India*, Cambridge: Cambridge University Press
- Talbot, Cynthia and Catherine B Asher (2006). *India Before Europe*, Cambridge: Cambridge University Press
- Brand, Michael and Glen D Lowry (Eds.). (1987). *Fatehpur Sikri*, Bombay: Marg Publications
- Koch, Ebba. (2002). *Mughal Architecture: An Outline of its History and Development, 1526-1858*, New Delhi, New York: Oxford University Press
- Mitchell, George. (1995). *Architecture and Art of Southern India: Vijayanagara and the Successor States 1350-1750*, Cambridge: Cambridge University Press
- Eaton, Richard M. And Phillip B. Wagoner. (2014). *Power, Memory, Architecture: Contested Sites on India's Deccan Plateau, 1300-1600*. New Delhi: Oxford University Press.
- Karashima, Noboru (2014). *A Concise History of South India: Issues and Interpretations*, New Delhi: Oxford University Press
- Rao, V N, David Shulman and S. Subrahmanyam. (1992). *Symbols of Substance: Court and State in Nayaka Period Tamilnadu*, Delhi: Oxford University Press

Unit V. This unit appraises students about the changing agrarian environment wherein the forest areas are brought under cultivation under the land revenue regime of dominant political regimes leading towards a process of peasantisation. Students would also grasp the crucial role of regional and local political formations, the Zamindars and the peasants in the agrarian society and economy of the period under study. **(Teaching Time- 2 weeks Approx.)**

- Singh, Chetan. (1995). "Forest, Tribes and Agrarian Society in Mughal India" in David Arnold and Ramchandra Guha, (Eds.), *Nature, Culture, Imperialism: Essays on Environmental History of South Asia*, New Delhi: Oxford University Press, pp. 21-48.
- Singh, Chetan. (2010). "Conformity and Conflict Tribes and the 'Agrarian System' of Mughal India" in Meena Bhargava (Ed.) *Exploring Medieval India, Vol. I*, Hyderabad: Orient Blackswan
- Bhargava, Meena (Ed.). (2017). *Frontiers of Environment: Issues in Medieval and Early Modern India*, Hyderabad: Orient Blackswan, (Introduction pp.1-42).

- Bhardwaj, Suraj Bhan (2012). “Migration, Mobility and Memories: Meos in the process of Peasantisation and Islamization in Medieval Period” *Indian Historical Review*, Vol. 39 No.1., pp. 217-250
- Ray, Aniruddha. (1984). *Some Aspects of Mughal Administration*, New Delhi: Kalyani Publishers
- Habib, Irfan (1999), *The Agrarian System of Mughal India 1556-1707*, Delhi: Oxford University Press
- Siddiqui, N A. (reprint 1989). *Land Revenue Administration under the Mughals (1700-1750)*. New Delhi: Munshiram Manoharlal Publishers
- Habib, Irfan. (1999). *The Agrarian System of Mughal India 1556-1707*, Delhi: Oxford University Press
- Habib, Irfan (1996). - “Peasant Differentiation and the Structure of Village Community: 16th and 17th Century Evidence From Northern India” in V K Thakur and A Anshuman (Eds.) *Peasants in Indian History*, Patna
- Chandra, Satish. (Ed.) (2005). *Religion, State and Society in Medieval India: Collected Works of Nurul Hasan*, Delhi: Oxford University Press
- Chandra, Satish. (1982). *Medieval India: Society, Jagirdari Crisis and the Village*. Delhi: Macmillan

Unit VI: The concluding unit of the course teaches students about political and religious ideologies of the times focusing not just on the Mughal rulers but more generally on the cross cutting ideas in circulation. It uses the case studies of Shaikh Ahmad Sirhindi and the Vaishnava saints to enlarge on some of these trends. **Teaching Time: 2 weeks Approx.)**

- Rizvi, S.A.A. (1975). *Religious and Intellectual History of the Muslims During the Reign of Akbar (1556-1605)*. New Delhi: Munshiram Manoharlal
- Alam, Muzaffar. (2000). ‘Akhlai Norms and Mughal Governance’ in Muzaffar Alam, Françoise Nalini, Delvoye and Marc Gaborieau (eds.). *The Making of Indo-Persian Culture*, Delhi: Manohar
- Alam, Muzaffar (2004). *The Languages of Political Islam: India (1200-1800)*, Delhi: Permanent Black
- Ali, S Athar (2008), “*Sulh-i-Kul* and Religious Ideas of Akbar” in *Mughal India: Studies in Polity, Ideas, Society and Culture*, Delhi: Oxford University Press
- Khan, A R. (2010). “Abu’l Fazl’s Account of Akbar’s Expansionism. Ambit of Reason and Tolerance” in Meena Bhargava (ed.) *Exploring Medieval India. Sixteenth to Eighteenth Century, Vol. II*, New Delhi: Orient BlackSwan
- Moosvi, Shireen (2007). “The Road to Sulh-i-Kul: Akbar’s Alienation from Theological Islam” in Irfan Habib (ed.) *Religion in History*, Delhi: Tulika
- Rizvi, S.A.A. (reprint 2014). *Muslim Revivalist Movements in Northern India In the 16th and 17th Century*. New Delhi: Munshiram Manoharlal

- Friedmann, Y. (2001). *Shaykh Ahmad Sirhindi: An Outline of his thought and a study of his Image in the Eyes of Posterity*, Oxford: Oxford University Press
- Habib, Irfan (1960). "Political Role of Shaikh Ahmad Sirhindi and Shah Waliullah" in *PIHC*
- Hasan, Nurul. (2005). "Shaikh Ahmad Sirhindi and Mughal Politics" in Satish Chandra (Ed.), *Religion, State and Society in Medieval India: Collected Works of Nurul Hasan*, New Delhi: The website on Vijayanagara is strongly recommended
- Lorenzen, David N. (1995). *Bhakti Religion in North India. Community Identity and Political Action*, New York: State University of New York Press
- Chatterjee, K. (2009). "Cultural Flows and Cosmopolitanism in Mughal India: The Bishnupur Kingdom", *Indian Economic and Social History Review*, vol. 46, No. 2, pp. 147-82.
- Bahugana, R.P. (2008). "Kabir and other Medieval Saints in Vaishnava Tradition", *PIHC*, Vol. 69
- Chakravarti, Ramakanta. (1977). "Gaudiya Vaisnavism in Bengal", in *Journal of Indian Philosophy*, Vol. 5, No. 1/2, pp. 107-49.
- Sharma, Krishna (2003). *Bhakti and Bhakti Movement*, Delhi: Munshiram Manoharlal Publishers

SUGGESTED READINGS:

- Alam, Muzaffar and S Subrahmanyam (2014). *Writing the Mughal World: Studies in Political Culture*, Delhi: Permanent Black
- Aquil, Raziuddin and Kaushik Roy (2012)- *Warfare, Religion and Society in Indian History*, Delhi: Manohar publishers and Distributors
- Balabanlilar, Lisa (2012). *Imperial Identity in the Mughal Empire: Memory and Dynastic Politics in Early Modern South and Central Asia*. New York: I B Tauris.
- Chandra, Satish (2018). *Madhyakalin Bharat (Part II), Sultanat se Mughal KalTak*, New Delhi: Jawahar Publishers & Distributors
- Day U.N. (2004). *Some Aspects of Medieval Indian History*. Delhi: Low Price Publications
- Grover, B R. (2004). "Nature of Dehat-i-Ta'aluqa (Zamindari Villages) and the Evolution of the Ta'aluqdari System During the Mughal Age" in Amrita Grover, Anju Grover and J C Jha, *Land Rights, Landed Hierarchy and Village Community During the Mughal Age: Collected Works of B R Grover*, Delhi: Books for All.
- Habib, Irfan (2016). *Madhyakalin Bharat Mein Prodhyogiki*, New Delhi: Rajkamal Prakashan
- Habib, Irfan (Ed.). (2000). *Madhyakalin Bharat*, (Vols. 1-8, relevant articles), New Delhi: Rajkamal Prakashan
- Habib, Irfan (Ed.). (2016). *Akbar AurTatkaleen Bharat*, New Delhi: Rajkamal Prakashan
- Habib, Irfan. (1966). "The Mansab System (1595-1637)", *PIHC*, pp 228-249
- Habib, Irfan. (1995). *Essays in Indian History: Towards a Marxist Perspective*, Delhi: Tulika

- Habib, Irfan. (2002). “Akbar and Technology” in Irfan Habib (Ed.), *Akbar and his India*, Delhi: Oxford University Press
- Habib, Irfan. (2017). *Madhyakalin Bharat ka ArthikItihas: EkSarvekshan*, New Delhi: Rajkamal Prakashan
- Nath, R. (2009). *Mysteries and Marvels of Mughal Architecture*, Gurgaon: Shubhi Publications
- Nizami, K A (1983). *On History and Historians of Medieval India*, New Delhi: Vedic Books
- Qaisar, A J. (1961). “Note on the date of institution of Mansab under Akbar”, *PIHC*, pp155-157
- Rezavi, S A N. (2013). *Fatehpur Sikri Revisited*, Delhi: OUP
- Rizvi, S.A.A. (2002).- *Fatehpur Sikri*, New Delhi: ASI and Eicher Goodearth Limited
- Saran, P. (1952). *Studies in Medieval Indian History*, Delhi: Ranjit Printers & Publishers.
- Siddiqui, I H. (1969). *Some aspects of Afghan Despotism in India*, Aligarh: Three Men Publications
- Spear, Percival (2009). “The Mughal Mansabdari System” in Edmund Leech and S N Mukherjee (eds.) *Elites in South Asia*, Cambridge: Cambridge University Press
- Verma H C. (Ed.) (2017). *Madhyakalin Bharat (Vol. II) 1540-1761*, Hindi Madhyam Karyanvan Nideshalaya Delhi University

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. Supporting audio-visual aids like documentaries and power point presentations will be used where necessary. Overall, the Teaching Learning Process shall emphasise the interconnect-edness of themes within the different rubrics to build a holistic view of the time period/region under study. The process shall consistently underline how various macro and micro-level devel-opments/phenomena can be historicised.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the stu-dents. Students will be assessed on their ability to engage with a sizeable corpus of readings as-signed to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Tawarikh, vernacular literature, Mughal State, *Mansabdari*, *Jagirdari*, *Zamindars*, architecture, Nayaks, *sulh-ikul*. Deccan Sultanates

Core Course X

History of India- VI (c. 1750-1857)

Course Objectives:

The paper introduces students to key features of the 18th century in the Indian subcontinent. It analyses the interface between the 18th century kingdoms and the early colonial state. The paper also discusses the processes by which the British East India Company transformed itself into a state and gradually consolidated its position over a vast expanse. Apart from the evolution of colonial institutions of governance and developing forms of colonial exploitation, the paper also highlights the interface between Company Raj and indigenous elite on various social issues. The paper concludes with a critical survey of peasant resistance to colonial agrarian policies, and the 1857 revolt against the Company Raj.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Outline key developments of the 18th century in the Indian subcontinent.
- Explain the establishment of Company rule and important features of the early colonial regime.
- Explain the peculiarities of evolving colonial institutions and their impact.
- Elucidate the impact of colonial rule on the economy.
- Discuss the social churning on questions of tradition, reform, etc. during first century of British colonial rule.
- Assess the issues of landed elite, and those of struggling peasants, tribals and artisans during the Company Raj.

Course Content:

Unit I: India in the mid-18th Century: society, economy, polity and culture

[a] Issues and Debates

[b] Continuity and change

Unit II: Dynamics of colonial expansion: indigenous states and Company power

[a] Regional kingdoms: economic and military and political dimensions of colonial expansion: Bengal, Mysore, Marathas, Awadh, Punjab and the North- East.

[b] Economic Developments, Culture and Society

Unit III: Colonial state and ideology: emergence of the Company State

- [a] Imperial ideologies: Orientalism, Utilitarianism, Evangelicalism and the question of Race
- [b] The colonial army: military culture and recruitment

Unit IV: Law and education

- [a] Evolution of law and colonial courts
- [b] Indigenous and colonial education: institutions and medium of instruction

Unit V: Economy and society

- [a] Land revenue systems and agrarian relations
- [b] Commercialization, indebtedness and famines
- [c] Forests and pastoral economy
- [d] Question of de-industrialization and foreign trade

Unit VI: Early 19th Century: Reforms and Revival

- [a] Young Bengal, Brahmo Samaj, Prathana Samaj, Faraizis and Wahabis
- [b] Debating Gender: Traditions and Reform in the 19th Century

Unit VII: Popular resistance

- [a] The Uprising of 1857
- [b] Peasant resistance to colonial rule: Santhal Uprising (1856); Indigo Rebellion (1860); Pabna Agrarian Leagues (1873); Deccan Riots (1875).

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: This Unit enables the students to outline key developments of the 18th century in the Indian subcontinent. These developments are discussed through key debates on the varied historical evidences used by historians when examining the weakening Mughal state, growth of regional kingdoms, changing dynamics of the economy, evolving social structures, cultural patterns, etc. **(Teaching Time: 2 weeks Approx.)**

- Alavi, Seema(ed.). (2002). *The Eighteenth Century in India*. New Delhi: OUP (Introduction).
- Roy, Tirthankar. (2013). "Rethinking the Origins of British India: State Formation and Military-fiscal Undertakings in an Eighteenth Century World Region". *Modern Asian Studies*, 47 (4), 1125-1156.
- Bayly, C.A. 1988. *Indian Society and the making of the British Empire*. Cambridge: CUP (Chapter 1, pp. 7- 44).

- Parthasarathi, Prasannan. 2011. *Why Europe Grew Rich and Asia Did Not: Global Economic Divergence, 1600- 1850*. Cambridge: CUP (Introduction and Part I, pp. 1-88; Part III, pp. 185- 269).
- Vries, Peer. (September 2012). "Review: Challenges, (Non-) Responses, and Politics: A review of Prasannan Parthasarathi, 'Why Europe Grew Rich and Asia Did Not: Global Economic Divergence, 1600-1850'." *Journal of World History*, 23(3), 639- 664.
- Faruqui, Munis D. 2013. "At Empire's End: The Nizam, Hyderabad and Eighteenth Century India," In Richard M. Eaton, Munis D. Faruqui, David Gilmartin and Sunil Kumar (Eds.), *Expanding Frontiers in South Asian and World History: Essays in Honour of John F. Richards* (pp. 1- 38).

Unit- II: This Unit introduces the students to the political process by which Company rules was established in the Indian subcontinent. The unit shall also acquaint students with the important features of the 18th century states and how they came to be positioned vis-à-vis an expanding Company state. **(Teaching Time: 2 weeks Approx.)**

- Bandyopadhyay, Sekhar .(2004). *From Plassey to Partition: A History of Modern India*. New Delhi: Orient Blackswan (Chapter 1, 'Transition to the Eighteenth Century', pp. 37-62).
- Bayly, C. A. (2008). *Indian Society and the making of the British Empire*. Cambridge: CUP (Chapter 2, 'Indian Capital and the Emergence of Colonial Society' pp. 45- 78; Chapter 3, 'The Crisis of the Indian State', pp. 79- 105).
- Fisher, Michael H. (1996). *The Politics of British Annexation of India 1757- 1857*. Oxford: OUP (Introduction).
- Marshall, P.J. (1990). *Bengal: The British Bridgehead*. Cambridge: CUP.
- Marshall, P. J. (1975). "Economic and Political Expansion: The Case of Awadh". *Modern Asian Studies*, 9 (4), pp. 465- 82.
- Cederlof, Gunnel. (2014). *Founding an Empire on India's North- Eastern Frontiers 1790- 1840: Climate, Commerce, Polity*. OUP.
- Mukherjee, Rudrangshu. (February 1982). "Trade and Empire in Awadh, 1765- 1804". *Past and Present*, 94, pp. 85- 102.
- Chaudhury, Sushil. (2000). *The Prelude to Empire: Plassey Revolution of 1757*. New Delhi: Manohar.
- Bryant, G. J. (April 2004). "Asymmetric Warfare: The British Experience in Eighteenth-Century India". *The Journal of Military History*, 68 (2), April 2004, pp. 431- 469.
- Marshall, P.J. (ed.). *The Eighteenth Century In Indian History: Evolution or Revolution?* (Introduction, pp. 1- 49).
- Chakravarti, Uma. (1998). *Rewriting History: The Life and Times of Pandita Ramabai*. New Delhi: Kali for Women (Chapter, 'Caste, Gender and the State in Eighteenth Century Maharashtra', pp. 3-42).

Unit-III:The unit shall discuss in detail and familiarise students with the evolving ideological underpinnings of the Company state, the idea of difference which developed within the imperial discourse, the changing military requirements and military culture of the expanding colonial state.(Teaching Time: 2 weeks Approx.)

- Metcalf, Thomas R. (2007 reprint). *Ideologies of the Raj*, Cambridge: CUP (Chapters 1,2 & 3).
- Wagoner, Phillip B. (October 2003). “Pre- colonial Intellectuals and the Production of Colonial Knowledge”.*Comparative Studies in Society and History*, 45 (4), pp. 783- 814.
- Cohn, Bernard. (1996). “The Command of Language and the Language of Command” In B. Cohn, *Colonialism and its Forms of Knowledge: The British in India*, Princeton: Princeton University Press.
- Stokes, Eric. (1982 reprint). *The English Utilitarians and India*. Oxford: OUP (Chapter ‘Doctrine and its Setting’)
- Alavi, Seema. (1995).*The Sepoys and the Company: Tradition and Transition in Northern India 1770- 1830*. New Delhi: OUP (Introduction and Chapters 1-3, pp. 1- 154).
- Roy, Kaushik (ed.). (2010). *War and Society in Colonial India*. New Delhi: OUP (Introduction, pp. 1- 20).
- Rocher, Rosanne. (1993). “British Orientalism in the Eighteenth Century: The Dialectics of Knowledge and Government”, in Peter van der Veer and Carol Breckenridge eds. *Orientalism and the Post- colonial Predicament: Perspectives on South Asia*. University of Pennsylvania Press, pp. 215-250.

Unit-IV: This Unit shall equip students to identify and explain the peculiarities of evolving colonial institutions and their impact. The discussion shall focus largely on the evolving legal apparatus and education structure and policy of the Company state.(Teaching Time: 2 weeks Approx.)

- Stokes, Eric. *The English Utilitarians and India*(Chapter, ‘Law and Government’).
- Metcalf, Thomas R. (2007 reprint). *Ideologies of the Raj*, Cambridge: CUP (Chapters 1 &2).
- Cohn, Bernard. “Law and the Colonial State” In Cohn, *Colonialism and its Forms of Knowledge*.
- Singha, Radhika. (2000). *A Despotism of Law: Crime and Justice in Early Colonial India*. New Delhi: OUP(Preface; Chapter 1 (pp.1- 35); Chapter 4 (pp.121- 167); Chapter 5 (pp. 168- 228); Epilogue (pp. 285- 301)).
- Viswanathan, Gauri. (2014 reprint). *Masks of Conquest: Literary Study and British Rule in India*. New York: Columbia University Press (Introduction and Chapters 1 to 4).
- Copland, Ian. (2007). “The Limits of Hegemony: Elite Responses to Nineteenth- Century Imperial and Missionary Acculturation Strategies in India”. *Comparative Studies in Society and History*. Vol. 49. No. 3. (637- 665).

- Seth, Sanjay. (2007). "Changing the Subject: Western Knowledge and the Question of Difference". *Comparative Studies in Society and History*. Vol. 49. No. 3. (666- 688).
- Kopf, David. (1969). *British Orientalism and the Bengal Renaissance: The Dynamics of Modernization*. Berkeley, Los Angeles: University of California Press (Introduction).
- Panikkar, K.N. (1995). *Culture, Ideology, Hegemony: Intellectuals and Social Consciousness in Colonial India*. New Delhi: Tulika(pp. 1-26 & pp. 47-53).
- Bhattacharya, Sabyasachi (ed.). (1998). *The Contested Terrain: Perspectives on Education in India*. New Delhi: Orient Blackswan ("Introduction").

Unit-V: This Unit shall familiarise students with the key debates on the economic impact of Company Raj. Students shall assess this impact by looking at changing agrarian relations, crop cultivation, forest policy, handicraft production and trade patterns. **(Teaching Time: 2 weeks Approx.)**

- Stein, Burton. (ed.). (1992). *The Making of Agrarian Policy in British India 1770-1900*. Oxford: OUP (Introduction (pp.1-32)& Chapter 4(pp.113-149)).
- Tomlinson, B.R. (2005). *The Economy of Modern India 1860-1970*. Cambridge: CUP (Chapter 2, pp.47- 67)
- Bose, Sugata. (Ed.). (1994). *Credit, Markets and the Agrarian Economy of Colonial India*. New Delhi: Oxford University Press (Introduction (pp. 1-28) & Chapter 2 (pp. 57- 79)).
- Guha, Ramachandra. (1990). "An Early Environmental Debate". *Indian Economic and Social History Review (IESHR)*.
- Bhattacharya, Neeladri. (1995). "Pastoralists in a Colonial World", In David Arnold and Ramachandra Guha (Eds.), *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia*, New Delhi: Oxford University Press.(49-85).
- Damodaran, Vinita. (June 1995). "Famine in a Forest Tract: Ecological Change and the Causes of the 1897 Famine in Chotanagpur", *Environment and History*, 1(2), pp. 129-158.
- Chandra, Bipan. (1999). "Colonialism, Stages of Colonialism and the Colonial State", in- Bipan Chandra, *Essays on Colonialism*, New Delhi: Orient Longman, pp. 58-78.
- Ray, Indrajit. (2016). "The Myth and Reality of Deindustrialization in Early Modern India", in Latika Chaudhary et al. (Eds.) *A New Economic History of Colonial India*. New York: Routledge. (52- 66).

Unit-VI: This Unit shall acquaint students with the social churning on questions of tradition, modernity, reform, etc. that unfolded during first century of British colonial rule. Through special focus on gender concerns, gender roles in the household and ideas of 'ideal womanhood', the unit shall enable students to contextualize the endeavours of nineteenth-century social reformers and nationalists. **(Teaching Time: 2 weeks Approx.)**

- Jones, Kenneth. (2003). *Socio-Religious Reform Movements in British India* (pp. 15- 47; pp. 122- 131).
- Joshi, V.C. (ed.). (1975). *Rammohun Roy and the Process of Modernization in India*. Vikas Publishing House (essays by A.K. Majumdar and Sumit Sarkar).
- Singh, Hulas. (2015). *Rise of Reason: Intellectual History of 19th-century Maharashtra*. Taylor and Francis (pp. 1- 197).
- Sarkar, Sumit and Tanika Sarkar (eds.).(2008). *Women and Social Reform in India: A Reader*. Bloomington and Indianapolis: Indiana University Press (Chapters 1, 2 and 4).
- Loomba, Ania. (Autumn 1993). “Dead Women Tell No Tales: Issues of Female Subjectivity, Subaltern Agency and Tradition in Colonial and Post- Colonial Writings on Widow Immolation in India”. *History Workshop*, 36, pp.209–227.

Unit-VII: This Unit shall enable students to identify and discuss the issues reflected in the major uprisings of the nineteenth century. In the context of heavy revenue assessment, changing land rights, deepening stratification within the rural society, emergence of new social forces in agrarian economy, etc., students shall discuss the discontent of the landed elite, and those of struggling peasants and tribals during the Company Raj. **(Teaching Time: 2 weeks Approx.)**

- Stokes, Eric and C.A. Bayly. (1986). *The Peasant Armed: the Indian Revolt of 1857*. Clarendon Press (Introduction).
- Mukherjee, Rudrangshu. (1993). “The Sepoy Mutinies Revisited”, in Mushirul Hasan and Narayani Gupta (Eds.), *India’s Colonial Encounter*, New Delhi: Manohar
- David, Saul. (2010). “Greased Cartridges and the Great Mutiny of 1857: A Pretext to Rebel or the Final Straw”, In Kaushik Roy (ed.) *War and Society in Colonial India* (82-113).
- Hardiman, David. (1993). *Peasant Resistance in India, 1858- 1914*. New Delhi: OUP. Introduction & pp. 1-125.
- Desai, A.R. (ed.) (1979). *Peasant Struggles in India*. Bombay: UP. (136- 158)

SUGGESTED READINGS

- Alavi, Seema ed. (2002). *The Eighteenth Century in India*. New Delhi: OUP.
- Bara, Joseph (2002) “Tribal Education, the Colonial State and Christian Missionaries: Chotanagpur 1839-1870.” In *Education and the Disprivileged : Nineteenth and Twentieth Century India*, edited by Sabyasachi Bhattacharya. New Delhi: Orient Longman, pp. 123-152.
- Bayly, Susan. (1999). “Chapter 2: Kings and Service People 1700-1830.” *Caste, Society and Politics in India from the 18th Century to the Modern Age*. Cambridge: Cambridge University Press. The New Cambridge History of India Series, pp. 64-79.
- Bhattacharya, Sabyasachi ed. (2007). *Rethinking 1857*. Delhi: Orient Longman.

- Chaudhury, Sushil. (2000). *The Prelude to Empire: Plassey Revolution of 1757*. Delhi: Manohar.
- Constable, Philip. (2001). "The Marginalization of a Dalit Martial Race in the Late Nineteenth and Early Twentieth Century Western India". *Journal of Asian Studies*, 60 (2), pp. 439-78.
- Dirks, Nicholas B. (2001). *Castes of Mind*. Princeton, New Jersey: Princeton University Press,
- Green, William A. et al. (Spring 1985). "Unifying Themes in the History of British India, 1757-1857: An Historiographical Analysis" *Albion: A Quarterly Journal Concerned with British Studies*, 17 (1), pp. 15-45. [pp. 20-24 is a survey of British strategy/calculations during its territorial expansion]
- Guha, Ranajit. (1983) *Elementary Aspects of Peasant Insurgency in Colonial India*. New Delhi: Oxford University Press (Introduction & Chapter 'Territoriality').
- Hutchins, Francis. (1967). *The Illusion of Permanence*. Princeton, New Jersey: Princeton University Press.
- Jones, Kenneth. (2003) *Socio-Religious Reform Movements in British India*. New Cambridge History of India, Vol.3.1. Cambridge: Cambridge University Press.
- Kapila, Shruti ed. (2010). *An Intellectual History for India*. Delhi: Cambridge University Press.
- Ludden, David ed. (2005). *Agricultural Production and South Asian History*. New Delhi: Oxford University Press.
- Metcalf, Thomas. (1995). *Ideologies of the Raj*. Cambridge: Cambridge University Press (Chapter 4, Ordering Difference, pp. 92-128).
- Mukherjee, Mithi. (2010) *India in the Shadows of Empire: A Legal and Political History 1774- 1950*. New Delhi: Oxford University Press (Introduction and Chapter 1, 'The Colonial and the Imperial', pp. 1- 44).
- Mukherjee, Rudrangshu. (1984) *Awadh in Revolt 1857-1858*. New Delhi: Oxford University Press.
- Mukherjee, Rudrangshu. (2018). "The Azimgarh Proclamation and Some Questions on the Revolt of 1857 in the North western Provinces". *The Year of Blood: Essays on the Revolt of 1857*. New Delhi: Social Science Press and Routledge.
- Pollock, Sheldon ed. (2011). *Forms of Knowledge in Early Modern Asia*. Delhi: Manohar. Introduction (1- 16).
- Parthasarathi, Prasannan. (2001). *The Transition to a Colonial Economy: Weavers, Merchants and Kings in South India, 1720-1800*. Cambridge: Cambridge University Press.
- Raj, K N. et al ed. (1985). *Essays on the Commercialization of Indian Agriculture*. New Delhi: Oxford University Press.
- Robb, Peter, ed. (1993). *Dalit movements and the meanings of labour in India*. New Delhi: Oxford University Press.
- Roy, Tirthankar. (2010). *Company of Kinsmen: Enterprise and Community in South Asian History 1700-1940*. New Delhi: OUP (Chapter 6, pp. 190- 219).

- Skuy, David. (July 1998). “Macaulay and the Indian Penal Code of 1862: The Myth of the Inherent Superiority and Modernity of the English Legal System Compared to India's Legal System in the Nineteenth Century”, *Modern Asian Studies*, 32 (3), pp. 513-557.
- Stein, Burton (ed.) (1992). *The Making of Agrarian Policy in British India, 1770-1900*. Delhi: Oxford University Press.
- Stern, Phillip. (2011). *The Company-State: Corporate Sovereignty and the Early Modern Foundations of the British Empire in India*. New York: Oxford University Press.
- Stokes, Eric. (1986). *The Peasant Armed: The Indian Rebellion of 1857* In C.A. Bayly (ed.). New Delhi: Oxford University Press.
- Tilak, Lakshmibai. (2017, 1973). *Smritichitre: The Memoirs of a Spirited Wife*. New Delhi: Speaking Tiger. (Translated by Shanta Gokhale).
- Rosanne Rocher, “British Orientalism in the Eighteenth century: The Dialectics of Knowledge and Government”, in Peter van der Veer and Carol Breckenridge eds. *Orientalism and the Postcolonial Predicament: Perspectives on South Asia*, University of Pennsylvania Press, 1993.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. Supporting audio-visual aids like documentaries and power point presentations will be used where necessary. Overall, the Teaching Learning Process shall emphasise the interconnect-edness of themes within the different rubrics to build a holistic view of the time period/region under study. The process shall consistently underline how various macro and micro-level devel-opments/phenomena can be historicised.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the stu-dents. Students will be assessed on their ability to engage with a sizeable corpus of readings as-signed to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

18th century Debates, Bengal, Mysore, Awadh, Marathas, Colonial Expansion, Utilitarianism, Evangelicalism, race, Colonial Army, Law and Courts, Colonial Education, Land Revenue, Forests, de-Industrialization, Reformist and Revivalist Movements, Gender, Caste, 1857

Core Course XI

History of Modern Europe – I

Course Objectives

This paper shall provide a critical overview of the French Revolution, and acquaint the students with the repercussions of the revolution, both within and beyond France. It shall also trace the patterns and outcomes of social upheaval throughout Europe in the first half of 19th century. The debates on the development and impact of industrial capitalism shall be discussed. The birth of new social movements, political ideas and structures shall be contextualised within developing capitalism of the nineteenth century.

Learning Outcomes:

On completing this course, the students will be able to:

- Identify what is meant by the French Revolution.
- Trace short-term and long-term repercussions of revolutionary regimes and Empire-building by France.
- Explain features of revolutionary actions and reactionary politics of threatened monarchical regimes.
- Delineate diverse patterns of industrialization in Europe and assess the social impact of capitalist industrialization.
- Analyse patterns of resistance to industrial capital and the emerging political assertions by new social classes.

Course Content:

Unit I: A Period of Revolutions 1789-1850

- [a] Crisis of the Ancien Regime and the Enlightenment
- [b] Phases of the French Revolution 1789-99
- [c] Social classes and emerging gender relations
- [d] Bonapartist State and Features of the first French Empire
- [e] Restoration of the old order, social and political currents in the early nineteenth century, revolutions: 1830s-1850s

Unit II: Industrial Revolution and Social Transformation (the 19th century)

- [a] Process of capitalist development in industry and agriculture; Changing class structure in France, Germany and Russia
- [b] Industrial Revolution and Society: Family Life and Gender

Unit III: Liberal democracy, working class movements and Socialism in the 19th and 20th centuries

- [a] The struggle for parliamentary democracy and civil liberties in Britain : Parliamentary and institutional reforms; working class discontent chartists; suffragettes
- [b] Socialism: Early socialist thought, Marxian socialism, Debates and Strategies: The International working class movement

Unit IV: Culture and Society: 1789-1850s

- [d] Art and culture in revolutionary France: neo classical art; reformation of the royal academies
- [b] The Consumption of Culture in 19th century Europe; Romanticism in art and literature
- [c] The City in the age of Industrialization

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit 1: At the end of this rubric students would have developed an understanding of the significant transformations in European polity and society till the mid nineteenth century. They would have explored various themes starting from the French Revolution, transformations in French Society, the nature of the Bonapartist regime and events leading up to the revolutions 1848. **(Teaching time: 6 weeks Approx.)**

- McPhee, Peter. (2002). *The French Revolution 1789-1799*. New York: Oxford University Press (Ch.1, Ch.2, Ch.3, Ch.4, Ch.5, Ch.6, Ch7, Ch.8 & Ch.9)
- Campbell, Peter R. (Ed.).(2006). *The Origins of the Revolution*. New York: Palgrave Macmillan, pp. 1-34, 139-159 (Introduction and Ch.5).
- Rude, George (2000). *Revolutionary Europe 1783-1815*. Somerset, New Jersey, U.S.A.: Wiley-Blackwell (Ch.1).
- Furet, Francois, (1988). *The French Revolution 1770-1814*. Oxford: Blackwell, pp.3-100 and 211-66.
- Landes, Joan B. (1988). *Women and the Public Sphere in the Age of the French Revolution*. Ithaca, London: Cornell University Press,
- Darnton, Robert. (1996). "What was Revolutionary About the French Revolution." in Peter Jones, (Ed.). *The French Revolution in Social and Political Perspective*. London: Edward Arnold, pp. 18-29.
- Kates, Gary. (Ed.).(1998). *The French Revolution: Recent debates and Controversies*. London and New York: Routledge.
- Grabb, Alexander.(2003). *Napoleon and the Transformation of Europe*. New York: Palgrave Macmillan (Ch. 2 & Ch.3).
- Lyons, Martin. (2006). *Post-Revolutionary Europe, 1815-1856*, New York: Palgrave Macmillan.

- Price, Roger (1988). *The Revolutions of 1848*. London: Macmillan.

Unit II: In this Unit the student would learn about the social and economic changes in Europe during the nineteenth century. The student would be expected to develop on her/his understanding of the social and economic dimensions of the Industrial revolution in eighteenth century Britain to compare and understand the specific case studies of France, Germany and Russia in the nineteenth century. **(Teaching time: 3 weeks Approx.)**

- Stearns, Peter N.(2013). *The Industrial Revolution in World History*. Boulder: Westview Press.
- Trabilcock, Clive. (2000). "Industrialization of Modern Europe 1750-1914." in T.C.W. Banning (Ed.). *The Oxford History of Modern Europe*. Oxford: Oxford University Press, pp. 46-75.
- Cameron, Rondo. (1985). "A New View of European Industrialization." *Economic History Review* 38 (1), pp. 1-23.
- Beaudoin, Steven M.(2003). *The Industrial Revolution*. Boston, New York: Houghton Mifflin Company (Ch.4 & Ch.5)
- Simonton, Deborah. (1998). *The Routledge History of Women in Europe since 1700*, London and New York: Routledge, pp.134-176 (Ch.5).

Unit III: At the end of this rubric the student will be expected to demonstrate an understanding of the transformations of the political systems in nineteenth century Europe. Taking up the case study of nineteenth century Britain the student will study the development of parliamentary institutions alongside a new politically assertive working class. The student will also be expected to bring together her/his understanding of the economic and political transformations in this period when exploring the emergence of socialist thought and critique of capitalism. **(Teaching time: 3 weeks Approx.)**

- Lang, Sean (2005). *Parliamentary Reform, 1785-1928*. London and New York: Routledge.
- Walton, John K.(1999). *Chartism*, London and New York: Routledge.
- Geary, Dick (1981). *European Labour Protest 1848-1939*. London: Croom Helm London
- Kolakowski, Leszec. (1978). *Main Currents of Marxism*. Volume I. Oxford: Clarendon Press.
- Lichthem, George. (1970). *A Short History of Socialism*. London: Weidenfield and Nicolson.
- Joll, James. (1990). *Europe Since 1870*. New York: Penguin Books, pp. 49-77

Unit IV: Culture and Society: 1789-1850s: Approx. In this Unit the student will be expected to link various themes from the earlier rubrics and develop an understanding of the cultural, artistic and urban transformations in nineteenth century Europe. The student will be expected to develop a competent understanding of the emergence of new art forms, reformation of various art and cultural academies, the developing notions of consumption of culture and the changing patterns of urbanism. **(Teaching time: 2 weeks Approx.)**

- Kennedy, Emmet. (1989). *A Cultural History of the French Revolution*. New Haven and London: Yale University Press.
- Hunt, Lynn. (2004). *Politics, Culture, and Class in the French Revolution*. Oakland: University of California Press.
- Hunt, Lynn. (1989). "Introduction: The French Revolution in Culture, New Approaches and Perspectives." *Eighteenth-Century Studies* 22(3), Special Issue: The French Revolution in Culture, Spring.
- Blanning, T.C.W. (2000). "The Commercialization and Sacralization of European Culture in the Nineteenth Century." in T.C.W. Blanning, (ed.). *The Oxford History of Modern Europe*. Oxford: Oxford University Press, pp. 101-125 & 126-152.
- Blanning, T.C.W. (2010). *The Romantic Revolution: A History*. London: George Weidenfeld & Nicholson.
- Bergdoll, Barry. (2010). *European Architecture 1750-1890 (Oxford History of Art)*. New York: Oxford University Press.
- Lees, Andrew and Lynn Hollen Lees. (2007). *Cities and the Making of Modern Europe 1750-1914*. Cambridge: Cambridge University Press.

SUGGESTED READINGS:

- Bayly, C.A. (2004). *The Birth of the Modern World, 1780-1914*. Oxford: Blackwell Publishing, pp. 199-242.
- Berger, Stefan. (Ed.). (2004). *A Companion to Nineteenth Century Europe 1789-1914*, Oxford: Blackwell Publishing.
- Bottomore, Tom. (Ed.). (1983). *A Dictionary of Marxist Thought*, Oxford: Blackwell.
- Breunig, Charles. (1977). *The Age of Revolution and Reaction 1789 to 1850*. New York: W.W. Norton and Company, pp. 252-278 (Ch.7).
- David, Thompson. (1990). *Europe Since Napoleon*. New York: Penguin Books.
- Davies, Peter. (2006). *The Debate on the French Revolution*. Manchester and New York: Manchester University Press.
- Deborah Simonton, Deborah. (1998). *A History of European Women's Work: 1700 to the Present*. London and New York: Routledge.
- Dowd, David L. (1951). "Art as National Propaganda in the French Revolution." *The Public Opinion Quarterly* 18 (3), pp. 532 – 546.
- Dowd, David L. (1959). "The French Revolution and the Painters." *French Historical Studies* 1 (2), pp. 127-148.
- Frederick Engels. (1970 reprint). *Socialism: Utopian and Scientific*, trans. Edward Aveling. Moscow: Progress Publishers. Available at http://www.marxists.org/archive/marx/works/download/Engels_Socialism_Utopian_and_Scientific.pdf.
- Frey, Linda S. and Marsha S. Frey. (2004). *The French Revolution*, Westport, CT: Greenwood Press, pp. 37-46 ("A New Political Culture").
- Hobsbawm, Eric (2011). *How to Change the World, Reflections on Marx and Marxism*. New Haven and London: Yale University Press.
- Hufton, Olwen. (1971). "Women in Revolution 1789-1796." *Past & Present* 53, pp. 90-108.

- Hunt, Lynn; Tomas R. Martin, Barbara H, Rosenwein, Bonnie G. Smith.(2010).*The Making of the West: Peoples and Cultures, A Concise History*. Boston and New York: Bedford / St. Martin.
- Kemp, Tom. (1978). *Historical Patterns of Industrialization*. New York: Longman
- Lee, Stephen J. (1998). *Aspects of European History 1789-1980*. London and New York: Routledge (Ch. 3 & Ch. 4).
- McPhee, Peter. (2013). *A Companion to the French Revolution*. New Jersey: Wiley-Blackwell (Ch.2, Ch.3, Ch.12, Ch.13, Ch.14, Ch.26 and Ch.28).
- Merriman, John. Open Yale Course Lectures [audio].
- Merriman, John. (2002). *A History of Modern Europe: From the Renaissance to the Present*. New York: W.W. Norton
- Ozouf, Mona. (1988). *Festivals and the French Revolution*. Cambridge: Harvard University Press (Introduction).
- Perry, Marvin and George W. Bock. (1993). *An Intellectual History of Modern Europe*. Princeton: Houghton Mifflin Company.
- Perry, Marvin. (1990).*Western Civilization: Ideas, Politics and Society*. Volume II.Boston and New York: Houghton Mifflin Harcourt Publishing Company.
- Price, Roger. (1993). *A Concise History of France*. Cornwall: Cambridge University Press
- Rapport, Michael. (2005). *Nineteenth Century Europe*. New York: Palgrave Macmillan.
- Sperber, Jonathan (2005). *The European Revolutions, 1848-1851*. Cambridge: Cambridge University Press.
- Thomson, David. (2007). *Europe since Napoleon*, New Delhi: Surjeet Publications, pp. 79-103 (Ch.6 & Ch.7).
- Willis, Michael. (1999). *Democracy and the State, 1830-1945*.Cambridge: Cambridge University Press.
- Wright, D.G. (1988). *Popular Radicalism: The Working Class Experience 1780-1880 - Studies In Modern History*. Second edition. New York: Longman.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Students shall also be encouraged to participate in talks/seminar presentations by specialists in the field. Since this is history of a region/s less familiar to students, adequate attention shall be given to background introductory lectures and discussions. Overall, the Teaching Learning Process shall emphasise the interconnectedness of themes within the different rubrics to build a holistic view of the time period/region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. Students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Ancien Regime, Gender Relations, Art and Culture, Napoleonic Consolidation, 1848, Industrialization, Demography, Gender, Family, British parliamentary Democracy, Protest Movements, Marxism, First & Second International

Core Course XII

History of India- VII (c. 1600-1750)

Course Objectives:

The course draws students into a discussion of the multiple historiographical narratives available for the history of India in the period between the early seventeenth and the mid-eighteenth centuries. It intends to familiarise them with internal as well as external problems and challenges that the Mughal state faced in the process of territorial expansion. Students also get to explore state sponsored art and architecture as part of the courtly cultures. Further they are encouraged to critically examine the major strides that were made in trade, technologies and artisanal activities during this period. In addition, the course aims to introduce students to contrasting religious ideologies of the time besides developing a critical insight into the historiographical debate on interpreting the eighteenth century in Indian history.

Learning Outcomes:

On completion of this course, the students shall be able to::

- Critically evaluate the gamut of contemporaneous literature available in Persian and non-Persian languages for the period under study
- Describe the major social, economic, political and cultural developments of the times
- Explain the intellectual ferment of the seventeenth and eighteenth centuries and its relation to state policies.
- Discern the larger motives behind the Imperial patronage of art and architecture
- Appreciate and express the continued expansion and dynamism of agriculture, crafts and maritime trade in India

Course Content

Unit 1: Sources

- (a) Persian Histories, Memoirs: Jahangirnama, Ma'asir-i Alamgiri
- (b) Travelogues: Bernier, Manucci
- (c) Vernacular literary cultures: Mangalkavya and Rekhta

Unit 2: Political developments and state formation

- (a) Issues in the wars of succession
- (b) Mughal relations with Rajput States (Mewar and Marwar)
- (c) Maratha state formation under Shivaji and expansion under the Peshwas

- (d) Sikh Community formation in the seventeenth century

Unit 3: Religion, Society and the State

- (a) Orthodoxy and syncretism: Naqshbandi Sufis and DaraShukoh
(b) Historiography on Aurangzeb: jizya, temples and music

Unit 4: Political and Visual Culture

- (a) Mughal courtly culture: Umara, Haram, Mirzai
(b) Shahjahanabad
(c) Mughal Painting: allegory and symbolism under Jahangir and Shah Jahan

Unit 5: Trade and Crafts

- (a) Indian Oceanic trade: European commercial enterprise-Kerala, Coromandel coast, Western India
(b) Crafts and technologies

Unit 6: Interpreting the Eighteenth Century

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I: Introduces students to the writing of history in the seventeenth and the eighteenth centuries. Through reading official and non-official, courtly and vernacular, public and personal accounts students shall be urged to think through histories, genres, and sources and rethink the above categories. The unit thus, contemplates a critical historiography. **(Teaching Time: 3 weeks Approx.)**

- Thackston, W. M. (2006).ed. & tr. *Jahangirnama – Memoirs of Jahangir: Emperor of India*, New York, Oxford University Press (Refer to the preface of the translator on Muhammad Hadi--a copier of *Jahangirnama*)
- Lefèvre, Corinne (2007), “Recovering a Missing Voice from Mughal India: The Imperial discourse of Jahangir (1605-27) in his Memoirs”, in *Journal of Economic and Social History of the Orient*, Vol. 50, No. 4, pp. 452-89.
- Moin, Afzar.(2012).*The Millennial Sovereign: Sacred Kingship and Sainthood in Islam*, New York: Columbia University Press
- Sarkar, J (1947). Tr. *A History of the Emperor Aurangzeb ‘Alamgir (r. 1658-1707 AD) of-SaqiMust‘ad Khan*, Calcutta: Royal Asiatic Society of Bengal
- Alvi, Sajida. (1976). “The Historians of Awrangzeb (sic): A Comparative History of three primary sources” in D.R. Little (ed.),*Essays on Islamic Civilization presented to NiyaziBerkes*, Leiden: E. J. Brill, pp. 57-73.
- Tambiah, S.J. (1988). “What did Bernier actually say? Profiling the Mughal Empire”, *Contribution to Indian Sociology*, vol.31 no.2, pp. 361-86.

- Ray, A. (2005). "Francoise Bernier's Idea of India" in I. Habib, (Ed.). *India: Studies in the History of an Idea*, New Delhi: Munshiram Manoharlal
- Irvine, William, (1907) tr. *Storia do Mogor-Or Mogul India; 1653-1708* by Niccolao Manucci, Volume I, London: Royal Asiatic Society
- Subrahmanyam, Sanjay. (2008). "Further thoughts on an Enigma: The tortuous life of Niccolao Manucci 1638-c.1720" in *Journal of the Economic and Social History of the Orient*, Vol. 45. No. 1, pp. 35-76.
- Subrahmanyam, Sanjay (2011). *Three Ways to be Alien: Travails and Encounters in Early Modern World*, New Delhi: Permanent Black, pp.133-212 (Chap-4, Unmasking the Mughals)
- Brown, Katherine B. (2007). "Did Aurangzeb Ban Music? Questions for the Historiography of his Reign" in *Modern Asian Studies*, Vol. 41. No. 1, pp. 77-120.
- Curley, David L. (2008), *Poetry and History. Bengali Mangal-Kabya and Social Change in Pre-Colonial Bengal*, New Delhi: Chronicle Books (Chaps. 1 and 5).
- Chatterjee, Kumkum (2013), "Goddess Encounters: Mughals, Monsters and the Goddess in Bengal" in *Modern Asian Studies*, Vol. 47, Issue-5, pp. 1435-87
- Faruqi, S.R. (2003), "A long History of Urdu Literary Culture: Part 1: Naming, Placing a Literary Culture" Chap 14, and Frances W. Pritchett, "Part 2: Histories, Performances and Masters" , Chap., 15, in Pollock, Sheldon. (Ed.). *Literary Cultures in History: Reconstructions from South Asia*, Berkeley: University of California Press

Unit II: Foregrounds issues in the formation and maintenance of political power in the Mughal and Maratha states. It analyses events of successions, alliances, and contestations to sketch an image of pre-colonial India. **(Teaching Time: 3 weeks Approx.)**

- Ali, Athar. (2006). "Religious Issues in the war of succession", in Athar Ali, "*Mughal India: studies in Polity, Ideas, Society and Culture*". Delhi: Oxford University Press.
- Richards, J. F. (2007). *The Mughal Empire: The New Cambridge History of India, Volume 5*, Cambridge: Cambridge University Press
- Hussain, S. M. Azizudin. (2002). *Structure of Politics under Aurangzeb*. Delhi: Kanishka Publishers.
- Faruqi, Munis (2014). "Dara Shukoh Vedanta and Imperial Succession", in Vasudha Dalmia and Munis Faruqi, (Eds.). "*Religious Interaction in Mughal India*. Delhi: Oxford University Press, pp.30-64.
- Chandra, Satish (1993). *Mughal Religious Policies, Rajputs and the Deccan*, New Delhi: Oxford University Press.
- Bhargava, V S. (1966). *Marwar and the Mughal Emperors*. Delhi: Munshiram Manoharlal
- Ziegler, Norman. P. (1998). "Some notes on Rajput Loyalties during the Mughal Period" in J. F. Richards (Ed.) *Kingship and Authority in South East Asia*. Delhi: Oxford University Press.
- Hallissey, Robert C. (1977). *The Rajput Rebellion against Aurangzeb: A Study of the Mughal Empire in Seventeenth-Century India*, Columbia: University of Missouri Press.

- Taft Frances H. (1994). "Honour and Alliance: Reconsidering Mughal-Rajput Marriages" in Karine Schomer, Joan L. Erdman, Deryck O. Lodrick and Lloyd I. Rudolph, (Eds.). *The Idea of Rajasthan*, Delhi: Manohar, Vol. 1, pp. 217-41.
- Gordon, Stewart. (1998). *The Marathas, 1600-1818*, Cambridge: Cambridge University Press.
- Chandra, Satish. (1982). *Medieval India: Society, the Jagirdari Crisis and the Village*. Delhi: Macmillan
- Wink, Andre (1986), *Land and Sovereignty in India: Agrarian Society and Politics under Eighteenth Century Maratha Swarajya*, Cambridge: Cambridge University Press.
- Syan, Hardip Singh. (2013). *Sikh Militancy in the Seventeenth Century: Religious Violence in Mughal and Early Modern India*. London: I.B. Tauris.

Unit III: Contends with state and doctrinal attitudes towards religious belief and practice and their relation to state policy. To that end, it surveys taxation policy, orthodox observances and state sanctioned desecration in the 17th Century. **(Teaching Time: 2 weeks Approx.)**

- Friedmann, Y. (2001). *Shaykh Ahmad Sirhindi: An Outline of his thought and a study of his Image in the Eyes of Posterity*, Delhi: OUP
- Habib, Irfan. (1960). "Political Role of Shaikh Ahmad Sirhindi and Shah Waliullah" in Proceedings of Indian History Congress.
- Hasrat Bikrama J. (1982). *Dara Shikuh: Life and Works*. Delhi: Munshiram Manoharlal, pp. 1-42, (Introduction: Chap 1).
- Kinra Rajeev. (2009). "Infantilizing Baba Dara: The Cultural Memory of Dara", in *Journal of Persianate Studies*, Vol. 2, pp. 165-93
- Dalmia Vasudha & Munis Faruqi, (ed.) (2014). *Religious Interactions in Mughal India*, Delhi: Oxford University Press, (Chap. 1-2)
- Chandra, Satish. (1993). *Mughal Religious Policies, the Rajputs and the Deccan*. Delhi: Vikas Publishing House.
- Brown Katherine B. (2007). "Did Aurangzeb Ban Music? Questions for the Historiography of his Reign" *Modern Asian Studies*, Vol. 41, No. 1, pp. 77-120.
- Eaton, Richard M. (2003). *Essays in Islam & Indian History 711-1750*, Delhi: OUP. (Introduction and Chapter 4-Temple Desecration and Indo-Muslim State).
- Hussain, Azizuddin. (2002). *Structure of Politics under Aurangzeb: 1658 -1707*, Delhi: Kanishka Publishers.

Unit IV: Acquaints students with core elements and the constitution of a courtly culture. It attends to sites of authority and domesticity, norms of comportment and masculinity, issues of urbanism and imperial identity. **(Teaching Time: 2 weeks Approx.)**

- Richards, J. F. (1998). "Formulation of Imperial Authority under Akbar and Jahangir" in Muzaffar Alam and Sanjay Subrahmanyam ed. *The Mughal State*, Delhi: Oxford University Press
- Richards, J. F. (1984). "Norms of Comportment among Mughal Imperial Officers " in Barbara D Metcalf ed. *Moral conduct and authority: The place of Adab in South Asian Islam*, Berkeley: University of California Press
- Lal, Ruby. (2005). *Domesticity and Power in early Mughal North India*, Cambridge: Cambridge University Press.
- Hanlon, Rosalind. O. (1999). "Manliness and Imperial Service in Mughal North India" *Journal of the Economic and Social History of the Orient*, Vol. 42, No. 1, PP. 47-93.
- Blake, Stephen. (1991). *Shahjahanabad: The Sovereign City in Mughal India, 1639-1739*. Cambridge: Cambridge University Press. (Chapter 3 on "Society" and Chapter 5 on "Courtly and Popular Culture")
- Schimmel, Annemarie. (2004). *The Empire of the Great Mughals: History, Art and Culture*, London: Reaktion Books. (Chapter 5 "Women in court" and chapter 7 "Life of a Mirza")
- Mukhia, Harbans. (2009). *The Mughals of India*, Delhi: Blackwell Publishing.
- Balabanlilar, Lisa. (2012). *Imperial Identity in the Mughal Empire: Memory and Dynastic Politics in Early Modern South and Central Asia*, New York: I B Tauris
- Asher, Catherine (1995). *Architecture of Mughal India, The Cambridge History of India: Vol. 1 Part 4*. Cambridge: Cambridge University Press.
- Koch, Ebba. (2001). *Mughal art and Imperial Ideology: Collected Essays*, Delhi: Oxford University Press.
- Koch, Ebba. (revised 2013). *Mughal Architecture: An outline of its History and Development (1526- 1858)*. Delhi: Primus.
- Blake, Stephen. (1991). *Shahjahanabad: The Sovereign City in Mughal India, 1639-1739*. Cambridge: Cambridge University Press.
- Koch, Ebba. (2001). "The Hierarchical Principles of Shah Jahani Painting" in Ebba Koch, *Mughal Art and Imperial Ideology*. Delhi: Oxford University Press.
- Moin, Afzar. (2012), *The Millennium Sovereign: Sacred Kingship and Sainthood in Islam*, New York: Columbia University Press
- Beach, M.C. (1992), *Mughal and Rajput Painting, New Cambridge History of India Vol.1. Part 3*. Cambridge: Cambridge University Press.
- Talbot, Cynthia and Asher, Catherine B. (2006). *India Before Europe*, Cambridge; Cambridge University Press.

Unit V. Discusses developments in the practices and representation of Oceanic trade and its attendant influence on craft and technology. **(Teaching Time: 2 weeks Approx.)**

- Chaudhuri, K. N.(1982), “European Trade with India” in Tapan Raychaudhuri and Irfan Habib (eds.) *The Cambridge Economic History of India, Vol. 1 (c.1200-c. 1750)*. Delhi: Orient Longman
- Gupta, Ashin Das (1982). “Indian Merchants and the Trade in Indian Ocean” in Tapan Raychaudhuri and Irfan Habib (Eds.) *The Cambridge Economic History of India, Vol. 1(c. 1200-c. 1750)*. Delhi: Orient Longman
- Gupta, Ashin Das (1998), “Trade and Politics in 18th Century India” in Alam, Muzaffar and Subrahmanayam, Sanjay. (ed.) *The Mughal State*. Delhi: Oxford University Press
- Raychaudhuri, Tapan. (1962). *Jan Company in Coromandel*, The Hague: MartinusNijhoff.
- Malekandathil, Pius. (2013), *The Mughals, the Portuguese and Indian Ocean: Changing Imageries of Maritime India*, New Delhi: Ratna Sagar Private Limited,
- Om Prakash, J. (1998). *European Commercial Enterprise in Pre-colonial India*. The Cambridge History of India II.5, Cambridge: Cambridge University Press
- Chaudhuri, Sushil. (2017). *Trade, Politics and Society: The Indian Milieu in the Early Modern Era*, London: Routledge, (Chapter 1)
- Raychaudhuri, Tapan. (1982). “Non-Agricultural Production, Mughal India” inTapan Raychaudhuri and Irfan Habib, (Eds.). *The Cambridge Economic History of India, Vol. 1 (c. 1200-c. 1750)*. Delhi: Orient Longman.
- Habib, Irfan (2016). *Technology in Medieval India c.650-1750*, Tulika Books
- Qaisar, Ahsan Jan. (1998), *The Indian Response to European Technology and Culture (AD 1498-1707)*, Delhi: Oxford University Press

Unit VI: Concerns with the debate centring on the eighteenth century as a dark age or as an era of prosperity and the diverse historiography related to it. **(Teaching Time: 2 weeks Approx.)**

- Alavi, Seema. (ed.) (2002). *The eighteenth century in India*. Delhi: Oxford University Press
- Patnaik, Prabhat. (ed.) (2011). *Excursion in History: Essays on Some Ideas of Irfan Habib*. Delhi: Tulika Books
- Dalal, Urvashi. (2015). “Femininity, State and Cultural Space in Eighteenth Century India” *The Medieval History Journal*, vol.18 no.1, pp. 120-65.
- Malik, Z. U. (1990). “The core and periphery: A contribution to the debate on 18th century”, *Social Scientist*, Vol. 18 No.11/12, pp. 3-35
- Alam Muzaffar and Sanjay Subrahmanyam (1998). *The Mughal state 1526 – 1750*, Delhi: Oxford University Press
- Alam, Muzaffar. (2013), *Crisis of the Empire in Mughal North India*, Delhi: Oxford University Press.
- Bhardwaj, Surajbhan. (2017). “Conflict over Social Surplus: Challenges of Ijara (Revenue Farming) in Eighteenth Century North India: A Case study of Mewat” in *Revisiting the History of Medieval Rajasthan: Essays for Professor Dilbagh Singh*. SurajbhanBhardwaj, R.P. Bahuguna and Mayank Kumar. Delhi: Primus, pp. 52-83.

- Bhargava, Meena. (2014). *State, Society and Ecology: Gorakhpur in Transition: 1750-1830*, Delhi: Primus.
- Sahai, Nandita Prasad. (2006). *Politics of Patronage and Protest: The State, Society, and Artisans in Early Modern Rajasthan*. New Delhi: Oxford University Press.
- Bayly, Christopher. (1983). *Rulers, Townsmen and Bazaars: North Indian Society in the age of British Expansion, 1770-1870*, Cambridge: Cambridge University Press
- Habib, Irfan. (1995). "Eighteenth Century India" Proceedings of Indian History Congress.

SUGGESTED READINGS:

- Alam, Muzaffar (1991) "Eastern India in the early eighteenth century – Some evidence from Bihar", *Indian Economic and Social History Review*, Vol. No. 28, Issue-I, pp43-71.
- Bhardwaj, Surajbhan, R. P. Bahuguna & Mayank Kumar. (2017). *Revisiting the History of Medieval Rajasthan: Essays for Professor Dilbagh Singh*, Delhi: Primus
- Bhargava, Meena (Ed.,) (2014). *The decline of the Mughal Empire*, Delhi: OUP
- Chenoy, ShamaMitra (1998), *Shahjahanabad*, Delhi: MunshiramManoharlal
- Dutta, Rajat (2003) "Commercialization, Tribute and the transition from Late Mughal to early Colonial in India" *The Medieval History Journal* , Vol:6 , No 2, pp.259-91.
- Ehlers, Eckart and Krafft, Thomas (2003), *Shahjahanabad / Old Delhi. Tradition and Colonial Change*, Delhi: Manohar
- Faruqui, Munis D. (2012), *The Princes of the Mughal Empire, 1504-1719*. Cambridge: Cambridge University Press.
- Faruqui, S.R. (2002). "Urdu Literature" in Zeenat Zaidi (ed.) *The Magnificent Mughals*, Karachi: Oxford University Press.
- Habib, Irfan ed. (2016), *Akbar aurTatkalin Bharat*, New Delhi: RajkamalPrakashan
- Jha, Mridula (2017). "Mingling of the Oceans: A Journey through the Works of Dara Shikuh", in RaziuddinAquil& David L. Curley, (Ed..) *Literary and Religious Interactions in Medieval and Early Modern India*, New Delhi: Routledge, pp. 62-93.
- Juneja, Monica (Ed.) (2010). *Architecture in Medieval India: Forms, Contexts, Histories*, Delhi: Orient Blackswan.
- Khan, Sumbul Halim. (2015). *Art and Craft Workshops Under the Mughals: A Study of Jaipur Karkhanas*, Delhi: Primus Books
- Mukherjee, Anisha Shekhar (2003). *The Red Fort of Shahjahanabad*, New Delhi: Oxford University Press
- Petievich, Carla. (2010). "Gender Politics and the Urdu Ghazal: Exploratory Observations on Rekhta verses Rekhti" in Meena Bhargava (Ed.).*Exploring Medieval India, Vol. II*, Delhi: Orient Blackswan, pp.186-217.
- Sreenivasan, Ramya. (2014). "Faith and Allegiance in the Mughal Era: Perspectives from Rajasthan" in Vasudha Dalmia and Munis D. Faruqui (Ed.). *Religious Interactions in Mughal India*, Delhi: Oxford University Press, pp. 159-191.

- Tillotson, G.H.R (1990), *Mughal India*, New Delhi: Penguin Books. (chapter on Shahjahanabad and Red Fort)

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. Supporting audio-visual aids like documentaries and power point presentations will be used where necessary. Overall, the Teaching Learning Process shall emphasise the interconnect- edness of themes within the different rubrics to build a holistic view of the time period/region under study. The process shall consistently underline how various macro and micro-level devel- opments/phenomena can be historicised.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the stu- dents. Students will be assessed on their ability to engage with a sizeable corpus of readings as- signed to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Jahangirnama; *Ma'asir-iAlamgiri*, Manucci, Bernier, Mughal Conquest, the Deccan, War of Suc- cession, Marathas, Shivaji, Peshwas, Sikhism, Dara Shukoh, Courtly Culture, Shahjahanabad, Mughal paintings, Indian Ocean, the 18th Century.

Core Course XIII

History of India VIII (c.1857 - 1950)

Course Objectives: This paper deals with the broad socio-economic and political trends in colonial India from the latter half of the 19th century. It also critically analyses the various trends in the national liberation movement and other aspects of politics which were foundational for the modern Indian state. The aim is to develop interdisciplinary analytical skills at the undergraduate level.

Learning Outcomes: After successful completion of the course, the students will be able to:

- Identify how different regional, religious, linguistic and gender identities developed in the late 19th and early 20th centuries.
- Outline the social and economic facets of colonial India and their influence on the national movement.
- Explain the various trends of anti-colonial struggles in colonial India.
- Analyse the complex developments leading to communal violence and Partition.
- Discuss the negotiations for independence, the key debates on the Constitution and need for socio-economic restructuring soon after independence

Course Content:

Unit 1: Caste, Community and Nation

- a) Regional, religious and linguistic identities
- b) Assertions of gender and caste identity: Sanskritizing trends and lower caste movements, regional variations

Unit 2: Economy and social classes

- a) Economic critique of colonial rule with special reference to Drain of Wealth
- b) Rise of modern industry: emergence of capitalists and the working class
- c) Famines and their impact

Unit 3: Early Nationalism

- a) Emergence of Indian National Congress (INC)
- b) Moderates and Extremists
- c) Swadeshi and Revolutionary Movements

Unit 4: Emergence and social base of Gandhian Nationalism

- a) Intellectual foundations of Gandhian Nationalism; Early Interventions: Champaran, Kheda, Ahmedabad; INC
- b) Rowlatt, Khilafat and Non-Cooperation Movements
- c) Civil Disobedience Movement d) Quit India Movement

Unit 5: Interfaces: Nationalism and Socio-Political Movements

- a) Ambedkar and the Dalit Movement
- b) Bhagat Singh and H.S.R.A
- c) Singh Sabha and the Akali Movement; Dravidian movements
- d) Left movements: peasants and workers' movements
- e) Tribal Movements

Unit 6: Communalism: ideologies and practices

- a) Trends in Communalism
- b) Partition

Unit 7: Independence and the New State

- a) World War II and the Post-War crisis
- b) Negotiations for Independence
- c) Integration of the Princely States
- d) The Making of the Constitution

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit 1: Caste, Community and Nation: The unit seeks to identify the developments in post-1857 India in terms of the shaping of different regional, caste, religious, linguistic and gender identities in the late 19th and early 20th centuries and the role of reform and debates in this. **(Teaching Time: 2 weeks Approx.)**

- Metcalfe, Barbara D and Thomas R. (2002). *A Concise History of India*. Cambridge: Cambridge University Press, pp.91 – 160
- Jones, Kenneth. (1994). *Socio-Religious Reform Movements in British India*. New Delhi: Cambridge University Press, pp.73-101.
- Blackburn, Stuart & Dalmia, Vasudha ed. (2004). *India's Literary History. Essays on the Nineteenth Century*. Delhi: Permanent Black, Introduction; pp. 1-22.
- Oberoi, Harjot. (1994). *The Construction of Religious Boundaries: Culture, Identity and Diversity, in the Sikh Tradition*. University of Chicago Press, Chapter 4,5,6
- Forbes, Geraldine. (1999). "Women in Modern India". *The New Cambridge History of India – Volume 4*. Cambridge: Cambridge University Press (Chapters 3, 4 & 5).

- Sarkar, Sumit and Tanika Sarkar. (Eds.). *Caste in Modern India*, Vols. 1 & 2. Delhi: Permanent Black (Vol. I-Chapters 2 & 3, pp. 24-87; Vol. 2-Chapter 8, pp. 200-233).
- O'Hanlon, Rosalind. (2002). *Caste, Conflict and Ideology: Mahatma Jyotirao Phule and Low Caste Protest in 19th Century Western India*. Ranikhet: Permanent Black, pp. 3-11
- Hardgrave, R.L. (1968). "The Breast-Cloth Controversy: Caste consciousness and Social Change in Southern Travancore", *Indian Economic and Social History Review (IESHR)*, June 1, Vol. 5 (2), pp. 171-87.

Unit II: This unit studies aspects of the colonial economy and its critique particularly with reference to the phenomenon of 'Drain of Wealth; the emergence of capitalists and the working class and the recurrence of famines and agrarian distress. **(Teaching Time: 2 weeks Approx.)**

- Chandra, Bipan. (1966). *The Rise and Growth of Economic Nationalism in India: Economic Policies of Indian National Leadership, 1880–1905*. New Delhi: People's Publishing House (Introduction).
- Bagchi, Amiya Kumar. (2002). "The Other Side of Foreign Investment by Imperial Powers: Transfer of Surplus from Colonies", *Economic and Political Weekly*, Vol. 37 (23), pp. 2229 - 2238.
- Bagchi, Amiya Kumar. (1972). *Private Investment in India, 1900-1939*. Cambridge: Cambridge University Press, pp. 3-25
- Mukherjee, Aditya. (2002). *Imperialism, Nationalism and the Making of the Indian Capitalist Class, 1920-1947*. New Delhi: Sage (Introduction).
- Ray, Rajat Kanta. (Ed.). (1994). *Entrepreneurship and Industry in India, 1800 - 1947*. New Delhi: Oxford University Press, pp.1-69.
- Arnold, David. (1988). *Famines. Social Crisis and Historical Change. New Perspectives on the Past*. Oxford: Basil Blackwell (Introduction; Chapters 1,3,4,6).

Unit III: After the successful completion of this unit, students will be able to understand various aspects of early nationalism and nationalist resistance. **(Teaching Time: 2 weeks Approx.)**

- McLane, J.R. (1977). *Indian Nationalism and the Early Congress*. Princeton: Princeton University Press, pp.3-21; 89-178

Tripathi, Amal. (1967). *The Extremist Challenge. India between 1890 and 1910*. Bombay, Calcutta, Madras, New Delhi: Orient Longmans, Chapters 1-5

- िपुपाठी, अमलेश. भारतीय राजनीति में मॉरमपंथ की चुनौती, नई दिल्ली: िंथिशाबी
- Seth, Sanjay. (2009). 'Rewriting Histories of Nationalism : The Politics of Moderate Nationalism in India, 1870-1905', in Sekhar Bandyopadhyay (Ed.), *Nationalist Movement in India : A Reader*, New Delhi: Oxford University Press, pp.30 - 48

- Sarkar, Sumit. (1973). *Swadeshi Movement in Bengal, 1903 – 08*. New Delhi, People's Publishing House. (also in Hindi: सुमत सरकार, बंगालमंडेशीआंदोलन(1903-1908), Chapter 1 and 2.

- Sarkar, Sumit. (1983). *Modern India: 1885—1947*, Delhi, Macmillan. Chapters III & IV

- मोहतकु मारहालदार, भारतीयनवजागरणऔरपुनुराँनवादीचेतना, नईदली: ईंथिशबी. 107

- Seal, Anil. (1973). 'Imperialism and Nationalism in India,' *Modern Asian Studies*, Vol. 7, No. 3 pp. 321-347.

Unit IV: This unit deals with how Gandhi's politics represented a new model for mobilizing different social groups in the national movement. **(Teaching Time: 2 weeks Approx.)**

- Parel, Anthony J. ed. (2009 edition). *'Hind Swaraj' and Other Writings*. Cambridge: Cambridge University Press (Editor's Introduction, pp. xiv – xxxviii).

- Hardiman, David. (2005). *Gandhi in his time and ours*. Delhi, Orient Blackswan, pp.1-81; 109-184.

- Baker, Chris. (1976). *Politics of South India: 1920-1937*. Cambridge, Cambridge University Press.

- Bandyopadhyay, Sekhar. (Ed.) (2009). *Nationalist Movement in India: A Reader*. New Delhi: Oxford University Press, pp. 55-155.

- Poucheпадass, Jacques. (1974). "Local leaders and the intelligentsia in the Champaran satyagraha (1917): a study in peasant mobilization", *Contributions to Indian Sociology*, Vol. 8 (1), Jan 1, pp. 67-87

- Brown, Judith. (1972). *Gandhi's Rise to Power: Indian Politics 1915-1922*. New York: Cambridge University Press (Chapters 3,4,5,6,7,9).

- Kumar, Ravinder. (1971). *Essays on Gandhian Politics, Rowlatt Satyagraha 1919*. Oxford: Clarendon Press, pp. 1-30

- Minault, Gail. (1982). *The Khilafat Movement: Religious Symbolism and Political Mobilisation in India*. Delhi: Oxford University Press (Introduction, Chapters II, III, IV).

- Sarkar, Tanika. (2011). "Gandhi and Social Relations", in Judith Brown and Anthony Parel (eds). *The Cambridge Companion to Gandhi*. Cambridge, Cambridge University Press, pp. 173-179.

- Amin, Shahid. (1996). *Event, Metaphor, Memory: Chauri Chaura, 1922 – 1992*. Delhi: Penguin. Re-print, 2006, pp. 9-19, 45-56, 69-93.

- Sarkar, Sumit. (1985) 'The Logic of Gandhian Nationalism: Civil Disobedience and the Gandhi-Irwin Pact (1930-31)', in Sumit Sarkar, *A Critique of Colonial India*. Calcutta: Papyrus, pp. 86 - 115

- Pandey, Gyanendra. (1988). *The Indian Nation in 1942*. Calcutta: K.P. Bagchi and Company (Chapters 1,2,3, 4, 8).

- हीरालालिसंह, (1971). असहयोगआंदोलनकीज्ञांिकयां.िदली: उंकाशनिवभाग

Unit V: It enables students to understand the way in which the national movement gave a new meaning to social and political movements and to diverse range of local struggles. **(Teaching Time: 2 weeks Approx.)**

- Zelliott, Eleanor. (1996). *From Untouchable to Dalit: Essays on the Ambedkar Movement*. New Delhi: Manohar Publications, pp. 53 - 177
- Grewal, J.S. (1990) *The New Cambridge history*. II.3. *The Sikhs of the Punjab*, Chapter 8, pp.157-180
- Moffat, Chris. (2019). *Inheritance; Politics and the Promise of Bhagat Singh*. Cambridge: Cambridge University Press, pp. 21-114. India's Revolutionary
- Habib, S.Irfan. (2007). *To Make the Deaf Hear: Ideology and Programme of Bhagat Singh and his Comrades*, New Delhi: Three Essays Collective, pp. 29 - 141
- Bandyopadhyay, Sekhar. (2017). *From Plassey to Partition and After: A History of Modern India*, New Delhi: Orient Blackswan, 2nd edition (Chapter 7, "Many Voices of a Nation").
- Nagaraj, D.R. (2011). *Flaming Feet*, Delhi, Seagull Books. (Chapter 1).
- Fay, Peter Ward. (1993). *The Forgotten Army: India's Armed Struggle for Independence, 1942 - 45*. Ann Arbor: University of Michigan Press. Chapters 5,6,8,9,12,13
- Sarkar, Sumit. (1983). *Popular Movements and Middle Class Leadership in Late Colonial India*. S.G. Deuskar Lectures on Indian History. Centre for Studies in Social Sciences, Calcutta.
- Geetha, V. (1998). *Towards a Non-Brahmin Millenium*, Delhi, Popular Prakashan Limited.
- Habib, Irfan. (1998). "The Left and the National Movement", *Social Scientist*, Vol. 26 (5/6), May-June, pp. 3-33.
- Chandra, Bipan. (1983) *The Indian Left: Critical Appraisal*. New Delhi: Vikas.
- Dhanagare, D.N. (1991). in *Peasant Movements India 1920-1950*.
- Amin, Shahid. (1988). "Agrarian Bases of Nationalist Agitation in India: An Historiographical Survey," in D.A. Low (Ed.), *The Indian National Congress: Centenary Highlights*, New Delhi: OUP, pp. 54-97.
- Pandey, Gyan. (1982). 'Peasant Revolt and Indian Nationalism: The Peasant Movement in Awadh, 1919-1922' in Ranajit Guha ed. *Subaltern Studies I. Writings on South Asian History and Society*. Delhi: Oxford University Press, pp. 143 - 197
- Arnold, David. (1982). 'Rebellious Hillmen: the Gudam-Rampa Risings, 1839-1924', in Ranajit Guha ed. *Subaltern Studies I. Writings on South Asian History and Society*. Delhi: Oxford University Press, pp. 88 - 142
- Bahl, Vinay. (2009). "Attitude of the Indian National Congress Towards the Working Class Struggle in India, 1918-1947", in Sekhar Bandyopadhyay (Ed.), *Nationalist Movement in India: A Reader*, New Delhi: Oxford University Press, pp. 294 – 313.

- Sarkar, Sumit. (1983). *Modern India 1885-1947*. Delhi: Macmillan, pp. 153-155, 198-203, 239-243, 266-278, 339-342.

Unit VI: This unit will enable students to analyse the complex developments leading to communal violence and partition. **(Teaching Time: 2 weeks Approx.)**

- Pandey, Gyanendra. (1992). *The Construction of Communalism in Colonial North India*. Delhi: Oxford University Press (Chapters 1, 2&7).
- Chandra, Bipan. (2008). *Communalism in Modern India*. New Delhi: Har-Anand Publications.
- Hasan, Mushirul. (1991). *Nationalism and Communal Politics in India 1885 – 1930*. Delhi: Manohar Publications.
- Page, David. (1987). *Prelude to Partition: the Indian Muslims and the Imperial System of Control*. Karachi: Oxford University Press, pp. 1-29, 73-140 (Introduction and Chapter 2).
- Jaffrelot, Christophe. (1996). *The Hindu Nationalist Movement and Indian Politics: 1925 to the 1990s*. London: C. Hurst & Company Publishers, pp. 1-45
- Chatterjee, Joya. (1995). *Bengal Divided: Hindu Communalism and Partition 1932 - 1947*. Cambridge, Cambridge University Press (Introduction and Chapters 3,5 & 6)
- Jalal, Ayesha. (1985). *The Sole Spokesman: Jinnah, the Muslim League and the Demand for Pakistan*. Cambridge, Cambridge University Press (Introduction, Chapters 1, 2& 5).
- Dhulipala, Venkat. (2015). *Creating a New Medina: State Power, Islam, and the Quest for Pakistan in Late Colonial North India*. New York: Cambridge University Press (Chapters 5,6,9).
- Zamindar, Vazira Fazila-Yacoobali. (2007). *The Long Partition and the Making of South Asia: Refugees, Boundaries, Histories*. New York, Columbia University Press. (Chapter I)
- Lelyveld, David. (2005). 'The Colonial Context of Muslim Separatism: from Sayyid Ahmad Bareilvi to Sayyid Ahmad Khan,' in Mushirul Hasan and AsimRoy (Ed.). *Living Together Separately: Cultural India in History and Politics*. Delhi, Oxford University Press.
- Metcalf, Barbara D. (2017). 'Maulana Ahmad Madani and the Jami'at 'Ulama-i-Hind: Against Pakistan, against the Muslim League' in Qasmi, Ali Usman,(Ed.), *Muslims against the Muslim League: Critiques of the Idea of Pakistan*, Cambridge, Cambridge University Press, pp. 1-34 and pp. 220-254.
- Arbab, Safoora. (2017). 'Nonviolence, Pukhtunwali and Decolonization: Abdul Ghaffar Khan and the Khuda' iKhidmatgar Politics of Friendship', in Qasmi, Ali Usman. ed., *Muslims against the Muslim League: Critiques of the Idea of Pakistan*, Cambridge, Cambridge University Press, pp. 220-254.

Unit VII: This unit studies the political developments during and after World War II; the negotiations and discussions for Independence, the question of integration of the Princely States and the key debates on the making of the Constitution. **(Teaching Time: 2 weeks Approx.)**

- Brown, Judith. (1984). *Modern India. The Origins of an Asian Democracy*. Oxford: Oxford University Press, pp. 307 - 350
- Mukherjee, Rudrangshu. (2015). *Nehru and Bose: Parallel Lives*. Delhi, Penguin.
- Menon, V.P. (2014). *Integration of the Indian States*. New Delhi: Orient Blackswan. Chapter III,IV,V
- Pati, Biswamoy and Waltraud Ernst ed. (2007). *India's Princely States India's Princely States: People, Princes and Colonialism*, Delhi, Routledge. (Chapters 1&2), pp. 1-29.
- Ramusack, Barbara. (2003). *The Indian Princes and their States*, Cambridge, Cambridge University Press. (Chapters 1 & 2).
- Guha, Ramachandra. (2007). *India After Gandhi. The History of the World's Largest Democracy*. New Delhi: Picador India, pp. 35 - 82
- Kamtekar, Indivar. (2002). "A Different War Dance: State and Class in India 1939-1945," *Past & Present*, Vol. 176, pp. 187-221.
- Granville, Austin. (1966). *The Indian Constitution: Cornerstone of a Nation*. Oxford: Clarendon Press.
- Chaube, S.K. (2009). *The Making and Working of the Indian Constitution*, Delhi, National Book Trust.

Suggested Readings:

- Bagchi, Amiya Kumar. (2002.) *Capital and Labour Redefined: India and the Third World* . New Delhi: Tulika.
- Bandyopadhyay, Sekhar. (2017). *From Plassey to Partition and After: A History of Modern India*, New Delhi: Orient Blackswan, 2nd edition
- Banerjee-Dube, I. (2015). *A History of Modern India*. Delhi: Cambridge University Press.
- Banerji, A.K. (1982). *Aspects of Indo-British Economic Relations 1858 – 1898*. Bombay: Oxford University Press.
- Batra, Amrit Kaur. (2015). *Communal Riots in the Punjab, 1923 – 28*. Delhi: Shree Kala Prakashan.
- Bhargava, Rajeev (ed). (2008). *Politics and Ethics of the Indian Constitution*. New Delhi, Oxford University Press.
- Brown, Judith.(1977). *Gandhi and Civil Disobedience. The Mahatma in Indian Politics 1928-34*. Cambridge: Cambridge University Press.
- Chandra, Bipan, Mukherjee, Mridula, Mukherjee, Aditya, Panikkar, K.N., Mahajan, Sucheta. (1989). *India's Struggle for Independence*. Delhi: Penguin Books.

- Chatterjee, Partha. (1986). *Nationalist Thought and the Colonial World. A Derivative Discourse?*. Delhi: Oxford University Press.
- Deshpande, Anirudh. (2009). “Sailors and the Crowd: Popular Protest in Karachi, 1946”, in Sekhar Bandyopadhyay, *Nationalist Movement in India: A Reader*. New Delhi: Oxford University Press, pp.336 - 358.
- Dutta, Vishwa Nath. (2000). *Gandhi and Bhagat Singh*. New Delhi: Rupa and Company.
- Gandhi, Rajmohan. (2017). *Modern South India: A History from the 17th Century to our Times*, Delhi, Aleph Press
- Gilmartin, David. (1988). *Empire and Islam: Punjab and the Making of Pakistan*. California: University of California.
- Guha, Amalendu. (2019). *Freedom Struggle & Electoral Politics in Assam From Planter Raj to Swara*. Delhi, Tulika Books (Chapters 5 & 6).
- Guha, Ramachandra. (2018). *Gandhi: The Years That Changed the World: 1914-1948*. New Delhi: Penguin.
- Guha, Ranajit. (2000). *A Subaltern Studies Reader, 1986-1995*. Delhi: Oxford University.
- Gupta, Amit (1997). “Defying Death: Nationalist Revolutionism in India, 1897-1938”, *Social Scientist*, Vol. 25 (9/10), pp.. 3-27.
- O’Hanlon Rosalind (2017). Caste and its Histories in Colonial India: A Reappraisal,’ *Modern Asian Studies* 51, 2 pp. 432–461
- Hasan, Mushirul and Asim Roy (Eds.). (2005). *Living Together Separately: Cultural India in History and Politics*. New Delhi: Oxford University Press.
- Hasan, Mushirul ed. (1993). *India’s Partition: Process, Strategy and Mobilization*. (Themes in Indian History. Oxford india Readings. Delhi: Oxford University Press.
- Hasan, Mushirul, Gupta, Narayani. (1993). India’s Colonial Encounter. Essays in Memory of Eric Stokes. Delhi: Manohar, pp. 183-199; 325-362.
- Kumar, Dharma. (1983)*The Cambridge Economic History of India. Vol. 2: c. 1757-1970*. Delhi: Orient Longman in association with Cambridge University Press.
- Kumar, Ravinder. (1969). ‘Class, Community or Nation? Gandhi’s Quest for a Popular Consensus in India’ *Modern Asian Studies*, Vol. 3, Issue. 4, pp. 357-376.
- Metcalfe, Barbara. (2014). *Islamic Revival in British India: Deoband, 1860-1900*. Princeton: Princeton University Press
- Mishra, Yuthika. (2004). “The Indian National Movement and Women’s Issues: 1850-1950”, in *The Encyclopaedia of Women’s Studies*, Vol. I. *Women’s Movements*, ed. Subhadra Channa, New Delhi: Cosmo Publications.

- Mukhopadhyay, Amitabh. (1995). *Militant Nationalism in India: 1876 – 1947*. Calcutta: Institute of Historical Studies.
- Naik, J.V. (2001). “Forerunners of Dadabhai Naoroji's Drain Theory”, *Economic and Political Weekly*, Vol. 36 (46), pp. 4428-32.
- Pandey, Gyanendra. (2001). *Remembering Partition: Violence, Nationalism and History of India*. Cambridge: Cambridge University Press
- Pandey, Gyanendra. (2002). *The Ascendancy of the Congress in Uttar Pradesh 1926-34: A Study in Imperfect Mobilization*. Second edition. New Delhi: Anthem Press (Introduction and Chapter 4).
- Parekh, Bhikhu. (2001). *Gandhi a Very Short Introduction*. Oxford: Oxford University Press, e-book.
- Pati, Biswamoy. (Ed.). (2000). *Issues in Modern Indian History: For Sumit Sarkar*. Mumbai: Popular Prakshan (Chapter 8).
- Robinson, Francis. (1994). *Separatism Amongst Indian Muslims: The Politics of the United Provinces' Muslims, 1860-1923*. New Delhi: Oxford University Press.
- Roy, Tirthankar. (2000). *The Economic History of India 1857-1947*. New Delhi: Oxford University Press.
- Sarkar, Sumit. (2014). *Modern Times: 1880s-1950s, Environment, Economy and Culture*. Ranikhet: Permanent Black.
- Sarkar, Sumit. (1998). *Writing Social History*. Delhi: Oxford University Press.
- Singh, Kumar Suresh. (2002). *Birsa Munda and His Movement, 1872 – 1901: A Study of a Millenarian Movement in Chotanagpur*. Chotanagpur: Seagull Books.
- Tomlinson, B.R. (1979). *The Political Economy of the Raj: 1914-1947, The Economics of Decolonisation in India*. London: Macmillan Press.
- Panikkar, K.N. (Ed.). (1980). *National and Left Movements in India*. Delhi: Vikas.
- Sen, Amartya.(1981). *Poverty and Famines. An Essay on Entitlement and Deprivation*. Oxford: Oxford University Press, pp. 52 – 85
- Srimanjari. (1998). ‘Denial, Dissent and Hunger: Wartime Bengal, 1942-44’, in B. Pati ed., *Turbulent Times: India 1940-44*. Mumbai: PPH, 1998, pp. 39-66
- Suhred, Tridip. (2011). *The Cambridge Companion to Gandhi*. Cambridge: CUP, pp. 71-92.
- कु मार, उभात. (1994). तंत्रतासंराम और गाँधी का संरारह. िदली: उभात पब्लिकेशन.
- गोपाल, राम. (1986). भारतीय तंत्रतासंराम, लखनऊ: सुलभ उकाशन.
- दे, आर.पी. (1977). आज का भारत. नईदली: मैकिमलन.
- देसाई, ऐ. आर. भारतीय राँववाद की सामाजिक पृथूमि. िदली: मैकिमलन.

पांडेय, उदीपकु मार. (1990). गाँधीकाआ थोकरासामाजिकचिंतन. िदली: िहंदीमाठमकायडायिनदेशालय, िदलीविविडालय.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials is the main teaching method. Presentations shall focus either on important themes covered in the class lectures, or on specific readings with the aim to bring out the interconnectedness of the themes during the course of discussion. Supporting audio-visual aids like documentaries and power point presentations will be used where necessary. Overall, the Teaching Learning Process shall emphasise the interconnectedness of themes within the different rubrics to build a holistic view of the time period/region under study. The process shall consistently underline how various macro and micro-level developments/phenomena can be historicised.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. Students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Identities, Community, Nation, Drain of Wealth, Famines, Early Nationalism, Gandhian Thought, *Satyagraha*, Mass Nationalism, Parallel Social and Political Movements, Communalism, Partition, Constituent Assembly, Integration of Princely States, Indian Constitution, Republic.

Core Course XIV

History of Modern Europe- II

Course Objectives:

This paper offers a historical overview of the development of nationalities and nation-states in the 19th and 20th centuries. Among the various case studies discussed, the paper traces the build-up to a revolution in the disintegrating Russian empire. It also introduces students to the concept of imperialism. In this light, the paper discusses the varied historical writings on World War One and on the nature of developments during the inter-war period. It familiarises students with the intellectual and art movements that were linked to the changes in the socio-economic and political milieu of 19th and early 20th century Europe.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- (a) Trace varieties of nationalists and the processes by which new nation-states were carved out.
- (b) Discuss the peculiarities of the disintegration of large empires and remaking of Europe's map.
- (c) Deliberate on the meaning of imperialism and the manifestations of imperialist rivalry and expansion in the 19th and early 20th century.
- (d) Analyse the conflict between radical and conservative forces, and the gradual consolidation of ultra-nationalist and authoritarian regimes in Europe.
- (e) Contextualise major currents in the intellectual sphere and arts.

Course Content:

Unit I: Tsarist Russia and the coming of the Bolshevik Revolution

- [a] Serfdom, Populism and Social Democracy
- [b] The Revolution of 1905; the revolutions of 1917: origins, visions, movements

Unit II: Varieties of Nationalisms, Imperialism, Crisis and the Great War

- [a] Intellectual currents, popular movements and the formation of national identities: Germany and Italy
- [b] State and Politics in post-unification Germany and Italy
- [c] Imperialism: Theories, Race, Darwin and Orientalism
- [d] War of 1914-18: historiographical debates; developments leading to the Great War

Unit III: Europe Between Wars

- [a] Post war developments, international institutions, social and economic consequences of the war
- [b] Understanding Fascism; Origins, Forms, Nature of the Fascist/Nazi State: Germany, Italy
- [c] Origins of the Second World War

Unit IV: Cultural and Intellectual Developments since c.1850

- [a] Print culture, mass education and the extension of literacy
- [b] Creation of new cultural forms: Realism, Impressionism, Post-Impressionism, Photography; Architecture: Art Nouveau, Expressionism and Futurism
- [c] Institutionalization of disciplines: History, Anthropology and Sociology

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: At the end of this rubric the student will be familiar with the economic, social and political issues that troubled the Tsarist regime in Russia in the nineteenth century. She/he will develop an understanding of popular movements and the political ascendancy of the socialists eventually leading to the revolutions in the early 20th century. **(Teaching time: 2 weeks Approx.)**

- (a) Wood, Alan. (2003). *The Origins of the Russian Revolution 1861-1917*. London and New York: Routledge.
- (b) Gleason, Abbot (Ed.). (2009). *A Companion to Russian History*. Sussex: Wiley-Blackwell. (Chapters 12, 13, 14, & 16)
- (c) Sheehan, James J. (2000). 'Culture' in T.C.W. Blanning (Ed.). *The Nineteenth Century: Europe 1789-1914*. Oxford: Oxford University Press.
- (d) Fitzpatrick, Sheila. (1994). *The Russian Revolution*. Oxford: Oxford University Press.

Unit-II: At the end of this rubric the student will be expected to demonstrate an understanding of the complex political and economic interplay associated with the unification of Germany and Italy. They will be able to trace these complexities into the politics of state formation post unification. The students will also develop an understanding of imperialism, wherein they will explore theories and also how questions of race and orientalism shaped the colonial interactions of European nations. **(Teaching time: 5 weeks Approx.)**

- (a) Riall, Lucy. (1994). *The Italian Risorgimento: State, Society and National Unification*. London and New York: Routledge.
- (b) Beals, Derek and Eugenio F. Biagini. (2002). *The Risorgimento and the Unification of Italy*. London and New York: Routledge

- (c) Eley, Geoff. (1986). *From Unification to Nazism: Reinterpreting the German Past*. London and New York: Routledge.
- (d) Blackbourn, David. (2002). *History of Germany 1780-1918: The Long Nineteenth Century*. Oxford: Oxford University Press.
- (e) Porter, Andrew. (1994). *European Imperialism 1860-1914*. Hampshire: Palgrave Macmillan.
- (f) Brewer, Anthony. (2001). *Marxist Theories of Imperialism: A Critical Survey*. London and New York: Routledge.
- (g) Henig, Ruth. (2003). *Origins of the First World War*. London and New York: Routledge.
- (h) Midgley, Clare. (Ed.). (1998). *Gender and Imperialism*. Manchester: Manchester University Press.
- (i) Dirks, Nicholas (Ed.). (1992). *Colonialism and Culture*. Michigan: University of Michigan Press.
- (j) Bernasconi, Robert and Tommy Lee Loft. (2000). *The Idea of Race*. Indianapolis: Hackett Publishing.

Unit- III: The student will be expected to develop an understanding of European politics of this period. She/he will examine the emergence of international institutions and the impact of war on European society and economy. This would also be essential to the students understanding of the emergence of right wing movements in Europe. The student will be expected to demonstrate a familiarity with the historiographical debates and discussion associated with the rise and development of the fascist/Nazi state in Italy and Germany eventually leading to the outbreak of the second world war. **(Teaching time: 4 weeks Approx.)**

- (a) Thurlow, Richard. (1999). *Fascism*. Cambridge: Cambridge University Press.
- (b) McDonough, Frank. (1999). *Hitler and Nazi Germany*. Cambridge: Cambridge University Press.
- (c) Griffin, Roger. (1995). *Fascism*. Oxford: OUP.
- (d) Passamore, K. (2002). *Fascism: A Very Short Introduction*. Oxford: Oxford University Press.
- (e) Kershaw, Ian. (1985). *The Nazi Dictatorship: Problems and perspectives of Interpretation*. London: Edward Arnold.
- (f) McDonough, Frank . (1997). *The Origins of the First and the Second World War*. Cambridge: Cambridge University Press.
- (g) Boyce, Robert and Joseph A. Maiolo (Eds.). (2003). *The Origins of World War Two: The Debate Continues*. London: Macmillan Education.

Unit-IV: At the end of the rubric the student will be expected to build on her/his understanding of European history to understand the cultural and intellectual transformations experienced in late nineteenth and early twentieth century Europe. The student will develop familiarity with how mass education, print culture, changes in artistic styles, emergence of photography and the academic institutionalization of disciplines shaped the modern European worldview. **(Teaching time: 3 weeks Approx.)**

- (a) Winders, James A. (2001). *European Culture Since 1848*. New York: Palgrave
- (b) Vincent, David. (2000). *The Rise of Mass Literacy: Reading and Writing in Modern Europe*. New Jersey: Wiley.
- (c) Brettell, Richard. (1999). *Modern Art, 1851-1929: Capitalism and Representation*. Oxford: Oxford University Press
- (d) Colquhoun, Alan. (2002). *Modern Architecture*. Oxford: Oxford University Press, pp. 13-35 & 87-109.
- (e) Clarke, Graham. (1997). *The Photograph*. Oxford University Press, Oxford, 1997 (p. 11-54)
- (f) Thompson, Kenneth. (1976). *August Comte: the Foundation of Sociology*. New Jersey: Wiley.
- (g) Kuper, Adam. (1975). *Anthropology and Anthropologists*. London: Penguin Books.
- (h) Eriksen, T.H. and F.S. Nielsen. (2013). *A History of Anthropology*. London: Pluto Press.

SUGGESTED READINGS:

- Bayly, C.A. (2004). *The Birth of the Modern World, 1780-1914*. Oxford: Blackwell Publishing, pp.199-242.
- Berger, Stefan (Ed.). (2004). *A Companion to Nineteenth Century Europe 1789-1914*. Oxford: Blackwell Publishing.
- Berger, Stefan. (Ed.). (2004) *A Companion to Nineteenth Century Europe 1789-1914*. Oxford: Blackwell Publishing, pp. 178-192
- Gooch, John. (2001). *The Unification of Italy*. London: Routledge.
- Gorman, Michael. (1989). *The Unification of Germany*. Cambridge: Cambridge University Press (Introduction).
- Henig, Ruth. (2003). *Origins of the First World War*. London and New York: Routledge.
- Hobsbawm, E.J. (1990). *Nations and Nationalism: Programme, Myth, Reality*. Cambridge: Cambridge University Press.
- Hopkins, A.G. (2000). "Overseas Expansion, Imperialism, and Europe" in T.C.W. Blanning, (Ed.). *The Nineteenth Century: Europe 1789-1914*. Oxford: OUP, pp. 210-24.
- Hunt, Lynn, Tomas R. Martin, Barbara H, Rosenwein, Bonnie G. Smith. (2010). *The Making of the West: Peoples and Cultures, A Concise History*. Boston and New York: Bedford / St. Marti.
- Joll, James. (1999). *Europe since 1870*. London: Penguin Books, pp. 78-112
- Kohn, David. (1985). *The Darwinian Heritage*. Princeton: Princeton University Press.
- McMaster, Neil. (2001). *Racism in Europe*. UK: Macmillan Education.
- Merriman, John. (2002). *A History of Modern Europe: From the Renaissance to the Present*. London. New York: W.W. Norton.
- Merriman, John. (2002). *A History of Modern Europe: From the Renaissance to the Present*. London, New York: W.W. Norton. pp. 1056-1111
- Merriman, John. *Open Yale Course Lectures* [audio].
- Perry, Marvin and George W. Bock. (1993). *An Intellectual History of Modern Europe*. Princeton: Houghton Mifflin Company.

- Perry, Marvin et.al. (2008). *Western Civilization: Ideas, Politics and Society, Vol.2*. Boston and New York: Houghton Mifflin Harcourt Publishing Company
- Perry, Marvin et.al. (2008). *Western Civilization: Ideas, Politics and Society, Vol. 2*. Boston and New York: Houghton Mifflin Harcourt Publishing Company, pp. 708-745
- Rapport, Michael. (2005). *Nineteenth Century Europe*. Hampshire: Palgrave Macmillan
- Rapport, Michael. (2005). *Nineteenth Century Europe*. New York: Palgrave Macmillan.
- Said, Edward. (1978). *Orientalism; Western Conception of the Orient*. New York: Pantheon Books.
- Sheehan, James J. (2000). "Culture", in T.C.W. Blanning (Ed.) *The Nineteenth Century: Europe 1789-1914*. Oxford: Oxford University Press.
- Simonton, Deborah. (1998). *A History of European Women's Work: 1700 to the Present*. London and New York: Routledge.
- Teich, Mikulas and Roy Porter. (Eds.). (1993). *The National Question in Europe in Historical Context*. Cambridge: Cambridge University Press, pp. 181 - 194
- Thompson, David. (1990). *Europe Since Napoleon*. London: Penguin Books.
- Todd, Allan. (2002). *The European Dictatorships: Hitler, Stalin, Mussolini*. Cambridge: Cambridge University Press.
- Wade, Rex A. (2000). *The Russian Revolution, 1917*. Cambridge: Cambridge University Press.
- Waller, Bruce (ed.). (2002). *Themes in Modern European History 1830-1890*. London and N.Y.: Routledge. (Chapter: Germany: Independence and Unification with Power, pp. 99-122.)

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Students shall also be encouraged to participate in talks/seminar presentations by specialists in the field. Since this is history of a region/s less familiar to students, adequate attention shall be given to background introductory lectures and discussions. Overall, the Teaching Learning Process shall emphasise the interconnectedness of themes within the different rubrics to build a holistic view of the time period/region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. Students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, i.e. being able to explain important historical trends and tracing historiography reflected in the assigned readings.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Unification of Germany and Italy, Balkan Nationalism, Tsarist Russia, Russian Revolution, Imperialism, War of 1914-18, Fascism and Nazism, New public Sphere, Art, Institutionalization of Disciplines, History, Anthropology and Psychology

Discipline Specific Elective

DSE-I

History of the USA: Independence to Civil War

Course Objective

The course attempts to study the beginnings of the 'New World' and its diverse demography. It facilitates the understanding of the invaluable contributions of the marginalized social groups that contributed to the development of USA. It focuses on the evolution of American democracy, capitalism and its limitations along with USA's quest for dominance in world politics.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Explain the evolving and changing contours of USA and its position in world politics.
- Examine the limits of American democracy in its formative stages.
- Analyse the character of early capitalism in USA and resultant inequities.
- Describe the economics of slavery in USA along with details of slave life and culture.
- Explain the main issues related with the Civil War in USA and its various interpretations

Course Content:

Unit I: A New World

- [a] The Growth of American Colonies: Diverse Demography; Forms of Labour: indigenous tribes, indentured labour, slaves
- [b] Revolution: sources, historiography

Unit II: Limits of American democracy

- [a] The Federalist Constitution: Structure and its Critique
- [b] Jeffersonian Democracy: Its Limitations
- [c] Westward Expansion: Jefferson and Jackson; Marginalization, Displacement of the indigenous tribes; case histories of the Shawnee and the Cherokee tribes

Unit III: Early Capitalism and its inequities

- [a] Growth of Market Society: Industrial Labour: gender, race, ethnicity
- [b] Immigrant Labour: religious, racial, ethnic bias; case history of Irish immigrants

Unit IV: U.S. quest for dominance

- [a] Imperialism and Changing Diplomacy: Manifest Destiny, War of 1812; Monroe Doctrine

Unit V: Slavery

- [a] The economics of slavery: South vs. North/Debate
- [b] Slave life and culture; nature of female slavery; slave resistance (including female slave resistance)

Unit VI: The Civil War

- [a] Issues of the War
- [b] Interpretations

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I: Student will know the growth of colonies in America, its diverse demography, forms of labour and indigenous tribes. Student will also learn about American Revolution. **(Teaching time: 3 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. I. New York: W.W. Norton & Co. 2nd ed.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. I. 5th ed. Massachusetts: Houghton Mifflin Company.
- Bailyn, B., D. Wood, J. L. Thomas et.al. (2000). *The Great Republic, A History of the American People*. Massachusetts: D.C. Heath & Company .
- Datar, K. *America Ka Itihas*. (1997). University of Delhi: Directorate of Hindi Medium Implementation Board.
- Grob, G.N. and G.A. Billias. (2000). *Interpretations of American History: Patterns and Perspectives*. Vol. I. New York: TheFree Press.
- Billias, George A. (2005). *The American Revolution, how revolutionary was it*. (American Problem Studies). New York: Holt, Rinehart & Winston.
- Lemisch, Jesse. 'The American Revolution Seen From the Bottom Up'. In Barton Bernstein. ed. (1970). *Towards A New Past: Dissenting Essays in American History*. New York: Pantheon Books. 1968. Also London: Chatto&Windus.

Unit II. This unit will explain limits of American Democracy in its initial phase. It will also examine the westward expansion and its' implications. Unit will also highlight marginalization and displacement of the indigenous tribes. **(Teaching time: 2 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. I. New York: W.W. Norton & Co. 2nd ed.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. I. 5th ed. Massachusetts: Houghton Mifflin Company.

- Bailyn, B., D. Wood, J. L. Thomas et.al. (2000) *The Great Republic, A History of the American People*. Massachusetts: D.C. Heath & Company.
- Datar, K. (1997). *America Ka Itihas*. University of Delhi: Directorate of Hindi Medium Implementation Board.
- Grob, G.N. and G.A. Billias. (2000). *Interpretations of American History: Patterns and Perspectives*. Vol. I. New York: TheFree Press.
- Levy, L.W. (1987). *Essays on the Making of the American Constitution*. New York: Oxford University Press.
- Beard, C. (1963). 'The Constitution as an Economic Document'. Sheehan, D. *The Making of American History: The Emergence of a Nation*. Vol. I. New York: Holt, Rinehart & Winston.
- Diggins, J.P. (1981). 'Power and Authority in American History: The Case of Charles Beard and His Critics'. *American Historical Review*, Vol. 86, October, pp. 701-30.
- Berkhofer, R. Jr. (1989). 'The White Advance Upon Native Lands'. Paterson, T.G., *Major Problems in American Foreign Policy: Documents and Essays*. Lexington, Massachusetts: D.C. Heath.
- Edmunds, R.D. (1983). 'Tecumseh, The Shawnee Prophet and American History'. *Western Historical Quarterly*, Vol. 14, No. 3, pp.261–276.
- Young, M. (1981). 'The Cherokee Nation: Mirror of the Republic'. *American Quarterly*, Vol. 33, No. 5, Special Issue: American Culture and the American Frontier. pp. 502-24.

Unit III: This unit will examine the growth of early Capitalism through study of growth of market society, industrial labour. It will also explore resultant inequities most visible in terms of race, migrant labour.**(Teaching time: 2 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. I. New York: W.W. Norton & Co. 2nd ed.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. I. 5th ed. Massachusetts: Houghton Mifflin Company.
- Bailyn, B., D. Wood, J. L. Thomas et.al. (2000). *The Great Republic, A History of the American People*. Massachusetts: D.C. Heath & Company.
- Datar, K. (1997). *America Ka Itihas*. University of Delhi: Directorate of Hindi Medium Implementation Board.
- Bruchey, Stuart. (1990). 'The Early American Industrial Revolution'. In Stuart Bruchey. *Enterprise: The Dynamic Economy of the Free People*. Massachusetts: Harvard University Press.
- Gutman, H. (1977). *Work, Culture & Society in Industrializing America*. New York: Random House Inc.
- Foner, Eric. (1981). 'Class, Ethnicity and Radicalism in the Gilded Age: The Land League and Irish America'. In Eric Foner. *Politics and Ideology in the Age of the Civil War*. New York: Oxford University Press.

Unit IV: This unit proposes to examine U.S. quest for dominance. US Imperialism and Changing Diplomacy which was manifested in Manifest Destiny and War of 1812 and subsequent enactment of Monroe Doctrine. **(Teaching time: 2 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. I. New York: W.W. Norton & Co. 2nd ed.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. I. 5th ed. Massachusetts: Houghton Mifflin Company.
- Bailyn, B., D. Wood, J. L. Thomas et.al. (2000). *The Great Republic, A History of the American People*. Massachusetts: D.C. Heath & Company.
- Datar, K. (1997). *America Ka Itihas*. University of Delhi: Directorate of Hindi Medium Implementation Board.
- Merk, F. (1995). *Manifest Destiny and Mission in American History*. Massachusetts: Harvard University Press.
- Goodman, W. (1963). 'The Origins of the War of 1812: A Survey of Changing Interpretations'. Sheehan, D. (ed.), *The Making of American History: The Emergence of a Nation*. Vol. I. New York: Holt, Rinehart & Winston.
- Perkins, D. (1963). 'The First Challenge: Monroe Hurls Defiance at Europe'. Sheehan, D. (ed.), *The Making of American History: The Emergence of a Nation*. Vol. I. New York: Holt, Rinehart & Winston.

Unit V: This unit examines the economics of slavery and its diverse often contradictory implications for South and North. It will also examine slave life and culture, and nature of female slavery along with a study of slave resistance (including female slave resistance). **(Teaching time: 3 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. I. New York: W.W. Norton & Co. 2nd ed.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. I. Massachusetts: Houghton Mifflin Company.
- Datar, K. *America Ka Itihas*. (1997). University of Delhi: Directorate of Hindi Medium Implementation Board.
- Gerald N. Grob & George A. Billias. (2000). *Interpretations of American History: Patterns and Perspectives*. Vol. I. New York: The Free Press.
- Genovese, Eugene. (1968). 'Marxian Interpretation of the Slave South'. In Barton Bernstein. ed. *Towards A New Past: Dissenting Essays in American History*. New York: Pantheon Books, pp. 90-125.
- Bracey, John H., August Meier, Elliott Rudwick. (Ed.). (1971). *American Slavery: The Question of Resistance*. California: Wadsworth Publishing Co. Inc.

- White, D.B. (1985). 'The Nature of Female Slavery'. in *Ar'n't I a Woman? Female Slaves in the Plantation South*. New York: W.W. Norton.

Unit VI: This unit deals with the history of Civil War in the United States. Various interpretations to explain the issues involved, causes and impact will be explained. **(Teaching time: 2 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. I. New York: W.W. Norton & Co. 2nd ed.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. I. 5th ed. Massachusetts: Houghton Mifflin Company.
- Bailyn, B., D. Wood, J. L. Thomas et.al. (2000). *The Great Republic, A History of the American People*. Massachusetts: D.C. Heath & Company.
- Datar, K. (1997). *America Ka Itihas*. University of Delhi: Directorate of Hindi Medium Implementation Board.
- Gerald N. Grob & George A. Billias. (2000). *Interpretations of American History: Patterns and Perspectives*. Vol. I. New York: The Free Press.
- Foner, E. (1981). 'The Causes of the American Civil War: Recent Interpretations and New Directions'. In Eric Foner. *Politics and Ideology in the Age of the Civil War*. New York: Oxford University Press.
- Barrington, M. Jr. (2015). 'The American Civil War: The Last Capitalist Revolution'. In M. Barrington Moore Jr. *Social Origins of Dictatorship and Democracy, Lord and Peasant in the Making of the Modern World*. Boston: Beacon Press.
- Beale, Howard. (1963). 'What the Historians have said about the Causes of the Civil War'. In Donald Sheehan. ed. *The Making of American History: The Emergence of a Nation*. Vol. I. New York: Holt, Rinehart & Winston.

SUGGESTED READINGS

- Barney, William L. (2000). *The Passage of the Republic: The Inter-Disciplinary History of the Nineteenth Century America*. Massachusetts: D.C. Heath & Company.
- Beard, Charles A. (1998). *An Economic Interpretation of the Constitution of the United States*. New Brunswick: Transaction Publishers.
- Carnes, M.C. & J.A. Garraty. (2006). *The American Nation, A History of the United States*. New York: Pearson Longman.
- Donald, David H., Jean H. Baker, Michael F. Holt. (2001). ed. *Civil War and Reconstruction*. New York: W.W. Norton & Co.
- Faragher, J.M., M.J. Buhle et al. (1995). *Out of Many: A History of the American People*. Vol. I. New Jersey: Prentice Hall.

- Faulkner, Harold U. (1978). *American Economic History*. New York: Harper & Row. (available online).
- Fitz, C.A. (2015). 'The Hemispheric Dimensions of Early U.S. Nationalism: The War of 1812, its Aftermath and Spanish American Independence'. *The Journal of American History*, Vol. 102, Issue 2, September.
- Foner, E. (1981). *Politics and Ideology in the Age of the Civil War*. New York: Oxford University Press.
- Foner, E. (2010). *The Fiery Trial: Abraham Lincoln and American Slavery*.
- Genovese, E.D. (2011). *Roll, Jordan, Roll: The World The Slaves Made*. 9th edition. New York: Knopf Doubleday Publishing Group.
- Genovese, Eugene. (1989). *The Political Economy of Slavery: Studies in the Economy and Society of the Slave South*. Connecticut: Wesleyan University Press.
- Hofstadter, Richard. (1989). *The American Political Tradition and the Men who Made it*. New York: Vintage.
- McDonald, Forrest. (1992). *We The People: The Economic Origins of the Constitution*. New Brunswick: Transaction Publishers.
- Randall, James G. & David H. Donald. (1969). *The Civil War and Reconstruction*. Massachusetts: D.C. Heath & Co.
- Remini, Robert V. (1989). 'Andrew Jackson and Indian Removal'. In T.G. Paterson. ed. *Major Problems in American Foreign Policy: Documents and Essays*. Lexington, Massachusetts: D.C. Heath. pp. 222-239.
- Stamp, K. *The Peculiar Institution: Slavery in the Ante-Bellum South*. New York: Vintage, 1989.
- Stamp, Kenneth. (1980). *The Imperilled Union: Essays on the Background of the Civil War*. New York: Oxford University Press.
- Stephanie M.H. Camp. (2002). *Closer to Freedom: Enslaved women and everyday resistance in the Plantation South*. Review of this is available in *American Historical Review*. Vol. III Issue 1. February 1, 2006.
- Vinovskis, Maris A. (Ed.). (1990). *Towards A Social History of The American Civil War: Explanatory Essays*. Cambridge: Cambridge University Press.
- Wallace, A.F.C. and E. Foner. (1996). *The Long, Bitter Trail: Andrew Jackson and the Indians*. New York: Hill and Wang.
- Zinn, H. (2003). *A People's History of the United States, 1492-Present*. New York: Harper Collins.

Selected Films

- 'Lincoln' Directed and Co-produced by Steven Spielberg, 2012.
- 'The Birth of a Nation' (based on slave Nat Turner, who led a rebellion in Southampton, Virginia in 1831) Directed and Co-produced by D.W. Griffith, 2016.

- ‘The Birth of a Nation’ (showcases assassination of Lincoln; originally based on ‘The Clansman’ and ‘The Leopard’s Spots’ by T.F. Dixon Jr.) Directed and Co-produced by D.W. Griffith, 1915.
- ‘Glory’ (set during the Civil War) Directed by Edward Zwick, Produced by Freddie Fields, 1989.
- ‘12 Years a Slave’ Directed and Co-produced by Steve McQueen, 2013.
- ‘Django Unchained’ (set in Old West and Ante-Bellum South) Directed by Quentin Tarantino, Produced by Stacey Sher and others, 2012.
- ‘Amistad’ (based on events in 1839 aboard the slave ship Le Amistad) Directed and Produced by Steven Spielberg, 1997.
- ‘Gone with the Wind’ (set in the Civil War era) Directed by Victor Fleming and Produced by David Selznick, 1939.
- ‘Uncle Tom’s Cabin’ (set in 1856) Directed by Stan Lathan and Produced by Jeffrey A. Nelson and Others, 1987.
- ‘Roots’ (based on Alex Haley, ‘Roots: The Saga of American Family, 1976) Directed by Bruce Beresford and Produced by Ann Kindberg and others, 2016.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Colonies, Revolution, Federalist Constitution, Jeffersonian Democracy, Westward Expansion, Indigenous tribes, Capitalism, Labour, Gender, Race, Manifest Destiny, 1812, Monroe Doctrine, Slavery, The Civil War

DSE II

History of the USSR: From Revolution to World War II (c. 1917-1945)

Course objective:

The course introduces students to the history of the USSR from the two revolutions of 1917 to the end of the Second World War. Students study the various challenges faced by the Bolsheviks and the steps taken to resolve these issues. Students will also trace the evolution of new institutions and ways of organizing production both in the factory and at the farm. They will also evaluate important foreign policy issues like the setting up of the Comintern, Soviet foreign policy and the Soviet Union's involvement and role in the World War.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Demonstrate a nuanced understanding of the major issues in the History of the USSR between 1917 to 1945.
- Explain how USSR emerged out of Imperial Russia.
- Summarize the steps in the consolidation of Bolshevik power.
- Explain the new organization of production in the fields and in the factory.
- Identify linkages between ideology, purges and propaganda.
- Examine Soviet policies for the period of the course in relation to nationalities and gender questions and literature and art forms.
- Outline Soviet foreign policy issues.

COURSE CONTENT:

Unit I: Background to the Russian Revolutions of February and October 1917:

- a) Peasants and workers movements
- b) Literature and arts in post emancipation Russia
- c) War and the revolutions of February and October

Unit II: Consolidation of Bolshevik Power, Economic Policies and Debate in the 1920s: an overview

Unit III: Collectivisation and industrialisation

Unit IV: Ideology Party and State: Centralization and its Problems

Unit V: Life under the Soviet System: 1917-1945

- a) The Nationalities question
- b) Gender
- c) Literature and art forms

Unit VI: Foreign Policy Issues: Comintern [anti-colonial struggles-India/Indo-China; the politics of United Front]; World War II.

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I: In this unit students will learn about the background to the Russian Revolutions of February and October 1917. They will also examine peasant and labour movements along with role of literature and arts in post emancipation Russia. **(Teaching time: 3 weeks Approx.)**

- Acton, Edward, Vladimir Cherniaev and William Rosenberg eds. (1997). *Critical Companion to the Russian Revolution, 1914-1921*. London: Arnold.
- Figes, Orlando. (1996). *A People's Tragedy: A History of the Russian Revolution*. London: Jonathan Cape.
- Kenez, Peter. (1999). *A History of the Soviet Union from the beginning to the end*. Cambridge: Cambridge University Press.
- Suny, Ronald Grigor, ed. (2006). *Cambridge History of Russia*. Volume 3. Cambridge: Cambridge University Press.
- Figes, Orlando. (2002). *Natasha's Dance: A Cultural History of Russia*. New York: Picador.
- Fitzpatrick, Sheila. (2001). *The Russian Revolution 1917-1932*. New York, USA: Oxford University Press.

Unit II: In this unit students will learn about the consolidation of Bolshevik Power, its economic policies and associated debate in the 1920s. **(Teaching time: 3 weeks Approx.)**

- Fitzpatrick, Sheila. (2001). *The Russian Revolution 1917-1932*. New York, USA: Oxford University Press.
- Nove, Alec. (1993). *An Economic History of the USSR, 1917-1991*. London: Penguin Books, (revised edition).
- Kenez, Peter. (1999). *A History of the Soviet Union from the beginning to the end*. Cambridge: Cambridge University Press.
- Suny, Ronald Grigor, ed. (2006). *Cambridge History of Russia*. Volume 3. Cambridge: Cambridge University Press.

Unit III: In this unit students will learn about the issues related to processes of Collectivisation and Industrialisation in Russia. **(Teaching time: 2 weeks Approx.)**

- Lewin, Moshe. (1985). *The Making of the Soviet System: Essays in the Social History of Inter-war Russia*. New York: Pantheon.
- Allen, Richard. (2003). *From Farm to Factory: A Reinterpretation of the Soviet Industrial Revolution*. Princeton and Oxford: Princeton University Press.
- Nove, Alec. (1993). *An Economic History of the USSR, 1917-1991*. London: Penguin Books, (revised edition).
- Fitzpatrick, Sheila. (1999). *Everyday Stalinism: Ordinary Life in Extraordinary Times: Soviet Russia in the 1930s*. New York: Oxford University Press.
- Davies, R.W., Mark Harrison and S.G. Wheatcroft (Eds.). (1994). *The Economic Transformation of the Soviet Union, 1913-1945*. Cambridge: Cambridge University Press.

Unit IV: In this unit student will understand the interplay between the ideology of the Party and the State. It will also address issues related to centralization and its problems. **(Teaching time: 2 weeks Approx.)**

- Fitzpatrick, Sheila. (1999). *Everyday Stalinism: Ordinary Life in Extraordinary Times: Soviet Russia in the 1930s*. New York: Oxford University Press.
- Getty, J. Arch and Oleg V. Naumov. (1999). *The Road to Terror: Stalin and the Self-Destruction of the Bolsheviks, 1932-1939*. New Haven: Yale University Press.
- Service, Robert. (1998). *A History of 20th Century Russia*. London: Penguin Books.
- Suny, Ronald Grigor, ed. (2006). *Cambridge History of Russia*. Volume 3. Cambridge: Cambridge University Press.

Unit V: In this unit students will learn about women, the minorities and the question of “nationalities” during the period of the Soviet system, 1917-1945. **(Teaching time: 2 weeks Approx.)**

- Engel, Barbara Alpern. (2004). *Women in Russia 1700-2000*. Cambridge: Cambridge University Press.
- Martin, Terry. (2001). *The Affirmative Action- Empire: Nations and Nationalisms in the Soviet Union 1923-1939*. Ithaca: Cornell University Press.
- Erlich, Victor. (1994). *Modernism and Revolution: Russian Literature in Transition*. Cambridge: Harvard University Press.
- Suny, Ronald Grigor, ed. (2006). *Cambridge History of Russia*. Volume 3. Cambridge: Cambridge University Press.

Unit VI: In this unit students will learn about Soviet foreign policy issues with reference to anti-colonial struggles in India/Indo-China. It also examine role of the USSR during the second World War.(Teaching time: 2 weeks Approx.)

- McDermott, Kevin and Jeremy Agnew. (1996). *The Comintern: A History of International Communism from Lenin to Stalin*. Basingstoke: Macmillan.
- Roberts, Geoffrey. (2006). *Stalin's Wars 1939-53: From World War to Cold War*. New Haven: Yale University Press.
- Suny, Ronald Grigor.(Ed.). (2006). *Cambridge History of Russia*. Volume 3. Cambridge: Cambridge University Press.
- Service, Robert. (1998). *A History of 20th Century Russia*. London: Penguin Books.
- Kenez, Peter. (1999). *A History of the Soviet Union from the beginning to the end*. Cambridge: Cambridge University Press.

SUGGESTED READINGS

- Carley, M.J. (1999). *1939: The Alliance that Never Was and the Coming of World War II*. Chicago: Ivan R. Dee.
- Carr, E.H. (1950-1964). *A History of Soviet Russia*, 7 volumes. New York: Macmillan.
- Cohen, Stephen. (1973). *Bukharin and the Russian Revolution: A Political Biography, 1888-1938*. New York: Alfred Knopf.
- Davies, R.W. (1980-1996). *The Industrialization of Soviet Russia*. Vol. 1: *The Socialist Offensive: The Collectivization of Soviet Agriculture, 1929-1930*. Basingstoke: Macmillan, Vols. 2,3, and 5.
- Dobrenko, Evgeny and Marina Balina ed. (2011). *The Cambridge Companion to Twentieth Century Literature*. Cambridge: Cambridge University Press.
- Dobrenko, Evgeny. (2007). *Political Economy of Socialist Realism*, New Haven: Yale University Press.
- Filtzer, Donald. (1986). *Soviet Workers and Stalinist Industrialization, 1928-1941*. Pluto Press.
- Fitzpatrick, Sheila. (1999). *Everyday Stalinism: Ordinary Life in Extraordinary Times: Soviet Russia in the 1930s*. New York: Oxford University Press.
- Gatrell, Peter. (2014). *Russia's First World War: a social and economic history*. New York: Routledge.
- Goldman, Wendy. (2002). *Women at the Gates: gender and industry in Stalin's Russia*. Cambridge: Cambridge University Press.
- Gregory, Paul. (2004). *The Political Economy of Stalinism: Evidence from the Soviet Secret Archives*. Cambridge: Cambridge University Press.
- Kotkin, Stephen. (1995). *Magnetic Mountain: Stalinism as a Civilization*. Berkeley: University of California Press.

- Lieven, Dominic.(Ed.). (2006). *Cambridge History of Russia*, Vol. 2: *Imperial Russia, 1689-1917*. Cambridge: Cambridge University Press.
- Moser, Charles.(Ed.). (1992). *Cambridge History of Russian Literature*. Cambridge: Cambridge University Press.
- Viola, Lynne.(Ed.). (2002). *Contending with Stalinism: Soviet Power and Popular Resistance in the 1930s*. Ithaca: Cornell University Press.
- Volkov, Solomon. (2009). *The Magical Chorus: A History of Russian Culture from Tolstoy to Solzhenitsyn*. New York: Vintage Books.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Russian Revolutions 1917, Peasants, Literature, Bolsheviks, Economic Policies, Collectivization, Centralization, Soviet System, Nationalities Question, Gender

DSE III

History of Africa, c.1500-1960s

Course Objectives:

This paper offers a historical overview of the African continent. It traces major long-term continuities and changes in Africa's socio-economic structures, cultural life and political formations from the 16th century to the mid-twentieth century. The paper closely examines colonial trade and rule, as well as anti-colonial resistance. It offers a critical analysis of the immediate post-independence years, and situates the specific positioning of Africa in connected histories of a globalising world.

Learning Outcomes:

On completion of this course the student shall be able to

- Critique stereotypes on the African continent and outline major shifts in African history.
- Explain elements of change and continuity in the African political experience, political regimes and national formations, economy, society and cultural milieu from the 16th to 20th centuries.
- Contextualise the impact of colonialism on the African continent.
- Explain social protest and anti-colonial resistance in Africa, as well as practices of 'transculturation'.
- Discuss the dilemmas and contradictions emerging from the post-independence economic, social, political and cultural milieu.

Course Content:

Unit I: Africa as 'The Dark Continent': The historiographic gaze and a brief survey of pre-15th century cultures and civilizations in Africa

Unit II: Trade in gold and slaves between Europe and Sub-Saharan Africa: economy, society and state in Africa from the end of the 15th to nineteenth centuries.

Unit III: Africa in the Atlantic world: slaves, slave-ships, piracy and slave rebellions; Africa's contribution to the development of European capitalism.

Unit IV: The abolition of the slave trade 1800 onwards: the end of the slave trade and the shift to 'Legitimate Commerce' and 'Informal Empire'.

Unit V: Imperialism and ‘The Scramble for Africa’

[a] Collaboration, conflict and state formation

[b] The making of colonial economies in Sub-Saharan Africa, between the end of the 19th

Unit VI: Decolonization, 1940’s to 1960’s: Worker protests, peasant rebellions and National Liberation Movements century to 1939: cash crops, mining, forced labour; peasant and worker protests, popular culture, gender and ethnicity.

Unit VII: Case studies:

[a] The historical roots and meaning of Apartheid in South Africa and the struggle against Apartheid

[b] The colonial experience of Algeria under the French, and the National Liberation Movement of Algeria

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-1: This unit deals with portrayal of Africa as ‘The Dark Continent’ with reference to historiography and a brief survey of pre-15th century cultures and civilizations in Africa. **(Teaching time: 2 weeks Approx.)**

- Mazrui, A.A., (Ed.). (1993). *UNESCO General History of Africa: Africa Since 1935 Vol. VIII*. London: Heinemann.
- Fanon, F. (1963). *The Wretched of the Earth*. New York: Grove Press.
- Rediker, M. (2007). *The Slave Ship: A Human History*. New York: Viking.

Unit-2: This unit will deal with the trade in gold and slaves between Europe and Sub-Saharan Africa, from the end of the fifteenth to the nineteenth centuries. It also examines the nature of economy, society and state in Africa. **(Teaching time: 2 weeks Approx.)**

- Rodney, W. (1972). *How Europe Underdeveloped Africa*. London: Bogle-L’Ouverture Publications.
- Williams, E. (1944). *Capitalism and Slavery*. University of North Carolina Press.
- Sparks, A. (1991). *The Mind of South Africa: The Story of the Rise and Fall of Apartheid*. New York: Ballantine Books.

Unit-3: This unit examines the history of Africa in the Atlantic world with specific reference to slaves, slave-ships, piracy and slave rebellions. It also elaborates upon Africa’s contribution to the development of European capitalism. **(Teaching time: 2 weeks Approx.)**

- Williams, E. (1944). *Capitalism and Slavery*. University of North Carolina Press.
- Austen, R. (1987). *African Economic History*. London: Heinemann.
- Reid, R. J. (2012). *A History of Modern Africa: 1800 to the Present*. Hoboken: Wiley Blackwell.

Unit-4: This unit traces history of the abolition of the slave trade and the shift to ‘Legitimate Commerce’ and ‘Informal Empire’, 1800 onwards. **(Teaching time: 2 weeks Approx.)**

- Williams, E. (1944). *Capitalism and Slavery*. University of North Carolina Press.
- Freund, B. (1988). *The African Worker*. Cambridge: Cambridge University Press.
- Vansina, J. (1990). *Paths in the Rainforests: Towards a History of Political Tradition in Equatorial Africa*. Wisconsin: University of Wisconsin Press.

Unit-5: This unit deals with the history of Imperialism and ‘The Scramble for Africa’. It also deals with the making of colonial economies in Sub-Saharan Africa towards the end of the 19th century. **(Teaching time: 2 weeks Approx.)**

- Ahmida, A.A. (Ed.). (2000). *Beyond Colonialism and Nationalism in the Maghrib: History, Culture, Politics*. London: Palgrave.
- Vansina, J. (1990). *Paths in the Rainforests: Towards a History of Political Tradition in Equatorial Africa*. Wisconsin: University of Wisconsin Press.
- Davidson, B. (1978). *Africa in Modern History: The Search for a New Society*. London: Allen Lane.

Unit-6: This unit traces the history of Decolonization from 1940’s to 1960’s. It also examines Worker protests, peasant rebellions and National Liberation Movements in Africa. **(Teaching time: 2 weeks Approx.)**

- Crummy, D. (Ed.). (1986). *Banditry, Rebellion and Social Protest in Africa*. London: Heinemann.
- Sueur, J.L. (Ed.). *The Decolonization Reader*. Abingdon: Psychology Press, 2003.
- Freund, B. (1988). *The Making of Contemporary Africa*. London: Palgrave Macmillan.

Unit-7: This unit examines two Case studies to highlight the historical roots and meaning of Apartheid in South Africa and the struggle against Apartheid history. And the colonial experience of Algeria under the French, and the National Liberation Movement of Algeria. **(Teaching time: 2 weeks Approx.)**

- Ross, R. (1999). *A Concise History of South Africa*. Cambridge: Cambridge University Press.

- Ruedy, J. *Modern Algeria: The Origins and Development of a Nation*. Bloomington: Indiana University Press, 2005.
- Stora, B. *Algeria, 1830-2000: A Short History*. (2001). Ithaca: Cornell University Press, 2001.
- Thompson, L. *A History of South Africa*. (2000). New Haven and London: Yale University Press.

SUGGESTED READINGS:

- Memmi, A. (1991). *The Colonizer and the Colonized*. Boston: Beacon Press.
- Owen, R., and Bob Sutcliffe. (Eds.). (1972). *Studies in the Theory of Imperialism*. London: Longman Publishing Group, 1972.
- Robinson, D., and Douglas Smith. (Eds.). (1979). *Sources of the African Past: Case Studies of Five Nineteenth-Century African Societies*. London: Heinemann.
- Bennoune, M. (1988). *The Making of Contemporary Algeria: Colonial Upheavals and Post-Independence Development*. Cambridge: Cambridge University Press.
- Callinicos, L. (1995). *A People's History of South Africa: Gold and Workers 1886-1924*, Volume 1. Johannesburg: Ravan Press Ltd.
- Callinicos, L. (1987). *A People's History of South Africa: Working Life 1886-1940*, Volume 2. Johannesburg: Ravan Press Ltd.
- Callinicos, L. (1993). *A People's History of South Africa: A Place in the City*, Volume 3. Johannesburg: Ravan Press Ltd.
- Du bois, W.E.B. (1979) *The World and Africa: An Inquiry into the part which Africa has played in World History*. New York: International Publishers.
- Rediker, M. (2014). *Outlaws of the Atlantic: Sailors, Pirates and Motley Crews in the Age of Sail*. Boston: Beacon Press.
- Inikori, J.E. (2002). *Africans and the Industrial Revolution in England: A Study in International Trade and Economic Development*. Cambridge: Cambridge University Press.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Gold, Slavery, Europe and Sub Saharan Africa, Atlantic Slave Trade, European Capitalism, Imperialism and the Scramble for Africa, Nationalist Movements, Decolonization, Apartheid, Algeria

DSE-IV
Gender in Indian History up to 1500 CE

Course Objectives:

The course teaches how ‘Gender’ is not an innocent term denoting biological differences but a social and culturally constructed unequal relationship that needs careful historical analysis in the context of Indian history. The focus is not merely on studying ‘women’s history’ but to go beyond and explore aspects of masculinities as well as alternative sexualities, spanning temporal frames from prehistory to 1500 CE. There is an added emphasis on learning inter-disciplinary analytical tools and frames of analysis concerning familiar topics such as class, caste, and environment that enriches an understanding of historical processes.

Learning Outcomes:

On completion of this course students shall be able to

- Explain critical concepts such as gender and patriarchy and demonstrate their use as tools for historical analysis
- Examine the role and functioning of power equations within social contexts in Indian history during the ancient period, in the construction of gender identities
- Critically examine representations of gender in literature, focusing on ideas of love, manliness and religiosity
- Examine the role of social and political patronage of art and literature in perpetuating gendered inequalities

Course Content:

Unit I: Theories and concepts

- [a] Gender: a tool of historical analysis
- [b] Understanding Origins and Structures of patriarchy

Unit II: Aspects of Gender: Politics, Power and Household

- [a] Economic and Social Roles: household, patronage and Property
- [b] Women and Power: Raziyya and Rudramadevi
- [c] Questions of Sexualities

Unit III: Gender, Representation and Literature

- [a] Religious Literature in the early period: Vedic, Buddhist and Puranic
- [b] Love and Manliness in Hindawi Romances; case studies of Padmavat, Purushpariksha and histories of Mira

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit -1. The unit should familiarise students with theoretical frames of gender and patriarchy and how these concepts provide tools for historical analysis. **(Teaching time: 3 weeks Approx.)**

- Geetha, V. (2002). *Gender*. Calcutta: Stree.
- Kent, Susan Kingley. (2012). *Gender and History*. New York: Palgrave McMillan. pp. 49-75.
- Scott, J. W. (1986). "Gender a useful Category of Historical Analysis". *The American Historical Review* vol.91/9, pp.1056-1075.
- Lerner, G. (1979). *The Majority Finds its Past: Placing Women in History*. New York: Oxford University Press.
- Walby, S.(1990). *Theorizing Patriarchy*. Oxford: Basil Blackwell. pp.1-24, 109-127.

Unit -2. This section should apprise students to locate fluctuating gender relations within households, court and also explore linkages between gender, power and politics. Additionally discussion on the question of sexualities would open up vistas for a nuanced historical learning of normative and alternative sexualities as well as issues of masculinities. **(Teaching time: 6 weeks Approx.)**

- Bhattacharya, N.N. (1999). "Proprietary Rights of Women in Ancient India", Kumkum, Roy (Ed.). *Women in Early Indian Societies*. Delhi: Manohar, pp.113-122.
- Chakravarti, U. (2006). *Everyday Lives Every Day Histories: Beyond the Kings and Brahmins of 'Ancient' India*. Tulika Books: New Delhi.138-155.
- Jaiswal, Suvira. (2008). "Caste, Gender and Ideology in the making of India". *Social Scientist* vol. 36, no. 1/2. pp. 3-39.
- Shah, S.(2012). *The Making of Womanhood; Gender Relations in the Mahabharata*. Revised Edition, Delhi: Manohar, pp. 32-83.
- Singh, Snigdha.(2018). "Exploring the Question of Gender at an Early Stupa: Inscriptions and Images", Snigdha, Singh et. Al. (Ed.). *Beyond the Woman Question: Reconstructing Gendered Identities in Early India*. Delhi: Primus Books, pp. 21-62.
- Tyagi, J. (2004). "Hierarchical Projections of Women in Household: Brahmanical Perceptions Recorded in the Early Grhyasutras c.800-500BC". *Social Scientist* vol. 32, no.5-6, pp.3-20.
- Gabbay, Alyssa. (2011). "In Reality a Man: Sultan Iltutmish, His Daughter, Raziya, and Gender Ambiguity in Thirteenth Century Northern India". *Journal of Persianate Studies*, vol. 4, 45-63.

- Roy, K. (2010). "Construction of Gender Relations in the Rajatarangini of Kalhana"; "Gender Relations during the First Millenium: An Overview", in Kumkum Roy, *The Power of Gender and the Gender of Power; Explorations in Early Indian History*, New Delhi: Oxford University Press, pp.142-164 and pp.195-222.
- Talbot, Cynthia. (1995). "Rudramba Devi The Female King: Gender and Political authority in medieval India". David Shulman(Ed.), *Syllables of the Sky: Studies in South Indian Civilisation*. OUP: New Delhi, pp.391-428.
- Sahgal, Smita. (2009-10). "Masculinity in Early India: Constructing an Embryonic Frame". *Proceedings of Indian History Congress* vol.70, pp. 151-163.
- Zwilling, L and M. Sweet. (1996). "Like a City Ablaze': The Third Sex and the Creation of Sexuality in Jain Religious Literature." *Journal of History of Sexuality*. vol.6/3, pp. 359-384.

Unit -3. The focus is on studying gender representation in literature that highlights the idea of love as well as manliness on the one hand and religiosity across temporal and regional spread on the other.(Teaching time: 5 weeks Approx.)

- Blackstone, R. K. (1998). *Women in the Footsteps of Buddha: Struggle for Liberation in the Therigathas*. Britain: Curzon Press.
- Chitgopekar, N. (2002). 'Indian Goddess: Persevering and Antinomian Presences'; and Kumkum, Roy. "Goddess in the Rgveda-An Investigation" NilimaChitgopekar (Ed.), *Invoking Goddess, Gender Politics in Indian Religion*. Delhi: Shakti Books, pp.11-61.
- Chakrabarti, Kunal. (2001). "Introduction". *The Religious Process: The Puranic and the Making of a Religious Tradition*. Delhi: Oxford University Press, pp.1-43.
- Jha, Pankaj. (2019). 'Political Ethics and the Art of Being a Man'. Pankaj Jha, *A political History of Literature: Vidyapati and the Fifteenth Century*. Delhi:Oxford University Press, pp.133-183.
- Sreenivasan, Ramya.(2003). "Padmini, The Ideal Queen: Sufi and Rajput Codes in Malik Muhammad Jayasi's Padmavat". Vijaya Ramaswamy, (Ed.), *Re-searching Indian Women*. New Delhi: Manohar, pp. 97-118.
- Sangari, Kumkum. (1990) "Mirabai and the Spiritual Economy of Bhakti". *Economic and Political Weekly*, vol. 25/ 27. July 7, pp. 1461-1475.
- Mahalaksmi, R. (2011). "Inscribing the Goddess: Female Deities in Early Medieval Inscriptions from Tamil Region", R., Mahalakshmi. *The Making of the Goddess: Korravai-Durga in Tamil Traditions*. New Delhi: Penguin Books India, pp. 156-98.
- Ramaswamy, V. (1997). "Rebels- House wives"; and "Women in and Out: Women within the WarkariPanths". Vijaya, Ramaswamy, *Walking Naked: Women and Spirituality in South India*. Simla: Indian Institute of Advanced Study, pp.145-194; pp.195-230.

SUGGESTED READINGS:

- Ali, A. (2013). "Women in Delhi Sultanate". *The Oxford Encyclopaedia of Islam and Women*, vol. 1. New York: Oxford University Press, pp.197-200.
- Altekar, A. S. (1956) *The Position of Women in Hindu Society*. Delhi: Motilal Banarsidas.
- Behl, Aditya. (2003). "The Magic Doe, Desire and Narrative in a Hindavi Sufi Romance, circa 1503", Richard M. Eaton (Ed.), *India's Islamic Traditions 711-1750*. New Delhi, OUP, pp.180-208. (Also available in Hindi, in Meenakshi Khanna (Ed.), (2007). *मध्यकालीनभारतकासांस्कृतिकइतिहास*, New Delhi: Social Science Press. pp. 173-202)
- Bhattacharya, S. (2014). "Issues of Power and Identity: Probing the absence of Maharani-A survey of the Vakataka inscription". *Indian Historical Review* vol.41/1, pp. 19-34.
- Bhattacharya, Shatarupa. (2018). "Gender, Dana and Epigraphs: Access to Resources in Early Medieval Central India". Singh, Snigdha et al (Ed.), *Beyond Woman Question: Reconstructing Gendered Identities in Early India*. Delhi: Primus, pp.63-100.
- Ernst, Carl W. and Bruce B. Lawrence. (2002). *Sufi Martyrs of Love: The Chishti Order in South Asia and Beyond*. New York: Palgrave Macmillan.
- Miller, B.S. (Ed.) (1992), *The Powers of Art and Patronage in Indian Culture*, Delhi: OUP. pp.1-16.
- Orr, Leslie, (2000). "Women's Wealth and Worship: Female Patronage of Hinduism, Jainism and Buddhism in Medieval Tamil Nadu". Mandakranta Bose (Ed.), *Faces of the Feminine in Ancient Medieval and Modern India*. New Delhi: Oxford University Press, pp. 124-146.
- Rangachari, Devika. (2013). *Exploring Spaces for Women in Early Medieval Kashmir*, NMML Occasional Papers.
- Roy, Kumkum. (2010). *Power of Gender and the Gender of Power*, Delhi: Oxford University Press, 2010, pp 195-219.
- Roy, Kumkum.(1994). *Emergence of Monarchy in North India, Eighth-Fourth Centuries BC: As Reflected in the Brahmanical Tradition*. Delhi: Oxford University Press.
- Sahgal, Smita. (2017). "Defining Sexuality and Locating it in Logic in Early India Text: Advocacy of the practice of Niyoga in Early Sanskrit and non-Sanskrit Texts". *Niyoga: Alternative Mechanism to Lineage Perpetuation in Early India; A Socio-Historical Enquiry*, Delhi: ICHR and Primus Books, 2017, pp.1-7 and pp.21-81.
- Sahgal, Smita.(2019). "Goddess Worship and Mutating Gender Relations within Hindu Pantheon: From Vedic to Puranic". Veenus Jain and Puspraj Singh(Ed.), *Women: A Journey Through Ages*, New Delhi: New Delhi Publishers, pp.23-32.
- Scott, J. W. (1998). *Gender and the Politics of History*. New York: Columbia University Press.
- Sharma, Sunil, (2005). "Amir Khusraw, "Poetics of the Sacred and Profane Ghazal", *The Poet of Sultans and Sufis*, Oxford: Oneworld, 2005, pp. 40-51.

- Sreenivasan, Ramya. (2002) “AlauddinKhalji Remembered: Conquest, Gender and Community in Medieval Rajput Narratives”. *Studies in History* vol. 18/2, pp. 275-294.
- Tyagi, J. (2008). *Engendering the Early Households, Brahmanical Precepts in early Grhyasutras, middle of the First millennium BCE*, Delhi: Orient Longman.
- Wright, R. P. (1991). “Women’s Labour and Pottery Production in Prehistory” Margret Conkey and Joan Gero (Ed.), *Engendering Archaeology*, USA: Basil Blackwell.
- Zwilling, L. (1992). “Homosexuality as Seen in Indian Buddhist Texts” . J. I. Cabezón (Ed.), *Buddhism, Sexuality and Gender*, Delhi: Sri Satguru Publications, pp. 203-214.
- शाह,शालिनी. (2016). नारीत्वकागठन: महाभारतमेंलैंगिकसम्बंधकसंरचना, Delhi: Granthshilpi.

Teaching Learning Process:

Students who opt for this course have already touched upon some fundamental concepts in their study of Indian history papers. So the classroom teaching can start with an element of recall that would help them to build on the course further. Tutorial classes can assist in both clarifying doubts as well as sharing knowledge and experience. Students can be encouraged not only to do meticulous readings but to make presentations, get feedback, and evolve their arguments. Audio-visual aids such as screening of films followed by discussions can add value to classroom interactions. The thrust should be on conducting micro studies and then connect it with macro historical processes analysed from the perspective of gender.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Gender, Gender relations, historical analysis, household, power, politics, literary representations.

DSE-V
History of the USA: Reconstruction to New Age Politics

Course Objective

The course attempts to understand the changing political culture of USA following the Civil War and Reconstruction. It focuses on the gender roles and mobilization of the African-Americans in the long duration, charting the processes that marked the eventual beginnings of the Civil Rights Movement and the Feminist Movement. It studies worker's culture, labour unions and movements, agrarian and urban reform even as it understands the strengthening and consolidation of American capitalism and imperialism and its impact on the global environment.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Explain the reasons for the implementation of 'Reconstruction' and the causes for its limited success.
- Analyse the growth of capitalism in USA especially in terms of big business, Monopolism, etc.
- Examine the features of Labour Union movements.
- Discern the history of Populist and Progressive movements along with introduction of New Deal in response to the Great Depression.
- Describe the nature of Women's Liberation movement and also explain the 'Pastoralization' of Housework
- Illustrate the significance of Civil Rights Movements and Martin Luther King Jr.

Course Content

Unit I: Reconstruction

- [a] The Makings of Radical Reconstruction; Radical Reconstruction in the South: Blacks, Carpetbaggers, Scalawags, KKK (Ku Klux Klan)
- [b] Redemption vs. Failure: an interpretation

Unit II: The Gilded Age – Economic and Social Divide

- [a] Growth of Capitalism - Big Business: Competition, Consolidation, Monopolism
- [b] Worker's Culture; Organization of Labour Unions and Movements (both men and women)

Unit III: Resistance vs. Reform

- [a] The Populist Challenge: Agrarian Crisis and Discontent
- [b] The Politics of Progressivism: Varieties and Limitations
- [c] The New Deal: Response to the Great Depression, Reformism or Economic Experimentation

Unit IV: Gender Roles

- [a] Cult of Womanhood in the Nineteenth Century; The 'Feminist Mystique': Women's Liberation
- [b] White and Black Women in 'Public' Space
- [c] Class and Gender: 'Pastoralization' of Housework; Sexual Division of Labor and Artisan Tradition; Lowell Textile Mill Workers

Unit V: African-American Movement

- [a] Black Leadership: Booker T. Washington; W.E.B. Dubois; NAACP and Marcus Garvey, Malcolm X
- [b] Civil Rights Movement: Martin Luther King Jr.

Unit VI: USA in World Politics

- [a] Imperial ambition and power: the Spanish-American War; USA and East Asia; USA and Latin America; America in the First World War
- [b] America in the Second World War; The Cold War: Strategy of 'Containment'; Truman Doctrine
- [c] Anti-Communist Crusade: McCarthyism; Korean War; Cuban Project

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I. This unit engages with the issues associated with Reconstruction in post civil war USA. It also examines what historians describe as 'redemption' and its failure. **(Teaching time: 3 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. II. New York: W.W. Norton & Co. 2ndedn.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. II. 5thedn. Massachusetts: Houghton Mifflin Company.
- Bailyn, B., D. Wood, J.L. Thomas et.al. (2000). *The Great Republic, A History of the American People*, Massachusetts: D.C. Heath and Company.
- Datar, K. *America Kalthas*. (1997). University of Delhi: Directorate of Hindi Medium Implementation Board.
- Grob, G.N. and G.A. Billias. (2000). *Interpretations of American History: Patterns and Perspectives*. Vol. II. New York: The Free Press.

- Foner, E. (2002). *Reconstruction: America's Unfinished Revolution, 1863-1877*. New York: Harper Perennial.
- Foner, E. (1983). 'The New View of Reconstruction'. *American Heritage*, Vol. 34, Issue 6, October-November, pp.10-15.
- Foner, E. (1989) 'The Continuing Evolution of Reconstruction History', *OAH Magazine of History*, Vol. 4, No. 1, Winter, pp.11-13.

Unit II: This unit addresses the history of the growth of Capitalism in the USA which saw the emergence of Big Business. It also examines the economic and social divide in society by examining the organization of Labour Unions and Civil Rights movements which touched both men and women.**(Teaching time: 2 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. II. New York: W.W. Norton & Co. 2ndedn..
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. II. 5thedn. Massachusetts: Houghton Mifflin Company.
- Bailyn, B., D. Wood, J.L. Thomas et.al. (2000). *The Great Republic, A History of the American People*, Massachusetts: D.C. Heath and Company.
- Datar, K. (1997). *America Ka Itihas*. University of Delhi: Directorate of Hindi Medium Implementation Board.
- Grob, G.N. and G.A. Billias. (2000). *Interpretations of American History: Patterns and Perspectives*. Vol. II. New York: The Free Press.
- Bruchey, S. (1990). *Enterprise: The Dynamic Economy of the Free People*. Massachusetts: Harvard University Press.
- Gutman, H. (1977). *Work, Culture & Society in Industrializing America*. New York: Random House Inc.

Unit III. This unit focuses on resistance and reforms. It also examines the politics of Progressivism and the making of the 'New Deal' as a response to the Great Depression and economic experimentation.**(Teaching time: 2 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. II. New York: W.W. Norton & Co. 2ndedn.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. II. 5thedn. Massachusetts: Houghton Mifflin Company.
- Bailyn, B., D. Wood, J.L. Thomas et.al. (2000). *The Great Republic, A History of the American People*, Massachusetts: D.C. Heath and Company.
- Datar, K. (1997). *America Ka Itihas*. University of Delhi: Directorate of Hindi Medium Implementation Board.

- Grob, G.N. and G.A. Billias. (2000). *Interpretations of American History: Patterns and Perspectives*. Vol. II. New York: The Free Press.
- Hicks, J.D. (1981). *The Populist Revolt: A History of the Farmers' Alliance and the Peoples Party*. Connecticut: Greenwood Press.
- Mann, A. (1963) *The Progressive Era: Liberal Renaissance or Liberal Failure*. New York: Holt, Rinehart & Winston. (Peter Smith Publication, Online Open Library, 2016).
- Bernstein, B.J. (1968). 'The New Deal: The Conservative Achievements of Liberal Reform'. Bernstein, B.J. (ed.). *Towards A New Past: Dissenting Essays in American History*. New York: Pantheon Books; also London: Chatto & Windus, 1970.

Unit IV: This unit explores gender roles by examining women's liberation movements and White and Black Women in the emerging 'Public' Space. **(Teaching time: 2 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. II. New York: W.W. Norton & Co. 2nd edn.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. II. 5th edn. Massachusetts: Houghton Mifflin Company.
- Bailyn, B., D. Wood, J.L. Thomas et al. (2000). *The Great Republic, A History of the American People*, Massachusetts: D.C. Heath and Company.
- Grob, G.N. and G.A. Billias. (2000). *Interpretations of American History: Patterns and Perspectives*. Vol. II. New York: The Free Press.
- Welter, B. (1966). 'The Cult of True Womanhood, 1820-1860'. *American Quarterly*, Vol. 18, No. 2, pp.151-74. (Articles in *Journal of Women's History*. Vol. 14, No. 1, Spring 2002 to debate Barbara Welter's Article).
- Matthews, G. (1996). *The Rise of Public Woman, Woman's Power and Woman's Place in the United States, 1630-1970*. New York: Oxford University Press.
- Dublin, T. (1993). *Women at Work: The Transformation of Work and Community in Lowell, Massachusetts, 1826-1890*. New York: Columbia University Press.
- Dublin, T. (1975). 'Women, Work and Protest in the Early Lowell Mills: The Oppressive Hand of Avarice Would Enslave Us'. *Labour History*, Vol. 16, No. 1, Winter, pp. 99-116.

Unit V: This unit examines the history of the African-American Movement. It also explores the Civil Right movements and the role of Martin Luther King. **(Teaching time: 3 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. II. New York: W.W. Norton & Co. 2nd edn.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. II. 5th edn. Massachusetts: Houghton Mifflin Company.
- Bailyn, B., D. Wood, J.L. Thomas et al. (2000). *The Great Republic, A History of the American People*, Massachusetts: D.C. Heath and Company.

- Grob, G.N. and G.A. Billias. (2000). *Interpretations of American History: Patterns and Perspectives*. Vol. II. New York: The Free Press.
- White, J. (1990). *Black Leadership in America, 1895-1968*. Studies in Modern History. London & New York: Longman (Digitized in 2008).
- Foner, E. (1970). *Americas Black Past: A Reader in Afro-American History*. New York: Harper Collins.
- Yee, Shirley J. (1992). *Black Women Abolitionists: A Study in Activism, 1828-1860*, Knoxville: The University of Tennessee Press.

Unit VI: This unit studies USA's imperial ambition in terms of the Spanish-American War and the Anti-Communist Crusade, McCarthyism, Korean War and Cuban Project. **(Teaching time: 2 weeks Approx.)**

- Foner, E. (2007). *Give Me Liberty! An American History*. Vol. II. New York: W.W. Norton & Co. 2ndedn.
- Boyer, P.S., H. Sitkoff et al. (2003). *The Enduring Vision: A History of the American People*. Vol. II. 5thedn. Massachusetts: Houghton Mifflin Company.
- Bailyn, B., D. Wood, J.L. Thomas et.al. (2000). *The Great Republic, A History of the American People*, Massachusetts: D.C. Heath and Company.
- Carnes, M.C. & J.A. Garraty. (2006). *The American Nation, A History of the United States*. 12thedn. New York: Pearson Longman.

SUGGESTED READINGS

- Barney, W.L. (2000). *The Passage of the Republic: The Inter-Disciplinary History of the Nineteenth Century America*. Massachusetts: D.C. Heath and Company.
- Carnes, M.C. & J.A. Garraty. (2006). *The American Nation, A History of the United States*. 12thedn. New York: Pearson Longman.
- Donald, David H., Jean H. Baker, Michael F. Holt. ed. (2001). *Civil War and Reconstruction*. New York: W.W. Norton & Co.
- Dubofsky, M. and F.R. Dulles, (2010). *Labor in America: A History*. New Jersey: Wiley Blackwell.
- Faragher, J.M., M.J. Buhle et al. (1995). *Out of Many: A History of the American People*. Vol. II. New Jersey: Prentice Hall.
- Faulkner, Harold U. (1978) *American Economic History*. New York: Harper & Row. (available online).
- Friedan, B. (1963). *The Feminine Mystique*. New York: W.W. Norton & Co..
- Higginbotham, E.B. (1992). 'African-American Women's History and the Metalanguage of Race'. *Signs*, Vol. 17, No. 2. Winter.
- Kerber, Linda & J. Sherron De Hart, (2016). *Women's America: Refocusing the Past*. New York: Oxford University Press.

- Leuchtenberg, W.E., (1963). *Franklin D. Roosevelt and the New Deal*. New York: Harper Perennial.
- McMath, R. & E. Foner (ed.). (1993). *American Populism: A Social History, 1877-1898*. New York: Hill & Wang.
- Nash, G., J.R. Jeffrey et al. (2000). *The American People, Creating a Nation and a Society*. New York: Addison Wesley Longman (chapter on Abolitionism and Women's Rights Movement).
- Randall, James G. & David H. Donald. (1969). *The Civil War and Reconstruction*. Massachusetts: D.C. Heath & Co.
- Zinn, H. (2003). *A People's History of the United States, 1492-Present*. New York: Harper Collins.

Selected Films

- 'And That's How We did in the Mill' - Women in the Lowell Textile Mills, Historymemory-culture.org, YouTube, September 2, 2016.
- 'Boycott' (African-American boycott of the buses during the Civil Rights Movement) Directed by Clark Johnson, 2001.
- 'Frida' (based on the professional and private life of surrealist Mexican painter Frida Kahlo) Directed by Julie Taymor and produced by Sarah Green & others, 2002.
- 'King' (story of Dr. Martin Luther King Jr.) Directed by Abby Mann, 1979.
- 'Lowell Mill Girls' by Colleen G. Casey, YouTube, December 7, 2010.
- 'Malcolm X' Directed by Spike Lee, 1992.
- 'Selma' (based on 1965 Selma to Montgomery voting rights marches) Directed by Ava DuVernay and Produced by Christian Colson & others, 2014.
- 'Separate but Equal' (American court case that destroyed legal validity of racial segregation), 1991.
- 'The Colour Purple' (story of a young African-American girl and the problems faced by African-American women during early twentieth century) Directed and Co-produced by Steven Spielberg, 1985.
- 'The Long Walk Home' (two women black and white in 1955 Montgomery, Alabama Bus Boycott) Directed by Richard Pearce, 1990.
- 'The Lowell Mill Girls (Student Film) by Laureen Meyering, YouTube, December 23, 2011.
- 'The Rosa Parks Story' (a seamstress story in 1955 bus boycott), TV Movie, 2002.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used

widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Reconstruction, Capitalism, Big Business, Populism, Progressivism, New Deal, Gender, Women Liberation, African-American Movement, American Imperialism, Anti-Communist Crusade. Korea, Cuba

DSE VI

History of the USSR: The Soviet Experience (c. 1945-1991)

Course Objectives:

The course studies the most dramatic years in the history of the USSR .i.e. the period between 1945 to 1991. During these years the Soviet Union acquired the status of a super-power. The extent of major economic and political changes between 1956 and 1991 will be examined. Students will also study the origins of the Cold War and Khrushchev's foreign policy and relations with Eastern European and other socialist countries. The students will be acquainted with trends in literature and culture during this period. The reforms of the Gorbachov era and the question of nuclear disarmament will provide some of the contexts for the study of the larger [global] processes that led to the dissolution of the Soviet Union.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Outline and explain key developments in the history of the USSR between 1945 and 1991.
- Critically analyse the Soviet political system and its global impact
- Co-relate the various developments to culture and literary growth.
- Explain the origins, developments and the end of the Cold War.
- Analyse the factors leading to economic slowdown, disintegration of the Soviet Union and the formation of Confederation of Independent States.

Course Content:

Unit 1: The Cold War: Origins, major developments and Khrushchev's foreign policy (1945-64)

Unit 2: The Khrushchev Era: De-Stalinisation and Khrushchev's industrial and agricultural reforms

Unit 3: Conservatism and reform in the Soviet political system: from Brezhnev to Gorbachev; literature and culture

Unit 4: The economics and politics of the Cold War (1964-1991):

- Economic and social consequences for the Soviet system and Eastern Europe
- Glasnost; Perestroika; nuclear weapons and disarmament

Unit 5: Dissolution of the Soviet Union (1991) and the Confederation of Independent States

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit 1: This unit will teach students about the history of the Cold War, its origins, major developments and transitions introduced by Khrushchev's foreign policy (1945-64). Student will learn about the politics of the bi-polar world. **(Teaching time: 3 weeks Approx.)**

- Gaddis, John Lewis. (2005). *The Cold War*. New York: Penguin Press.
- Haslam, Jonathan. (2011). *Russia's Cold War: from the October Revolution to the Fall of the Wall*. New Haven: Yale University Press.
- McCauley, Martin, ed. (1987). *Khrushchev and Khrushchevism*. Basingstoke and London: Palgrave Macmillan.
- Ulam, Adam. (1968). *Expansion and Co-existence: The History of Soviet Foreign Policy from 1917-67*. USA: Praeger.
- Brown, Archie. (2010). *The Rise and Fall of Communism*. London: Vintage.
- Leffler, Melvyn P., ed. (2010). *The Cambridge History of the Cold War*, Volumes I, II, and III, Reprint edition. Cambridge: Cambridge University Press.

Unit 2: This unit deals with the Khrushchev Era, history of De-Stalinisation and Khrushchev's industrial and agricultural reforms. Student will understand history of changes in USSR. **(Teaching time: 3 weeks Approx.)**

- McCauley, Martin, ed. (1987). *Khrushchev and Khrushchevism*. Basingstoke and London: Palgrave Macmillan.
- Hanson, Philip. (2014). *The Rise and Fall of the Soviet Economy: An Economic History of the USSR, 1945-1991*. New York: Routledge.
- Taubman, William. (2003). *Khrushchev: The Man and His Era*. New York: Norton.
- Thompson, William J. (1997). *Khrushchev: A Political Life*. United Kingdom: Palgrave Macmillan.
- Suny, Ronald Grigor, ed. (2006). *Cambridge History of Russia Volume 3*. Cambridge: Cambridge University Press.

Unit 3: This unit deals with the era of Conservatism and reform in the Soviet political system. It begins with the era of Brezhnev and goes up to the era of Gorbachev. It also examines the role of literature and culture of the period. **(Teaching time: 2 weeks Approx.)**

- Crump, Thomas (2013). *Brezhnev and the Decline of the Soviet Union*, Routledge.
- Nove, Alec. (1988). *Stalinism and After: The Road to Gorbachov*. 3rd edition. Routledge.

- Brown, Archie. (1996). *The Gorbachov Factor*. Oxford: Oxford University Press, Paperback.
- Suny, Ronald Grigor, ed. (2006). *Cambridge History of Russia* Volume 3. Cambridge: Cambridge University Press.

Unit 4: This unit addresses historical development during the Cold war era. The economics and politics of the Cold War (1964-1991) has been examined. **(Teaching time: 3 weeks Approx.)**

- Zubok, Vladislav. (2007). *A Failed Empire: The Soviet Union in the Cold War from Stalin to Gorbachov*. Chapel Hill, North Carolina: University of North Carolina Press.
- Brown, Archie. (1996). *The Gorbachov Factor*. Oxford: Oxford University Press, Paperback.
- McCauley, Martin, ed. (1983). *Soviet Union After Brezhnev*. New York: Holmes & Meier publishers.
- Nove, Alec. (1988). *Stalinism and After: The Road to Gorbachov*. 3rd edition. Routledge.
- Leffler, Melvyn P. ed. (2010). *The Cambridge History of the Cold War*, Volumes I, II, and III, Reprint edition. Cambridge: Cambridge University Press.

Unit 5: This unit deals with the history of dissolution of the Soviet Union around 1991 and the emergence of Confederation of Independent States. **(Teaching time: 3 weeks Approx.)**

- Kotz, David and Fred Weir. (1997). *Revolution from Above: The Demise of the Soviet System*. Oxford and New York: Routledge.
- Suny, Ronald Grigor. (1993). *The Revenge of the Past: Nationalism, Revolution, and the Collapse of the Soviet Union*. Stanford: Stanford University Press.
- Suny, Ronald Grigor. (1997). *The Soviet Experiment: Russia, the USSR and the Successor States*. New York: Oxford University Press.
- White, Stephen. (1993). *After Gorbachov*. Cambridge: Cambridge University Press.
- Suny, Ronald Grigor, ed. (2006). *Cambridge History of Russia* Volume 3. Cambridge: Cambridge University Press.

Suggested Readings

- Brown, Archie. (2009). *Seven Years That Changed the World: Perestroika in Perspective*. Oxford: Oxford University Press.
- Brown, Archie. (2010). *The Rise and Fall of Communism*. London: Vintage.
- Cohen, Stephen. (2009). *Soviet Fates and Lost Alternatives: From Stalinism to the New Cold War*. New York: Columbia University Press, New York; Columbia paperback 2011.
- Ellman, Michael and Vladimir Kontorovich. (1998). *The Destruction of the Soviet Economic System: An Insider's History*. London and New York: Routledge.
- Figes, Orlando. (2014). *Revolutionary Russia, 1891-1991*. United Kingdom: Pelican paperback.
- Glazov, Yuri. (1985). *The Russian Mind Since Stalin's Death*. Dordrecht, Netherlands: D Riedel Publishing Company.

- Gregory, Paul and Robert Stuart. (2001). *Russian and Soviet Economic Performance and Structure*. USA: Addison Wesley.
- Hosking, Geoffrey. (1992). *History of the Soviet Union: 1917-1991*. Third edition: Fontana Press.
- कौशिक, करुणा, (1999). साम्यवादीरूस, हिंदीमाध्यमकार्यान्वयननिदेशालय.
- Kotkin, Stephen. (2008). *Armageddon Averted: The Soviet Collapse, 1970-2000*. Second edition. Oxford and New York: Oxford University Press.
- Nove, Alec. (1977). *The Soviet Economic System*. London: Allen & Unwin.
- Overy, Richard. (1998). *Russia's War, 1941-1945*. New York: Penguin.
- Sanchez-Sibony, Oscar. (2014). *Red Globalization: The Political Economy of the Soviet Cold War from Stalin to Khrushchev*. Cambridge: Cambridge University Press.
- Service, Robert. (2015). *The End of the Cold War: 1985-1991*. London: Pan MacMillan

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Cold War, Khrushchev, De-Stalinisation, Soviet political system, Eastern Europe, Literature, Perestroika and Glasnost, Confederation of Independent States

DSE VII

History of Latin America, c.1500-1960s

Course Objectives:

This paper offers a historical overview of Latin America. It traces major long-term continuities and changes in Latin America's socio-economic structures, cultural life and political formations from the 16th century to the mid-twentieth century. The paper closely examines colonial trade and rule, as well as anti-colonial resistance. It offers a critical analysis of the immediate years post-independence, and situates the specific positioning of Latin America in connected histories of a globalising world.

Learning Outcomes:

On completion of this course the student shall be able to

- Critique stereotypes on Latin America and outline major shifts in Latin American history.
- Explain elements of change and continuity in Latin American polities, economy, society and cultural milieu from the 16th to 20th centuries.
- Contextualise the impact of colonialism on Latin America.
- Explain social protest and anti-colonial resistance in Latin America, as well as practices of 'transculturation'.
- Discuss the dilemmas and contradictions emerging from the post-independence economic, social, political and cultural milieu.

Course Content:

Unit 1: Historiography and a brief survey of pre-15th century cultures and civilizations of Latin America

Unit 2: The colonization and conquest of Central and South America by Spain and Portugal, 1490's onwards:

- [a] War and conquest; agrarian transformation; gold and silver mining; the question of labour and slavery; transatlantic commerce and the modern world system; institutions of state; the advent of Christianity and evangelization
- [b] Demographic consequences; resistance, collaboration, survival; new and old hierarchies; gender, race, and culture: separateness or syncretism?

Unit 3: The breakdown of the colonial order and the movements for independence: social base, practices and ideologies

Unit 4: Class and state formation, industrialization, immigration, and popular culture, 1830's to the 1930's: case studies of Mexico, Argentina, and Brazil

Unit 5: Authoritarianism, populism, revolutions and the politics of literature, music and sports, 1930's to the 1960's

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-1: This unit historiography and a brief survey of pre-15th century cultures and civilizations of Latin America. **(Teaching time: 3 weeks Approx.)**

- Bethell, L., ed. (1997). *Cambridge History of Latin America: Colonial Latin America, volume II* Cambridge: Cambridge University Press.
- Bethell, L., ed. (2002). *Cambridge History of Latin America: From Independence to c. 1870, volume III*. Cambridge: Cambridge University Press.

Unit-2: This unit elaborates the colonization and conquest of Central and South America by Spain and Portugal from 1490's onwards. It will also examine the nature of agrarian transformation, demographic changes etc. **(Teaching time: 3 weeks Approx.)**

- Chasteen, J. (2006). *Born in Blood and Fire: A Concise History of Latin America*. New York: W.W. Norton and Company.
- Frank, A.G. (1967). *Capitalism and Underdevelopment in Latin America*. New York: Monthly Review Press.
- Galeano, E. (2010). *Century of the Wind: Memories of Fire Volume III*. New York: Nation Books.

Unit-3: This unit deals with the breakdown of the colonial order and the movements for independence. It also examines independence movement's social base, practices and ideologies. **(Teaching time: 3 weeks Approx.)**

- Burns, E.B. (1992). *Latin America Conflict and Creation: A Historical Reader*. New York: Pearson.
- Skidmore, T. and Peter H. Smith. (2010) *Modern Latin America*. New York: Oxford University Press.
- Wade, P. (1997). *Race and Ethnicity in Latin America*. London: Pluto.
- Williamson, E. (2010). *The Penguin History of Latin America*. London: Penguin Books.

Unit-4: This unit address history of class and state formation, industrialization, immigration, and popular culture from 1830's to the 1930's with specific reference to case studies of Mexico, Argentina, and Brazil. **(Teaching time: 3 weeks Approx.)**

- Bothell, L., ed. (1985). *Mexico Since Independence*. Cambridge: Cambridge University Press.
- Galeano, E. (2010). *Faces and Masks: Memories of Fire Volume II*. New York: Nation Books.
- Galeano, E. (2010). *Genesis: Memories of Fire Volume I*. New York: Nation Books.
- Levine, R.M., and John Crocitti, (Eds.). (2002). *The Brazil Reader: History, Culture, Politics*. Durham: Duke University Press.
- Nouzeilles, G., and Graciela Montaldo. (Eds.). (2002). *The Argentine Reader: History, Culture, Politics*. Durham: Duke University Press.

Unit-5: This unit deals with emergence of authoritarianism, reactions against it as manifested in populism and subsequent revolutions. It will also examine the politics of literature, music and sports; 1930's to the 1960's. **(Teaching time: 2 weeks Approx.)**

- Galeano, E. (1997). *Open Veins of Latin America: Five Centuries of the Pillage of A Continent*. New York: Monthly Review Press.
- Gott, R. (2005). *Cuba A New History*. New Haven: Yale University Press.
- Wright, T. (2001). *Latin America in the Era of the Cuban Revolution*. Connecticut: Praeger Publishers.

SUGGESTED READINGS:

- Bellos, A. Futebal. (2003). *The Brazilian Way of Life*. London: Bloomsbury.
- Chavez, L., 9ed). (2005). *Capitalism, God and Good Cigar*. Durham: Duke University Press.
- Craske, N. (1999). *Women and Politics in Latin America*. New Brunswick: Rutgers University Press.
- Hanke, L., and Jane M. Rausch. (Eds.). (1999). *Latin American History from Independence to the Present*. Princeton: Markus Wiener.
- Karush, M.B., and O. Chamosa, (Eds.). (2010). *The New Cultural History of Peronism*. Durham: Duke University Press.
- Levine, R.M. (1998). *Father of the Poor: Vargas and His Era*. Cambridge: Cambridge University Press.
- Marichal, C. etal. (2006). *From Silver to Cocaine: Latin American Commodity Chains and the Building of World Economy, 1500-2000*. Durham: Duke University Press.
- Marquez, G.G. (1996). *Autumn of the Patriarch*. London: Penguin.

- Meyer, C.M. et al. (1999). *The Course of Mexican History*. New York: Oxford University Press.
- Naipaul, V.S. (1982). *Loss of Eldorado: A History*. London: Penguin Books.
- Romero, L.A. (2002). *A History of Argentina in the Twentieth Century*. Pennsylvania: Penn State University Press.
- Womack, J. (1972). *Zapata and the Mexican Revolution*. New York: Alfred A. Knopf.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Colonization and Conquest, Agrarian Transformation, Mining, Labour, Slavery, Trans Atlantic Commerce, Christianity, Old and New Hierarchies, Gender, Race, Popular Movements, Literature, Sports

DSE-VIII
GENDER IN INDIAN HISTORY, c.1500-1950

Course Objectives:

The module will delineate gendered constructs in Mughal and Modern India. It contextualizes the participation and contribution of women in imperial spaces, political and legal processes, which had male predominance. While examining questions and debates on social reforms, caste, religious identities, popular culture and partition, it questions patriarchy and the nuances of historical gender dynamics. The course tries to historicize and analyse institutions of harem, household and norms of masculinity, through cultural expressions in music, literature and paintings. The course also tries to give students a critical overview of the tangled historiographical paradigm that labels women as ‘victims and agents’ and ‘objects and subjects’.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Explain critical concepts such as gender and demonstrate its use as a tool for historical analysis, through a historiographical engagement
- Critically assess popularly held notions about women in Islamic empires
- Examine critical issues of gender and power in the context of medieval and early Modern Indian history
- Examine the social reforms around the ‘women’s question’ in the modern period of Indian history.
- Explore the popular culture of the modern period to study the dynamics of class and caste in the context of marriage and society
- Discuss issues of gender in the context of partition and the post-partition period of the construction of the independent state

Course Content:

Unit I: Gender and historiographical concerns 1500-1950

Unit II: Women in Early Modern India: 1500 to 1750’s

Political Processes, law and gender

Harem, Household and Family

Masculinities and Sexualities

Culture: Literature and Music

Unit III: Women, Colonialism and Modernity: 1750's to 1950's

The Women's Question, social reforms, nationalism and political mobilisation

Engendering caste, class and religious identities

Histories of love and masculinities

Literature and popular culture

Unit IV: Women, Partition, and the State

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit -1. This section equips students to understand and discern gender as a device of historical essay. **(Teaching time: 2 weeks Approx.)**

- Lal, Ruby. (2005). *Domesticity and Power in the Early Mughal World*. Cambridge: Cambridge Studies in Islamic Civilization, pp. 1-49, 212-226. (Introduction, Ch. 2 & Conclusion).
- Hambly, Gavin R.G. (Ed.). (1999). *Women in the Medieval Islamic World*. Gordonsville: Palgrave Macmillan. pp. 3-19 ("Introduction").
- Gupta, Charu. (2012). 'Gendering *Colonial India: Reforms, Print, Caste and Communalism*'. Delhi: Orient Blackswan, pp. 1-36 ("Introduction").
- Sen, Samita. (2000). "Toward a Feminist Politics? The Indian Women's Movement in Historical Perspective". *Policy Research Report on Gender and Development Working Paper Series no.9*, pp. 2-70.

Unit-2. The learning outcome of this unit is to question gender stereotypes about women in different regimes where Islam was the religion of the ruling classes. It provides for a more contextual and nuanced understanding of how historical and gendered constructions of spaces, institutions and norms of comportment helped create political sensibilities and cultural templates in early modern India. **(Teaching time: 4 weeks Approx.)**

- Balabanlilar, Lisa. (2010). "The Begums of the Mystic Feast: Turco-Mongol Tradition in the Mughal Harem". *Journal of Asian Studies* vol. 69/1, pp. 123–147.
- Hasan, Farhat. (2005). *State and Locality in Mughal India: Power Relations in Western India, c.1572-1730*. University of Cambridge: Oriental Publications. (Chapter V: "Women, Kin and Shari'a"), pp. 71-90.
- Lal, Ruby. (2018). *Empress—The Astonishing Reign of Nur Jahan*. W. W. Norton & Company, pp. 131-149 (Ch.10, Wonder of the Age).
- Bokhari, Afshan. (2015). "Masculine Modes of Female Subjectivity. The case of Jahanara Begum". Anshu Malhotra and Siobhan Lambert-Hurley (Ed.), *Speaking of the Self. Gender, Performance, and Autobiography in South Asia*. Durham: Duke University Press, pp. 53-61.

- Lal, Ruby. (2005). *Domesticity and Power in the Early Mughal World*. Cambridge: Cambridge Studies in Islamic Civilization. (Ch. 5 and 7), pp. 103-139 & 176-213.
- Mukhia, Harbans. (2004). *The Mughals of India*, Oxford: Blackwell. (Ch. 3, “The World of Mughal Family”), pp. 113-155, (available in Hindi).
- Blake, Stephen. (2011). “Returning the Household to the Patrimonial-Bureaucratic Empire: Gender, Succession, and Ritual in the Mughal, Safavid and Ottoman Empires”. P.F. Bang and C.A. Bayly, (Ed.), *Tributary Empires in Global History*. New York: Palgrave Macmillan, pp. 214-226.
- Faruqi, Munis. (2012). *The Princes of the Mughal Empire, 1504–1719*. Cambridge: Cambridge University Press. (Ch. 3), Princely Households, pp. 66-133.
- Anooshahr, Ali. (2008). “The King Who Would Be Man: The Gender Roles of the Warrior King in Early Mughal History”. *Journal of the Royal Asiatic Society* Third Series, vol. 18/3, pp. 327-340.
- O'Hanlon, Rosalind. (2007). “Kingdom, Household and Body History, Gender and Imperial Service under Akbar”. *Modern Asian Studies* vol. 41/5, pp. 889-923.
- Sarkar, N. (2013). “Forbidden privileges and history-writing in medieval India”. *Medieval History Journal*, vol.16/1, pp. 21–62. (Only the Mughal section)
- Petievich, Carla. (2001). “Gender politics and the Urdu Ghazal: Exploratory observations on Rekhta versus Rekhti”. *The Indian Economic & Social History Review*, vol.38/3, pp. 223-248. (Available in Hindi).
- Alam, M, and S. Subrahmanyam. (2006). “Love Passion and Reason in Faizi’s Nal-Daman”. F. Orsini (Ed.), *Love in South Asia: A Cultural History*. Cambridge: University of Cambridge Press, pp.109-141.
- Schofield, K. B. (2012). “The Courtesan Tale: Female Musicians and Dancers in Mughal Historical Chronicles, c.1556-1748”. *Gender and History* vol. 24/1, pp.150–171.
- Brown, Katherine Butler. (2006). “If Music be the food of love: Masculinity and Eroticism in the Mughal Mehfil”. F. Orsini(Ed.), *Love in South Asia: A Cultural History*. Cambridge: University of Cambridge Press, pp. 61-83.

Unit-3. This segment enquires into social reforms in terms of the women’s question. It explores and questions the linkages of class and caste, women and work, the workplace. domestic ideologies, sentiments of love and (sometimes complicated by unequal) marriages. As a part of its exploration, the unit will focus also on the modes of representation of women, in literature certainly, but equally in the popular medium of calendar art. **(Teaching time: 5 weeks Approx.)**

- Sarkar, Tanika & Sumit Sarkar (Ed.) (2008). *Women and Social Reform movement in Modern India*, Bloomington: Indiana University Press. (Introduction, pp. 1-18.)
- Kumar, Radha. (1993). *The History of Doing. An Illustrated Account of Movements for Women’s Rights and Feminism in India 1800-1960*. New Delhi: Kali for Women. (Ch. 2; pp. 7-26.)

- Anandi, S. (1991). "Women's Question in the Dravidian Movement c. 1925-1948". *Social Scientist* vol. 19/5, pp. 24-41.
- Malhotra, Anshu. (2005). "The *Pativrata* and Domestic Ideologies in Early Twentieth Century Punjab". Shakti Kak & BiswamoyPati (Ed.), *Exploring Gender Equations. Colonial and Post Colonial India*. New Delhi: Nehru Memorial Museum and Library, pp.1-27.
- Warriar, Shobhana. (2005). "Women and Workplace". Shakti Kakand, BiswamoyPati (Ed.), *Exploring Gender Equations. Colonial and Post Colonial India*. New Delhi: Nehru Memorial Museum and Library, pp. 231-265.
- Raychaudhuri, Tapan. (2000). "Love in a Colonial Climate: Marriage, Sex and Romance in Nineteenth-Century Bengal". *Modern Asian Studies*, vol.34/2, pp.349–378.
- Gupta, Charu. (2002). "(Im) possible Love and Sexual Pleasure in Late-Colonial North India". *Modern Asian Studies*, vol. 36 / 1 pp. 195-221.
- Sinha, Mrinalini. (1999). "Giving Masculinity a History: Some Contributions from the Historiography of Colonial India". *Gender &History* vol.11/3, pp. 445–460.
- Orsini, Francesca. (2002). *The Hindi Public Sphere 1920-1940*. UK: Oxford University Press. (Ch. 4), pp. 243-308.
- Minault, Gail. (1988). "Urdu Women's Magazine in the Early Twentieth Century". *Manushi*, pp. 2-9.
- Thakurta, Tapati Guha. (1991). "Women as 'Calendar Art' Icons: Emergence of Pictorial Stereotype in Colonial India". *Economic and Political Weekly* vol. 26/43, pp. 91-99.
- Ramaswamy, Sumathi. (2001). "Maps and Mother Goddesses in Modern India". *Imago Mundi*, vol.53, pp.97-114.

Unit-4. This section explores and reflects on the time frame of pre-partition, during and post-partition and how partition took place over the bodies of women and intervention of the state, which came in after partition. **(Teaching time: 3 weeks Approx.)**

- Butalia, Urvashi. (1993). "Community, State and Gender: On Women's Agency during Partition". *Economic and Political Weekly* vol. 28/17, pp.12-24.
- Menon Ritu and Kamla Bhasin. (1993). "Recovery, Rupture, Resistance: Indian State and Abduction of Women during Partition". *Economic and Political Weekly* vol. 28/17, pp. 2-11.
- Forbes, Geraldine. (2004). *The New Cambridge History of India, Women in Modern India, vol. 4, part 2*. New York: Cambridge University Press, pp. 223-254, (Ch. 8).

SUGGESTED READINGS:

- Major, Andrea. (2011). *Sovereignty and Social Reform in India. British colonialism and the campaign against sati 1830-60*. Edinburgh: Routledge, Edinburgh South Asian Studies. (Ch. 3), pp. 79-114.

- Chowdhry, Prem. (2007). "Fluctuating Fortunes of Wives: Creeping Rigidity in Inter-Caste Marriages in the Colonial Period". *The Indian Historical Review*, vol. 34/1, pp. 210-43.
- Curley, D. (2001). "Marriage, Honour and Agency and Trial by Ordeal: Women's Gender Roles in Candimangal", *Modern Asian Studies* vol. 35/2, pp. 315-348.
- Dalal, U. (2015). "Femininity, State and Cultural Space in Eighteenth-Century India". *Medieval History Journal*, vol.18/1, pp.120–165.
- Dalal, U. (1999). "Women's Time in the Havelis of North India". *The Medieval History Journal*, vol. 2, pp. 277-308.
- Flavia, Agnes. (2001). *Law and Gender Inequality: The Politics of Women's rights in India*. New Delhi: Oxford University Press. (Ch. 4, 5 & 6), pp. 41-90.
- Forbes, Geraldine. (2004). *The New Cambridge History of India, Women in Modern India*, volume 4, part 2. New York: Cambridge University Press(rpt.).(Ch. 2, pp. 32-63).
- Gupta, Charu. (2012). *Streetva se Hindutva TakAupaniveshik Bharat Mein YauniktaAur-Saampradayikta*. Delhi:RajkamalPrakashan. (Ch.4, 7, 10 & 11).
- Gupta, Charu. (2000). "Hindu women, Muslim men: Cleavages in shared spaces of everyday life, United Provinces, c.1890-1930". *Indian Economic Social History Review*, pp.121-149.
- Hambly, Gavin. (1999). "Armed Women Retainers in the Zenanas of Indo-Muslim Rulers". Gavin R.G. Hambly (Ed.), *Women in the Medieval Islamic World*. Gordonsville: Palgrave Macmillan. pp. 429-467.
- Hussain, Rokeya Sakhawat. (2005). *Sultana's Dream and Padmarag: two feminist utopias*. Translated with an introduction by Barnita Bagchi. Delhi: Penguin, 2005 (also available on-line: <https://digital.library.upenn.edu/women/sultana/dream/dream.html>).
- Kozlowski, Gregory C. (1999). "Private Lives and Public Piety: Women and Practice of Islam in Mughal India". Gavin R.G. Hambly (Ed.), *Women in the Medieval Islamic World*. Gordonsville: Palgrave Macmillan. pp. 469-488.
- Naim, C.M. (2004). "Homosexual (Pederastic) Love in Pre-Modern Urdu Poetry". *Urdu Texts and Contexts*. Delhi: Permanent Black, pp. 19-41.
- O'Hanlon, Rosalind. (2014). *At the Edges of Empire. Essays in the Social and Intellectual History of India*. New Delhi: Permanent Black. (Ch. 10, pp. 302-350.)
- O'Hanlon, Rosalind. (1999). "Manliness and Imperial Service in Mughal North India". *Journal of the Economic and Social History of the Orient*, vol. 42/1, pp. 47-93.
- Sarkar, Tanika. (1992). "The Hindu wife and the Hindu nation: Domesticity and nationalism in nineteenth century Bengal". *Studies in History*, Vol. 8(2), pp. 213–235.
- Sarkar, Tanika. (1993). "Rhetoric against Age of Consent: Resisting Colonial Reason and Death of a Child-Wife Source". *Economic and Political Weekly*, vol. 28/36, pp. 1869-1878.
- Kugle,Scott. (2016). "Sufi Attitudes Towards Homosexuality: Chishti Perspectives from South Asia". Raziuddin Aquil and David L. Curley (Ed.), *Literary and Religious Practices in Medieval and Early Modern India*. New Delhi: Manohar. pp. 31-59.
- Singh, Dilbagh. (2003). "Regulating the Domestic: Notes in the Pre-colonial States and the Family". *Studies in History* vol.19/1, pp. 69-86.

- Trivedi, Madhu. (2012). *The Emergence of the Hindustani Tradition: Music, Dance and Drama in North India, 13th to 19th Centuries*. Delhi: Three Essays Collective.
- Vanita, Ruth and Saleem Kidwai (Ed.) (2000). *Same-Sex Love in India: Readings from Literature and History*. New York: Palgrave-Macmillan, pp. xiii-xxiv, 107-125 (“Preface” and “Introduction to materials in the Perso-Arabic tradition”).
- Warriar, Shobhana. “Interwoven identities: Gender, Class and Community in the Mills of Madurai 1914-51” an *unpublished article*.

Teaching Learning Process:

Classroom teaching will be enriched by discussions and presentations made by students in class and/or in tutorials. Presentations shall focus either on important themes covered in class lectures, or on specific readings. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Gender, Haram, Masculinities and Sexualities, Class, Caste, Love, Popular Culture, Partition.

DSE IX

HISTORY OF MODERN CHINA (c. 1840s-1950s)

Course Objectives:

The course studies the transformation of China from an imperial power into a modern nation taking its place among a constellation of world powers. This transition has been studied in the context of the impact of a specific form of western imperialism on China and the country's numerous internal fissures and contradictions.. This paper seeks to focus on a range of responses to the tumultuous changes taking place: various strands of reform (from liberal to authoritarian), popular movements, and revolutionary struggles. It facilitates an understanding of the multiple trajectories of China's political and cultural transition from a late imperial state, to a flawed Republic, to the Communist Revolution led by Mao Tse Tung. The paper shall expose students to historiographical debates pertaining to each of these themes, keeping in mind historical and contemporary concerns centred on such issues.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Develop an in-depth understanding of China's engagement with the challenges posed by imperialism, and the trajectories of transition from feudalism to a bourgeois/ capitalist modernity.
- To locate these historical transitions in light of other contemporaneous trajectories into a global modernity, especially that of Japan.
- Analyse significant historiographical shifts in Chinese history, especially with reference to the discourses of nationalism, imperialism, and communism.
- Investigate the political, economic, social and cultural disruptions caused by the breakdown of the centuries old Chinese institutions and ideas, and the recasting of tradition to meet modernist challenges.
- Comprehend the genesis and unique trajectories of the Chinese Communist Revolution.
- Locate the rise of China and Japan in the spheres of Asian and world politics respectively.

Course Content:

Unit I: Late Imperial China: Society, Economy, Polity

- (a) Confucian Value System
- (b) China and the Great Divergence Debate

Unit II. Imperialism, Popular Movements and Reforms in the 19th century

- (a) Opium Wars and the Unequal Treaty System
- (b) Taiping and Boxer Movements – Causes, Ideology, Nature
- (c) Self-Strengthening Movement; Hundred Days Reforms of 1898

Unit III: Emergence of Nationalism

- (a). The Revolution of 1911: Context, Nationalist Ideologies, Role of Social Groups, Changing Gender Roles.
- (b). Sun Yat-sen (Sun Zhong Shan)— Ideology and Three Peoples Principles
- (c) May Fourth Movement of 1919

Unit IV: Nationalism and Communism

- (a). 1921-1927: Formation of the CCP and early activities; Reorganization of the KMT (Nationalist Party); The First United Front
- (b). 1928-1949: Kiangsi (Jiangxi) Period; Evolution of Maoist Strategy and Revolutionary Measures; the Yen-an Phase; Peasant Nationalism and Communist Victory

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I: This unit will introduce student to history of China since early modern times. As a backdrop it will discuss Confucianism and it will also examine the Great Divergence debate. **(Teaching time: 4 weeks Approx.)**

- Latourette, K.S. (1954). *History of Modern China*. London: Penguin Books, (Chapter 2 & Chapter 3).
- Gray, J. (1990). *Rebellions and Revolutions: China from 1800s to the 1980s*. Oxford: Oxford University Press, (Chapter 1).
- Pomeranz, K. (2000). *The Great Divergence: China, Europe and the Making of the Modern World*. Princeton: Princeton University Press, (Introduction, Chapter 1).
- Wong, R. Bin. (1997). *China Transformed: Historical change and the Limits of European Expansion*. Ithaca and London: Cornell University Press, pp. 1-52 (The “Introduction” is available on line:
http://www.history.ubc.ca/sites/default/files/documents/readings/bin_wong_introduction_1.pdf.)

Unit II: This unit deals with European imperialism in China. It also examines the nature and consequences of popular Movements; Taiping and Boxer Movements. It also deals with Hundred Days Reforms of 1898. **(Teaching Time: 4 weeks Approx.)**

- Peffer, N. (1994). *The Far East- A Modern History*. New Delhi: Surjeet Publications, (Chapter VI & Chapter VII).
- Chung, Tan. (1978). *China and the Brave New World: A Study of the Origins of the Opium War*. New Delhi: Allied Publishers, (Chapter 2, Chapter 6 & Chapter 7).
- Vinacke, H.M. (1982). *A History of the Far East in Modern Times*. Delhi: Kalyani Publishers, (Chapter II).
- Chesneaux, J. (1973). *Peasant Revolts in China 1840-1949*. London: Thames and Hudson, (Chapter 2).
- Cohen, P.A. (1997). *History in Three Keys: The Boxer as Event, Experience and Myth*. New York: Columbia University Press.
- Fairbank, J.K. and Merle Goldman. (2006). *China: A New History*. Harvard: Harvard University Press, (Chapter 10 & Chapter 11).
- Gray, J. (1990 reprint). *Rebellions and Revolutions: China from 1800s to the 1980s*. Oxford: Oxford University Press, (Chapter 3 & Chapter 6).
- Purcell, V. (1963). *The Boxer Rebellion: A Background Study*. Cambridge: Cambridge University Press, (Chapter VI, Chapters IX, Chapter X & Conclusion).
- Tan, Chester C. (1967). *The Boxer Catastrophe*, New York: Octagon Books.
- Shih, Vincent. (1967). *Taiping Ideology: Its Sources, Interpretations and Influences*. Seattle: University of Washington Press.

Unit III: This unit examines the history of emergence of Nationalism in China. The Revolution of 1911, its character, nature of protest and participation etc. It also deals with the rise and impact of Sun Yat-sen (Sun Zhong Shan), his ideology and Three Peoples Principles. **(Teaching Time: 3weeks Approx.)**

- Wright, M. C. (Ed.). (1968). *China in Revolution: the First Phase, 1900-1913*. London: Yale University Press, (Introduction).
- Zarrow, P. (2005). *China in War and Revolution 1895-1949*. London: Routledge.
- Lazzerani, Edward J. (Ed.). (1999). *The Chinese Revolution*. Westport, Connecticut: Greenwood Press, pp 19-32.
- Linebarger, P.M.A. (1973). *The Political Doctrines of Sun Yat-sen: An Exposition of the San min Chu I*. Westport (Connecticut): Greenwood Press, ("Introduction". Also available online: <http://www.gutenberg.org/ebooks/39356>).
- Schiffrin, H.Z. (1968). *Sun Yat-sen and the Origins of the Chinese Revolution*, Berkeley: University of California Press, (Chapter 1, Chapter II & Chapter X).
- Bianco, L. (1967). *Origins of the Chinese Revolution 1915-1949*. Stanford: Stanford University Press, (Chapter 2).
- Chow, Tse-tung. (1960). *The May Fourth Movement*. Stanford: Stanford University Press, (Chapter I, Chapter XIV).

- Sheridan, J.E. (1975). *China in Disintegration: The Republican Era in Chinese History 1912-1949*. London: Free Press, Collier Macmillan Publishers, (Chapter IV).
- Spence, J. (1999). *The Search for Modern China*. New York: W.W. Norton, (Chapter 11. 13).

Unit IV: This unit will examine nature of Nationalism and emergence of Communism in China. It will also examine the formation of the CCP and its early activities. History of Reorganization of the KMT (Nationalist Party) and The First United Front will also be elaborated upon. **(Teaching time: 3 weeks Approx.)**

- Bianco, L. (1967). *Origins of the Chinese Revolution 1915-1949*. Stanford: Stanford University Press, (Chapter 3 & Chapter 4).
- Fairbank, J.K. (1987). *The Great Chinese Revolution 1800-1985*, Part Three. London: Chatto and Windus, (Chapter 12, Chapter 13 & Chapter 14).
- Harrison, J.P. (1972). *The Long March to Power: A History of the Chinese Communist Party, 1921-1972*, London: Macmillan, (Chapter 2, Chapter 3 & Chapter 9).
- Isaacs, H. (1961). *The Tragedy of the Chinese Revolution*. Stanford: Stanford University Press, (Preface, Chapter 1, Chapter 2, Chapter 3, Chapter 4 & Chapter 18).
- Johnson, Chalmers A. (1962). *Peasant Nationalism and Communist Power: The Emergence of Revolutionary China, 1937-1945*. Stanford: Stanford University Press, (Chapter I).
- Selden, M. (1971). *The Yen-an Way in Revolutionary China*. Cambridge: Harvard University Press, (Chapter 1 & Chapter VI).
- Shinkichi, E. and H. Z. Schiffrin, (Ed.). (1984). *The 1911 Revolution in China: Interpretive Essays*. Tokyo: University of Tokyo Press, pp. 3-13.
- Snow, E. (1937). *Red Star over China, Part Three*. London: Victor Gollancz, (Chapter 2).
- Spence, J. (1999). *The Search for Modern China*. New York: W.W. Norton, (Chapter 16).

SUGGESTED READINGS:

- Bailey, Paul J. (2007). *Gender and Education in China: Gender discourses and women's schooling in the early twentieth century*. London: Routledge.
- Cameron, Meribeth H. (1931). *The Reform Movement in China, 1898-1912*, Stanford: Stanford University Press.
- Chen, J. (1965). *Mao and the Chinese Revolution*. London: Oxford University Press.
- Chesneaux, J. (Ed.). (1972). *Popular Movements and Secret Societies in China 1840-1950*. Stanford: Stanford University.
- Chesneaux, Jean et. al. (1976). *China from Opium War to 1911 Revolution*. New York: Random House, (Chapters 2-4, 7).
- Cohen, P. A. and John E. Schrecker. (1976). *Reform in Nineteenth Century China*, Cambridge: Harvard University Press.

- Duara, Prasenjit. (2009). *The global and the regional in China's nation-formation*. London: Routledge.
- Fairbank, J. K. (1953). *Trade and Diplomacy on the China Coast: the opening of the treaty ports, 1842-54*. Cambridge: Harvard University Press, (Basic textbook, select chapters).
- Fairbank, J.K. (Ed.). (1983). *Cambridge History of China: Volume XII: Republican China 1912-1949*, Cambridge: Cambridge University Press
- Fairbank, J.K. and Merle Goldman. (2006). *China: A New History*. Harvard: Harvard University Press, (Chapter 12).
- Fairbank, J.K., E.O. Reischauer and A.M. Craig. (1998). *East Asia: Tradition and Transformation*. New Jersey: Houghton Mifflin.
- Fenby, J. (2009). *The Penguin History of Modern China: The Fall and Rise of a Great Power 1850-2009*. London: Penguin Books, 2009.
- Franke, Wolfgang. (1980). *A Century of Chinese Revolution, 1851-1949*, Colombia: University of South Carolina Press.
- Goodman, Bryna and Wendy Larson (Ed.). (2005). *Gender in Motion: Divisions of Labor and Cultural Change in Late Imperial and Modern China*. Lanham: Rowman and Littlefield Publishers.
- Greenberg, M. (1951). *British Trade and the Opening of China*. Cambridge: Cambridge University Press, (Basic textbook, select chapters).
- Hsu, I.C.Y. (1985). *The Rise of Modern China*. Hong Kong: Oxford University Press, (Chapter 10).
- Hsu, I.C.Y. (Ed.). (1971). *Readings in Modern Chinese History, Part Two*. Hong Kong: Oxford University Press, (Chapter II).
- Lovell, J. (2011). *The Opium War: Drugs, Dreams, and the Making of China*, London: Picador.
- Michael, F.H. (1966-1971). *The Taiping Rebellion: History and Documents*. Seattle: University of Washington Press.
- Schram, S.R. (1963). *The Politics and Thoughts of Mao Tse Tung*. London: Pall Mall.
- Schurmann, F. and O. Schell (Ed.). (1968). *China Reader Series: Vol. I– Imperial China, Vol. II– Republican China*. Harmondsworth: Penguin Books.
- Schwartz, B. (Ed.). (1972). *The Reflections on the May Fourth Movement: A Symposium*. Cambridge: Harvard University Press.
- Sheng, Hu. (1981). *Imperialism and Chinese Politics*, Beijing: Foreign Languages Press, (Basic textbook, select chapters).
- Spence, J.D. (1972). *The Gate of Heavenly Peace*. London: Faber and Faber Limited.
- Tan Chung. (1986). *Triton and Dragon: Studies on the 19th Century China and Imperialism*. New Delhi: Gian Publishing House.
- Teng, S.Y. (1971). *The Taiping Rebellion and the Western Powers: A Comprehensive Survey*. Oxford: Clarendon Press.

- Twitchett, D. and J.K. Fairbank. (1978). *The Cambridge History of China*. Cambridge: Cambridge University Press.
- Vohra, Ranbir. (1987). *China's Path to Modernization: A Historical Review From 1800 to the Present*. Englewood: New Jersey.: Prentice Hall.
- Waller, D. *Kiangsi Soviets Republic: Mao and the National Congress of 1931 and 1934*. Berkeley: University of California Press.
- Wasserstorm, Jeffrey N. (2003). *Twentieth Century China: New Approaches (Rewriting Histories)*. London: Routledge.
- Wasserstorm, Jeffrey N. (2016). *The Oxford Illustrated History of Modern China*, Oxford: Oxford University Press.
- पन्त,शैला:(year) आधुनिक चीन का उदय.
- मिश्र,कृष्णकान्त. (2005).बीसवीं सदी का चीन: राष्ट्रवाद और साम्यवाद, ग्रन्थशिल्पी.
- सत्यकेतुविद्यालंकार. (1952). एशिया का आधुनिक इतिहास, Masoori: Sarasvati Sadan.
- जैनएसके.(year) आधुनिक एशिया का इतिहास.
- जैनकैलाशचंद.(year) एशिया की विकासोन्मुखीएकता.
- सराओ,के. टी.एस. (year) चीन का इतिहास.
- चीन का भूगोल, विदेशी भाषा प्रकाशन गृह, पेइचिंग, 1985
- एप्सटाइन,इजराइल. (1984). अफीम युद्ध से मुक्तितक.
- मोहंती,मनोरंजन. (1980). माओत्सेतुंग का राजनीतिक चिंतन (अनुवाद: आनंद स्वरूप वर्मा), दिल्ली : मैकमिलन.
- पाण्डेय धनपति. (2005). आधुनिक एशिया का इतिहास. Delhi: Motilal Banarsidas.

Teaching Learning Process:

Classroom teaching will be enriched by discussions and presentations made by students in class and/or in tutorials. Presentations shall focus either on important themes covered in class lectures, or on specific readings. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period.

Assessment Methods:

Students shall submit two pieces of written work and shall make presentations based on the prescribed readings during tutorial classes. Since this is a discipline-specific elective paper chosen by the student, she should be encouraged to explore the subject through as many diverse media and in as many ways as possible. Students will be encouraged to innovatively use diverse learning aids, such as maps, texts on historical geography, literature, media reports, documentaries, and movies.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

China, Nationalism, Canton, Opium, Communism, Mao, KMT, CCP, Soviet, Peasantry, Reform, Revolt, Revolution, Sun Yat-sen, Imperialism, Confucianism, Great divergence, Warlordism, Peasant nationalism, Soviets.

DSE X

The Making of pre-Colonial Southeast Asia

Course Objectives:

This course offers an overview of pre colonial Southeast Asian history. It seeks to familiarise students with historiographical debates involving the construction of Southeast Asia as a region. It analyses processes of state formations, the impact of maritime activity on society and polity in the mainland and the archipelago. It focuses on the development and localization of religious traditions across a linguistically and culturally diverse region. The paper will require students to engage with recent developments in the historiography especially with recent research on aspects of social and political history, external influences on the region, architecture, urban history and its local histories. Through this the student will develop a clear and comprehensive understanding of different aspects of pre modern Southeast Asian history.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Explain the processes of state formation, the localization and spread of religious traditions like Islam and Buddhism
- Analyse the impact of the European presence on local society
- Examine the impact of maritime activity of local society and polity and the developments in the economic and architectural history of the region.
- Discern the history of Populist and Progressive movements along with introduction of New Deal in response to the Great Depression.
- Describe the historiographical trends to study history of Southeast Asia

Course Content:

Unit-I: Introducing maritime and mainland Southeast Asia:Environments, Language, Cultures and People; the macro region

Unit-II: Sources and historiographical trends: Indianization / Sinicization / Localization

Unit-III: a) **State formation:**the early kingdoms; later polities (Pagan, Srivijaya, Khmer);
b) **social structures**
c) **Indian Ocean and overland routes**
d) **art & architecture**

Unit-IV: Religion: Popular beliefs; the spread and localization of Buddhism, Hinduism, Islam and Christianity

Unit-V: Political and Economic transformations the 14th century: Majapahit Empire, regional formations, the Portuguese and Spanish commercial enterprise

Unit-VI: The Age of European Commerce: Maritime economy, trade routes, commodities, business communities and port cities

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: In this unit the student will better appreciate the region and its linguistic, ecological and ethnic diversity. S/he will become familiar with recent historiographical debates. **(Teaching time: 3 weeks Approx.)**

- Tarling, N., ed. (2000). *The Cambridge History of Southeast Asia (vol. 1, part 1: from earliest times to 1500 CE)*, Cambridge: Cambridge University Press. (A basic text book for the course).
- Wolters, O.W. (1999). *History, Culture and Region in Southeast Asian Perspectives*, Singapore: Institute of Southeast Asian Studies
- Andaya, Leonard Y. (2008). *Leaves of the Same Tree: Trade and Ethnicity in the Straits of Melaka*, Honolulu: University of Hawaii Press
- Monica L Smith. (1999). “‘Indianization’ from the Indian Point of View: Trade and Cultural Contacts with Southeast Asia in the Early First Millennium C.E”, *Journal of the Economic and Social History of the Orient*, Vol. 42, No. 1, pp. 1-26
- Suarez, Thomas. (1999). *Early Mapping of Southeast Asia: The Epic Story of Seafarers, Adventurers and Cartographers who first mapped the regions between China and India*, Singapore: Periplus.

Unit- II: At the end of this rubric the students would be able to discuss the process of state formation in the region. They will develop a better understanding of the evolving social structures in the region and will be familiar with the important networks of trade and artistic patronage. **(Teaching time 4 weeks Approx.)**

- Miksic, John N. and GeokYian Goh. (2017). *Ancient Southeast Asia*, London: Routledge
- Kenneth R. Hall, (2011). *A History of Early Southeast Asia: Maritime Trade and Societal Development, 100-1500*, London: Rowman & Littlefield Publishers
- Kulke, H. (1993; 2001). *Kings and Cults: State Formation and Legitimation in India and Southeast Asia*, New Delhi: Manohar.

- Klokke, M., (Ed.) (2000). *Narrative Sculpture and Literary Traditions in South and Southeast Asia*. Leiden: Brill.
- Girard-Geslan, M., M. Klokke, A. Le Bonheur, D.M. Stadtner, T. Zephir, (1998). *Art of Southeast Asia*, London: Harry N. Abrams
- Guy, J., et al. (2014). *Lost Kingdoms: Hindu-Buddhist Sculpture of South and Southeast Asia*. New York: Metropolitan Museum of Art and Yale University Press.

Unit-III: The student will be expected to develop an understanding of local beliefs and ritual practices in both maritime and mainland southeast Asia. She/he will be able to demonstrate familiarity with the historical time line and local impact of the spread and localization of important religious traditions in the region. **(Teaching time: 4 weeks Approx.)**

- Acri, Andrea, Helen Creese and Arlo Griffiths (Eds.). (2011). *From Lanka eastwards: The Ramayana in the Literature and Visual Arts of Indonesia*, Leiden: Brill
- Morgan David O. and Anthony Reid. (2010). *The New Cambridge history of Islam: The Eastern Islamic World eleventh to eighteenth centuries, Vol. 3*, Cambridge: Cambridge University Press
- Artonang, Jan Sihar and Karel Steenbrink (Eds.). (2008). *A History of Christianity in Indonesia*, Leiden: Brill
- Tara Albert. (2014). *Conflict and Conversion: Catholicism in Southeast Asia, 1500-1700*, Oxford: Oxford University Press

Unit- IV: By the end of this rubric the students will be able to trace the changing character of regional political formations and the beginnings of the European presence in the region. They will also be better acquainted with the various dimensions of the maritime activity involving communities, commodities and port cities. **(Teaching time: 3 weeks Approx.)**

- Pinto, Paulo Jorge de Sousa. (2012). *The Portuguese and the Straits of Melaka, 1575-1619: Power Trade and Diplomacy*, Singapore: National University of Singapore Press
- Reid, Anthony. (1988). *Southeast Asia in the Age of Commerce, 1450-1680: The Lands Below the Winds*, New Haven: Yale University Press
- Reid, Anthony (Ed.). (1993). *Southeast Asia in the early modern era: Trade, power and belief*, Ithaca, New York: Cornell University Press
- Bulbeck, David, Anthony Reid, Lay Cheng Tan and Yiqi Wu, (1998). *Southeast Asian Exports since the 14th century: Cloves, Pepper, Coffee and Sugar*, Singapore: Institute of Southeast Asian Studies

SUGGESTED READINGS:

- Ahmad, Abu Talib and Tan LiokEe, (2003). *New Terrains in Southeast Asian History*, Singapore: Singapore University Press
- Andrea,Acri, Helen Creese and Arlo Griffiths (eds.) (2011). *From Lanka eastwards: The Ramayana in the Literature and Visual Arts of Indonesia*, Leiden; Brill
- Borschnerg, Peter. (2010). *The Singapore and Melaka Straits: Violence, Security and Diplomacy in the 17th century*, Singapore: National University of Singapore
- Broese, Frank. (1997). *Gateways of Asia: Port Cities of Asia in the 13th - 20th centuries*, London: Routledge.
- Chaudhuri, K.N. (1985). *Trade and Civilization in the Indian Ocean: An Economic History from the Rise of Islam to 1750*, New Delhi: MunshiramManoharlal.
- Goh, Robbie B.H. (2005). *Christianity in Southeast Asia*, Singapore: Institute of Southeast Asian Studies
- Hall, K. (1985). *Maritime Trade and State Development in Early Southeast Asia*. Honolulu: University of Hawaii Press.
- Hall, K.R. and Whitmore, J.K. (1976). *Explorations in Early Southeast Asian History: the origins of Southeast Asian Statecraft*. Ann Arbor: Centre for Southeast Asian Studies, University of Michigan. Michigan Papers on South and Southeast Asia, 11.
- Henley, David and Henk Schulte Nordholt (eds.). (2015). *Environment, Trade and Society in Southeast Asia*, Leiden: Brill
- Kulke, H, K. Kesavapany, and V. Sakhuja. (2009). *Nagapattinam to Suvarnadwipa: Reflections on the Chola Expeditions to Southeast Asia*. Singapore: Institute of Southeast Asian Studies.
- Kulke, H. ([1993] 2001). *Kings and Cults: State Formation and Legitimation in India and Southeast Asia*. New Delhi: Manohar.
- Lieberman, Victor. (2009), *Strange Parallels: Southeast Asia in Global Context, c.800-1830, Volume 2, Mainland Mirrors: Europe, Japan, China, South Asia and the Islands*, Cambridge: Cambridge University Press
- Manguin, Pierre-Yves, A. Mani & Geoff Wade (eds.). (2012). *Early Interactions between South and Southeast Asia: Reflections on Cross Cultural Exchange*, Singapore: Institute of Southeast Asian Studies. (A basic text book for the course).
- Masashi, Haneda. (2009). *Asian Port Cities, 1600-1800: Local and Foreign Cultural Interactions*, Singapore: National University of Singapore Press.
- Morgan, David O. and Anthony Reid. (2010). *The New Cambridge history of Islam: The Eastern Islamic World eleventh to eighteenth centuries, Vol. 3*, Cambridge: Cambridge University Press
- Ray, H.P. (1994). *The Winds of Change: Buddhism and the Maritime links of Early South Asia* Delhi: Oxford University Press.

- Singh, Upinder and P. Dhar ed., (2014). *Asian Encounters: exploring connected histories*, New Delhi: Oxford
- Smith, R.B. and W. Watson. (1979). *Early South East Asia: Essays in Archaeology, History and Historical Geography*, New York and Kuala Lumpur: Oxford University Press

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

State Formation, Pagan Srivijaya, Indian Ocean, Art & Architecture, Localisation of Religious Traditions, Buddhism, Hinduism, Islam, Portuguese and Spanish Commercial Enterprise

DSE XI

Global Ecological Histories

Course Objectives:

This course will examine the relationship between society and nature from prehistoric times to the present. Drawing on environmental, political ecology, historical geography and gender studies perspectives, the course will introduce students to the concepts, methods and ideas of global ecological histories. Moving beyond regional and national scales of analysing historical processes, the following units elaborate the global interconnectedness of socio-ecological histories. With a long-term perspective on the overlapping nature of historical and geological time, the course provides critical perspectives on how social differences including class, gender, caste, ethnicity and nationality were articulated ecologically.

Learning Outcomes

Upon completion of this course the student shall be able to:

- Critique an understanding of environmental concerns based on a narrow scientific/technological perspective
- Discuss environmental issues within a social- political framework
- Examine the role of social inequality, i.e. unequal distribution of and unequal access to environmental resources. This is critical in gaining an understanding of the environmental crisis of the world - from the global to the local
- Examine the complexities of resource distribution and inequalities of resource use, locating these within specific social contexts, with reference to case studies regarding water rights and forest rights
- Locate solutions to environmental problems within a framework of greater democratisation of resource use
- Problematisé (or *critique?*) the notion of a pristine past - of perfect balance between human societies and nature in pre-modern times.

Course Content:

Unit-I: Political Ecologies and Societies

Global Ecological interconnectedness and writing histories

Anthropocentrism and critical histories

Unit-II: Energy Regimes in World History

Prime Movers in Pre-Industrial Societies

Industrial Energy Regimes

Unit-III: Ecologies of the Industrial World.

Ecological Imperialism

Colonialism and the re-articulation of inequalities

Colonialism and the re-articulation of inequalities

Unit-IV: Industrial Appropriation of Nature

Industrial Agriculture

Gendered access to natural resources

Cities and Urban Landscapes

Unit-V: Debating Anthropocene/Capitalocene

Climate change and writing ecological histories

Whose Anthropocene?

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-1: This unit introduces students to history of conflict over natural resources. It also examines human nature interactions, with specific reference to anthropogenic activities. **(Teaching Time: 4 weeks Approx.)**

- Dickinson, William. (2013). “Changing Times: the Holocene Legacy” in J. R. McNeil and Alan Roe, eds., *Global Environmental History: An Introductory Reader*. London: Routledge, pp 3-23.
- McNeil, J. R. and Mauldin, E. S. (2012). *A Companion to Global Environmental History*. Oxford: Wiley-Blackwell, Introduction pp. xvi-xxiv.
- Crist, Eileen. and Kopnina, Helen. (2014) “Unsettling Anthropocentrism”, *Dialectical Anthropology*, Vol. 38, No 4, pp. 387-396.
- Sayre, Nathan F. (2012). “The Politics of the Anthropogenic”, *Annual Review of Anthropology*, Vol. 41, pp. 57-70.

Unit-2: Introduces students to the emerging field of energy studies. An In-depth reading of energy histories, especially forest, pastoralism, agriculture will enable students to critique the assumption regarding harmonious co-existence between man and nature in pre-modern societies. **(Teaching Time: 3 weeks Approx.)**

- Vaclav Smil, (2017). *Energy and Civilisation*. Cambridge: MIT, pp. 127-224.
- Burke III, Edmund. (2009) “The Big Story: Human History, Energy Regime and the Environment” in Edmund Burke III and Kenneth Pomeranz, eds., *the Environment and World History*. Berkeley: University of California Press, pp. 33-53.

- Mitchell, Timothy. (2011). *Carbon Democracy: Political Power in the Age of Oil*. London: Verso, pp. 231-254.
- Urry, John. (2013) *Societies Beyond Oil: Oil Dregs and Social Futures*. London: Zed Books, pp. 202 -240.

Unit-3: This unit explores how Empires of the New World transferred flora and fauna across continents, affected the demography of local societies and completely transformed landscapes. The second rubric explains how colonialism generated new patterns of consumption by appropriating global resources and fossil fuels for industry, to produce an inter-connected but unequal world. **(Teaching Time: 3weeks Approx.)**

- Crosby, Alfred W. (1986). *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*. New York. Cambridge University Press, pp.294-308
- McNeill, J.R. (2012). “Biological Exchange in Global Environmental History”, in J. R. McNeill & E. S. Maudlin, eds., *Companion to Global Environmental History*. Oxford:Blackwell, pp. 433-452
- Gadgil, Madhav and Guha, Ramachandra. (1992). “Conquest and control.” In Madhav Gadgil and Ramachandra Guha, eds., *This Fissured Land: An ecological History of India*. Delhi: OUP, pp. 113- 145.
- Prabhakar, R. and Gadgil, Madhav. (1995) ‘Maps as Markers of Ecological Change: A Case study of the Nilgiri Hills of Southern India’ in David Arnold and Ramachandra Guha. eds., *Nature, Culture and Imperialism: Essays on the Environmental History of South Asia*. New Delhi: OUP, pp. 152-84.

Unit-4: This unit studies the new energy regimes of the modern world, with a special focus on industrial agriculture. It offers a historical perspective on increasing inequality of access to natural resources for women and the poor (within their own locations and across the world). **(Teaching Time: 3weeks Approx.)**

- McKittrick, Meredith.(2012). “Industrial Agriculture”, in J. R.McNeill & E. S. Maudlin, eds., *Companion to Global Environmental History*. Oxford: Blackwell, pp. 411-432.
- Fitzgerald, Amy J. (2015). *Animals as Food Reconnecting Production, Processing and Impacts*. Michigan:Michigan State University Press, pp 9-34.
- Agarwal, Bina. (1992). “The Gender and Environment Debate: Lessons from India”, *Feminist Studies*, Vol. 18, No.1. pp. 119-158.
- Unger, N. G. (2014). “Women and Gender”, in A. C. Isenberg (ed.), *The Oxford Handbook of Environmental History*. New York: OUP, pp 600-643.
- Bauer Jordan and Melosi, Martin V. (2012). “Cities and the Environment” in J. R. McNeill and E. S. Maudlin, eds., *Companion to Environmental History*. Oxford:Blackwell, pp. 360-376.

- Culver, Lawrence. (2014). “Confluence of Nature and Culture: Cities in Environmental History”, in A. C. Isenberg (ed.), *The Oxford Handbook of Environmental History*. New York: OUP, pp. 553-572.

Unit-5: Introduces the concept of Anthropocene to discuss emergent concerns regarding the influence of humans on the planet’s history. This provides a long-term historical perspective on contemporary environmental issues including global warming and need for innovation, policy change at the international level and the production of post humanist histories. **(Teaching Time: 1 week Approx.)**

- Steffen, Will, Crutzen, Paul J and McNeill J. R. (2008). “The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature”, *Ambio*, Vol. 36(No.8), 614-21.
- Morrison, Kathleen D. (2015). “Provincializing the Anthropocene”, *Seminar*, 673 (Sept.), 75-80.
- Lewis, Simon L. and Maslin, Mark A. (2015). “Defining the Anthropocene”, *Nature*, Vol. 519(12March), 171-80.

SUGGESTED READINGS:

- Beinart, William and Hughes Lotte. eds. (2007). *Environment and Empire*. Oxford: OUP, pp. 200-214 (Imperial Scientists, Ecology and Conservation)
- Beinart, William and Karen Middleton. (2004), “Plant Transfers in Historical Perspective: A Review Article”. *Environment and History*, vol. 10 no.1, pp. 3-29.
- Bulliet, Richard. (2005). *Hunters, Herders and Hamburgers: The Past and Future of Human-Animal Relationships*. New York: Colombia University Press. pp. 205 -224.
- Chakrabarty, Dipesh “Whose Anthropocene? A Response” in: *Whose Anthropocene? Revisiting Dipesh Chakrabarty’s ‘Four Theses*. Robert Emmett and Thomas Lekan, (eds.), (2016). *RCC Perspectives: Transformations in Environment and Society* No. 2, pp.103–113.
- Cronon, William. (1996). “The Trouble with Wilderness: Or, Getting Back to the Wrong Nature”. *Environmental History*, vol. 1 no.1, pp. 7-28.
- Cronon, William. (1996). *Uncommon Ground: Rethinking the Human Place in Nature*. New York: W. W. Norton & Co. pp. 23-68.
- Crosby, Alfred W. (2006). *Children of the Sun: A History of Humanity’s Unappeasable Appetite for Energy*. New York: W. W. Norton. pp. 159-166 & pp. 117-158
- D’Souza, Rohan. (2015). Mischievous Rivers and Evil Shoals: “The English East India Company and the Colonial Resource Regime” in V.Damodaran, A.Winterbottom and A. Lester(ed.), *The East India Company and the Natural World*. New York: Palgrave, pp.128-146
- Guha, Ramachandra. (2000). *Environmentalism: A Global History*. New York: Longman.

- Heynen, Nik, Maria Kaika, and Erik Swyngedouw. (2006), 'Urban Political Ecology: Politicizing the production of Urban nature' in Nik Heynen et al. (Eds.). *In the Nature of Cities: Urban Political Ecology and Politics of Urban Metabolism*. London: Routledge, pp. 1-19.
- Kalof, Linda. (2007). *Looking at Animals in Human History*. London: Reaktion Books. pp. 1-71
- Malm, Andreas. (2016). *The Rise of Steam Power and the Roots of Global Warming*. London: Verso. pp.389-394
- McAfee, Kathleen. (2016). "The Politics of Nature in the Anthropocene" in "Whose Anthropocene? Revisiting Dipesh Chakrabarty's 'Four Theses,'" Robert Emmett and Thomas Lekan (eds.), *RCC Perspectives: Transformations in Environment and Society* No. 2, pp.65–72.
- McKenney, Jason. (2002). Artificial Fertility: "The Environmental Costs of Industrial Age Fertilisers" in Andrew Kimbrell (Ed.), *The Fatal Harvest Reader: The Tragedy of Industrial Agriculture*. London: Island Press, pp.121-129
- McNeill, William. (2012). *Mosquito Ecology and War in the Greater Caribbean 1620-1914*. New York: CUP pp.137-192
- Moore, Jason W. (ed.) (2016) *Anthropocene or Capitalocene?: Nature, History and the Crisis of Capitalism*. Oakland: PM Press. pp. 173-195
- Peretti, Jonah H. (1998). "Nativism and Nature: Rethinking Biological Invasion" *Environmental Values*, Vol. 7(No.2), pp 183-192.
- Sklan, Daniela (2007). *The Rise and Predictable Fall of Industrial Agriculture*. International Forum on Globalisation San Francisco: International Forum on Globalisation, pp.38-56
- Shiva, Vandana. (1988). "Women in the Food Chain" (Ch.5) in Vandana Shiva, *Staying Alive: Women, Ecology and Survival in India*. New Delhi: Kali for Women. pp. 96-178.
- Tully, John. (2011). *The Devil's Milk: A Social History of Rubber*. New York: Monthly Review Press. pp. 345-360

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her en-

gement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Energy Regimes, Industrialisation, Gender, Urban Landscapes, Anthropocene, Ecological Histories,

DSE XII

HISTORY OF MODERN JAPAN (c. 1868-1950s)

Course Objectives:

The course studies the transition of Japan from quasi-feudalism to a modern industrialised capitalist nation. It focuses on the political and economic strategies adopted by Japan to meet the challenges posed by western imperialistic intrusions. It facilitates an understanding of Japan's emergence as a major non-European power within an international order dominated by western imperial powers. It studies the trajectory of Japan towards ultra-nationalism and militarism in the context of a failed parliamentary democracy, eventually leading to disaster in the Second World War. The course aims to pay close attention to historiographical shifts in all topics, contextualising these against the backdrop of their contemporary history and politics. Adequate attention is given to the study of social and cultural aspects with a special emphasis on the role of women in late 19th and early 20th century Japan.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Explain Japan's attempts to create new institutional structures and recast traditions to encounter challenges of the west.
- Analyse historiographical shifts in Japanese history in the context of global politics.
- Examine the divergent pathways to modernity followed by Japan.
- Examine distinct perspectives on imperialism and nationalism in East Asia, and understand how historiographical approaches are shaped by their contexts.
- Conceptualise how these distinct histories can be rooted in common cultural traditions.
- Locate and contextualise the history of Japan in world politics.
- Critically discuss contemporary international studies with much greater clarity based on the knowledge of history and culture of Japan.

Course Content:

Unit 1: Transition from Feudalism to Capitalism

- a. Crisis of the Tokugawa *Bakufu* System
- b. The Meiji Restoration : Nature and Significance; Early Meiji Reforms
- c. Economic Development in the Meiji Era
Agrarian Settlement
Industrialisation and Capitalism

Unit 2: Democracy and Militarism

- a. Popular Rights Movement
- b. Women's Rights in the Meiji Era
- c. Meiji Constitution
- d. Failure of Parliamentary Democracy; Militarism and Fascism

Unit 3: Imperialistic Expansion and Resistance

- a. Imperialism and Japanese Nationalism
- b. Expansion in China and Manchuria
- c. Colonisation of Korea and Korean Nationalism

Unit 4: American Occupation, post-War Reconstruction and “Reverse Course”

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit 1: This unit will introduce student to the history of Japan from its transitions from feudalism to Capitalism. The Unit will also examine historical process which led to Meiji Restoration and its impact on the economy of Japan. **(Teaching Time: 5weeks Approx.)**

- Gordon, A. (2003). *A Modern History of Japan- From Tokugawa Times to the Present*. New York: Oxford University Press, Chapters 3- The Intellectual World of Late Tokugawa & Chapter 4- Overthrow of the Tokugawa.
- Hall, J.W. (1970). *Japan from Pre-history to Modern Times*. Centre for Japanese Studies, the University of Michigan. Chapter 13- The Meiji Restoration and Its Meaning.
- Hall, J.W. (1991). (ed.). *Cambridge History of Japan*. Volume IV: Early Modern Japan. CUP. Cambridge.
- Jansen, M.B. (2000). *The Making of Modern Japan*. Cambridge: Harvard University Press.
- Jansen, M.B. and Gilbert Rozman. (1986). *Japan in Transition from Tokugawa to Meiji*. Princeton, Princeton University Press.
- Livingston, J. et al. (1974). *The Japan Reader: Volume I- Imperial Japan: 1800-1945*. Pantheon Asia Library, 1974.
- McClain, J.L. (2002). *Japan – A Modern History*. W.W. Norton and Company. Chapter 3- Self and Society.
- Pyle, K.B. (1995). *The Making of Modern Japan*. Lexington: D.C. Heath.
- Sansom, G.B. (2015). *The Western World and Japan-- a Study in the Interaction of European and Asiatic Cultures*. Bibliolife DBA of Biblio Bazaar II LLC. Chapters 14 and 15.
- Totman, C. (1980). *Collapse of the Tokugawa Bakufu. 1862-1868*. University of Hawaii Press.

Unit 2: This unit deals with emergence and growth of democratic governance in Japan. Role of popular rights movements, polemics of Meiji constitution, and failure of democracy and subsequent rise of Militarism has been examined in this unit.(**Teaching Time: 4 weeks Approx.**)

- Moore Jr., Barrington. (2015). *Social Origins of Dictatorship and Democracy, Lord and Peasant in the Making of the Modern World*. Boston: Beacon Press.
- Beasley, W.G. (2000). *The Rise of Modern Japan: Political, Economic and Social Change Since 1850*. Palgrave Macmillan. Chapter 6- Protest and Dissent.
- Beckmann, G.M. (1957). *The Making of the Meiji Constitution: The Oligarchs and the Constitutional Development of Japan, 1868-1891*. University of Kansas Press.
- Jansen, M. B. et. al ed. (1988). *Cambridge History of Japan*. Volume V: *The Twentieth Century*. Cambridge, CUP.
- Fairbank, J.K., E.O. Reischauer and A. M. Craig. (1998). *East Asia: Tradition and Transformation*. New Jersey: Houghton Mifflin. Chapter 23- Imperial Japan: Democracy and Militarism.
- Gordon, A. (2003). *A Modern History of Japan- From Tokugawa Times to the Present*. New York: Oxford University Press. pp 88-91.
- Ike, N. (1969). *The Beginnings of Political Democracy in Japan*. Praeger, 1969.
- Jansen, M.B. (1988). *Cambridge History of Japan*. Volume V: *The Nineteenth Century*. Cambridge: Cambridge University Press. pp 651-673
- Hall, J.W. (1970). *Japan from Pre-history to Modern Times*. Centre for Japanese Studies, the University of Michigan. Chapter 16- The Meiji Constitution and the Emergence of Imperial Japan. Chapter 17- The Decade of the 20's- Political Parties and Mass Movements.

Unit 3: This unit will enable students to understand the imperialistic design of Japan and the role of nationalism in its conception. This unit will examine the nature and consequences of Japanese colonialism over China and Manchuria. It also deals with Japanese colonialism over Korea and the growth of Korean Nationalism.(**Teaching Time: 3weeks Approx.**)

- Beasley, W.G. (1987) *Japanese Imperialism 1894-1945*. Oxford: Clarendon Press.
- Buzo, A. (2002). *The Making of Modern Korea*. London: Routledge. Introduction, Chapter I- Joined to the Empire 1910-31, Chapter II- The dark gulf, 1931-45.
- Fairbank, J.K., E.O. Reischauer and A. M. Craig. (1998). *East Asia: Tradition and Transformation*. New Jersey, Houghton Mifflin, 1998, Chapter 26- The New Japan.
- Hall, J.W. (1970). *Japan from Pre-history to Modern Times*. Centre for Japanese Studies, the University of Michigan. Chapter 18- From Manchuria to War in the Pacific.
- Iriye, A. (1981). *Power and Culture, The Japanese-American War, 1941-1945*. Harvard University Press.

- Jansen, M.B. (1975). *Japan and China: From War to Peace, 1894-1972*. Princeton University: Rand McNally College Publishing Company/Chicago. Chapter 4- Japan and Change in Korea, Chapter 7-The New Generation, pp 241-247, Chapter 10-The Road to the Pacific War.
- Mayo, J.M.(Ed.). (1970). *The Emergence of Imperial Japan-Self Defence or Calculated Aggression?* Lexington, Massachusetts: D.C. Heath and Company. pp 19-24, 25-30, 47-53, 55-58, 69-73.
- Morley, J.W. (Ed). (1971). *Dilemmas of Growth in Pre-war Japan*. Princeton, New Jersey: Princeton University Press. Chapter I- introduction: Choice and Consequence, Chapter IV-The Failure of Military Expansionism, Chapter VI- Rural origins of Japanese Fascism, Chapter IX- Intellectuals as Visionaries of the New Asian Order, Chapter XIII- What Went Wrong?.
- Seth, M.J. (2011). *A History of Korea: From Antiquity to the Present*. New York, Toronto, Plymouth. Chapter 10- Colonial Korea, 1910 to 1945.

Unit 4: This unit deals with the period between the two World wars and the subsequent history of Japan. The American occupation of Japan after World War-II and the post war reconstruction has been examined in this unit.(**Teaching Time: 2 weeks Approx.**)

- Dower, J.W. (1999). *Embracing Defeat: Japan in the Wake of World War II*. New York.W.W. Norton & Company.
- Duus, P. (1997). *Modern Japan*. Boston. Houghton Mifflin
- Jansen, M.B. (1975). *Japan and China: From War to Peace, 1894-1972*. Princeton University: Rand McNally College Publishing Company/Chicago. Chapter 12- The Postwar Era, pp 447-462.
- Porter, E.A. and Porter, Ran Ying, (2018) *Japanese Reflections on World War II and the American Occupation*. Amsterdam, Amsterdam University Press.
- Takemae, E. (2002). *The Allied Occupation of Japan*. New York, London: The Continuum International publishing group.

SUGGESTED READINGS

- Akita, G. (1967). *Foundations of the Constitutional Government in Japan, 1868-1900*. Harvard East Asian Series, 23. Cambridge, Mass: Harvard University Press.
- Allen, G.C. (1946). *A Short Economic History of Modern Japan 1867-1937*. London: Allen &Unwin. (Chapter 2).
- Allen, G.C. (1946). *A Short Economic History of Modern Japan 1867-1937*. London: Allen & Unwin, 1946, Chapter 2.
- Ayusawa, I.F. (1976). *History of Labour in Modern Japan*. Praeger.
- Barnhart, M.A. (1995). *Japan and the World since 1868*. New York: Edward Arnold.

- Beasley, W.G. (1963). *The Making of Modern Japan*. London:Werdenfield and Nicolson, 1963, Chapter VI- New Men and New Methods 1868-1873.
- Beasley, W.G. (1972). *The Meiji Restoration*. Stanford University Press.
- Borton, H. (1955). *Japan's Modern Century*. New York: Ronald Press Co.
- Chatterji, B.R. (1966). *Modern Japan: Perry to Sato*. Meerut, Meenakshi Prakashan, India.
- Duus, P. (1968). *Party Rivalry and Political Change in Taisho Japan*. Harvard: Harvard University Press.
- Fairbank, J.K., E.O. Reischauer and A. M. Craig. (1998). *East Asia: Tradition and Transformation*. New Jersey: Houghton Mifflin, Chapter 15-Tokugawa Japan: A Centralized Feudal State, Chapter 17- Japan's Response to the West, and Chapter 18- Modernization in Meiji Japan.
- Hall, J.W. (1970). *Japan from Pre-history to Modern Times*. Centre for Japanese Studies, the University of Michigan.
- Hall, J.W. (1991). ed. *Cambridge History of Japan*. Volume IV: *Early Modern Japan*. Cambridge University Press. Beasley, W.G. (1963). *The Making of Modern Japan*. London: Werdenfield and Nicolson Chapter 1- Japan in the Early 19th Century.
- Hane, M. (1992). *Modern Japan: A Historical Survey*. Avalon Publishing.
- Ike, N. (1969). *The Beginnings of Political Democracy in Japan*. Praeger.
- Jansen, M.B. (1965). ed. *Changing Japanese Attitudes toward Modernization*. Princeton: Princeton University Press.
- Jansen, M.B. (1988). ed. *The Cambridge History of Japan*. Volumes IV, V and VI. Cambridge, Cambridge University Press.
- Jansen, M.B. and Gilbert Rozmaned, (1986). *Japan in Transition: From Tokugawa to Meiji*. Princeton, New Jersey: Princeton University Press.
- Kajima, M. (1965). *A Brief Diplomatic History of Modern Japan*. Charles E. Tuttle Co.
- Karlin, J.G. (2014). *Gender and Nation in Meiji Japan: Modernity, Loss, And The Doing of History*. Honolulu: University of Hawai'i Press, 2014.
- Kiguchi, Junko. *Japanese Women's Rights in the Meiji Era*. <https://www.soka.ac.jp>
- Kunio Y. (1967). *Japanese Economic Development: A Short Introduction*. Oxford University Press. Third edition 1995.
- Lockwood, W.W. (1954). *The Economic development of Japan: Growth and Structural Change, 1868-1938*. Princeton, N.J.: Princeton University press.
- Lockwood, W.W. (1965). *The State and Economic Enterprise in Japan*. Part I and II. Princeton: Princeton University Press.
- McClain, J.L. (2002). *Japan – A Modern History*. Boston.W.W. Norton and Company.
- McLaren, W.W. (1923). *A Political History of Japan during the Meiji Era 1867-1912*. Reproduction by Nabu Press, 2000.
- Molony, Barbara, (2002). "Women's Rights, Feminism, and Suffragism in Japan, 1870-1925". *Pacific Historical Review*, Volume 69, No. 4, *Woman Suffrage: The View from the Pacific*. pp. 639-661.

- Molony, Barbara. *Feminism in Japan*. Oxford Research Encyclopaedia of Asian History.
- Morris I. (Ed.). (1963). *Japan 1931-1945: Militarism, Fascism, Japanism?* D.C. Heath and Company.
- Myers, R.H. and Mark R. Peattie (Ed.). (1984). *The Japanese Colonial Empire, 1895- 1945*. Princeton University Press.
- Norman, E.H. (1940). *Japan's Emergence as a Modern State*. New York: International Secretariat, Institute of Pacific Relations, First Indian Reprint 1977, Khosla and Co., Chapter III- The Restoration.
- Pfeffer, N. (1958). *The Far East: A Modern History*. University of Michigan Press. Chapter 14- Constitutionalism, Japanese Style.
- Pfeffer, N. (1958). *The Far East: A Modern History*. University of Michigan Press, Chapter 8- Japan Opened to the World, Chapter 13- Japan Resolves to Modernize.
- Pittau, J. (1967). *Political thought in Early Meiji Japan 1868-1889*. Cambridge, Harvard University Press.
- Sansom, G.B. (1931). *Japan: A Short Cultural History*. London and New York: Cresset Press and D. Appleton.
- Scalapino, R.A. (1953). *Democracy and Party Movement in Pre-War Japan: the Failure of the First Attempt*. Berkeley: California University Press.
- Shively, D.H. and Carmen Blacker, ed. (1976). *Tradition and Modernization in Japanese Culture*. Princeton University Press.
- Smethurst, R.J. (1974). *A Social Basis for Pre-War Japanese Militarism: The Army and the Rural Community*. University of California Press.
- Storry, R. (1991). *A History of Modern Japan*. Original Publication 1961. Penguin Publishing Group.
- Tipton, E.K. (2002) *Modern Japan: A Social and Political History*. London and New York: Routledge.
- Tsutsui, W.M. (2009). ed. *A Companion to Japanese History*. Oxford: Wiley-Blackwell.
- Wray, H. and H. Conroy. (1983). *Japan Examined: Perspectives on Modern Japanese History*. University of Hawaii Press, Honolulu.
- Yanaga, C. (1949). *Japan since Perry*. New York: McGraw-Hill Book Company.
- सत्यकेतु विद्यालंकार. (1952). एशिया का आधुनिक इतिहास, Masoori: Sarasvati Sadan.
- जैनएसके.आधुनिक एशिया का इतिहास.
- जैनकैलाशचंद.एशिया की विकासोन्मुखी एकता.
- नोरमनई. एच. जापान का इतिहास. Delhi: K. K. Publication.
- पाण्डेयधनपति. (2005). आधुनिक एशिया का इतिहास. Delhi: Motilal Banarsidas.
- तिवारीप्रेमशंकर. (2005). जापान का इतिहास. Vishwa Bharti: Vishwa Bharti Publications.
- स्कॉटलातौरैतेकेनेथ.जापान का इतिहास.
- सराओके. टी.एस. जापान का इतिहास. Place: Publisher

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Tokugawa, Meiji Era, Industrialisation and Capitalism, Popular Movements, Women Rights, Imperialism, Expansion into China, Korea, Post War Reconstruction

DSE XIII

History of Southeast Asia: Colonial to the Post Colonial

Course Objectives:

This paper offers an overview of modern Southeast Asian history to students who could be familiar or unfamiliar with the region. A study of the social, economic, and political transformations in Southeast Asia during the colonial period will enable students to develop a critical and comparative approach, given their in-depth study of South Asian history. In this paper students will learn how to engage with recent historiographical developments, especially on themes of education, gender, race, historical anthropology, and maritime history. The paper offers analysis of impact of colonialism and the process of de-colonisation on the region. The student shall analyse the establishment and changing character of the European presence from a commercial enterprise to a colonial state; the transformation of local society and the emergence of anti-colonial movements; and the transformations in the region since the Second World War.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Explain the character and functioning of colonial state and society.
- Analyse the impact of the European presence on maritime and agrarian economy of the region.
- Examine the impact of maritime activity of local society and polity and the developments in the economic and architectural history of the region.
- Discern the influences of new forms of knowledge, Euro-centric notions of modernity and how ideas of race defined local religion.
- Illustrate the transformation of the local agrarian and labour economy.
- Interpret the history of popular movements and peasant revolts
- Describe the historiographical trends to study history of Southeast Asia

Course Content:

Unit 1: From Commerce to Colonialism:

[a] The Dutch and English ascendancy

[b] Changing Patterns of Maritime Trade: The Straits of Malaka

Unit 2: Colonialism in Dutch Indonesia, French Indo-China, British Burma: The 19th and 20th centuries

- [a] The Colonial State: Traditional elite, legal systems
- [b] Agrarian Transformation: Plantation Economy, Peasant Protests, Migrations
- [c] Colonial Modernity: Education and religion in the early twentieth century

Unit 3: Redrawing the Political Map of Southeast Asia: Nationalism, Anti-Colonial Movements 1900-1970s

- [a] Burma: From Independence to the Revolutionary Council
- [b] Indonesia: The Revolution, the making of Indonesia, Sukarno
- [c] French Indo-China: Khmer Republic, Khmer Rouge and the Socialist Republic of Vietnam

Unit 4: Post War Southeast Asia

- [a] Language and Politics in Modern Southeast Asia: The Malay and the making of modern Malaysia
- [b] The Port and City in Southeast Asia: Singapore

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-1: The student will be able to demonstrate their understanding of the beginnings of European Colonialism in the region by specifically taking up the case studies of the English and Dutch East India Companies in the 17th and 18th centuries. They will also demonstrate an understanding of how ethnic communities like those in the straits of Melaka responded to the changes in trade and politics. **(Teaching time: 3 weeks Approx.)**

- Tarling, Nicholas. (1993). *Cambridge History of South East Asia, Volume I & II*, Cambridge: Cambridge University Press
- Reid, Anthony. (1993). *Southeast Asia in Early Modern era: Trade, Power and Belief*, Ithaca and London: Cornell University Press
- Goor, Jurrien van. (2004). *Prelude to Colonialism: The Dutch in Asia*, Hilversum: UitgeverijVerloren
- Hussin, Norid. (2007). *Trade and Society in the Straits of Melaka: Dutch Melaka and English Penang, 1780-1830*, Singapore: National University of Singapore Press
- Andaya, Leonard Y. (2008). *Leaves of the Same Tree: Trade and Ethnicity in the Straits of Melaka*, Honolulu: University of Hawaii Press

Unit- II: At the end of this rubric the students will be able to demonstrate an understanding of the nature of the colonial state in Southeast Asia. They will through the specific case studies of Dutch Indonesia, British Burma and French Indo China show how the structure and organization of the colonial state and the agrarian plantation economy altered the political and economic land-

scape of the region during this period. They will also through a specific case study of Indonesia, show how certain policies of the colonial state and western notions of modernity impacted local society and Islam. **(Teaching time: 5 weeks Approx.)**

- Tarling, Nicholas. (1993). *Cambridge History of South East Asia, Volume II*, Cambridge: Cambridge University Press
- Saha, Jonathan. (2013). *Law, Disorder and the State: Corruption in Burma c.1900*, New York: Palgrave Macmillan
- Keck, Stephen L. (2015). *British Burma in the New Century, 1895-1918*, London: Palgrave Macmillan
- Vickers, Adrian. (2015). *A History of Modern Indonesia*, Cambridge: Cambridge University Press
- BosmaUlbe and Raben Remco. (2008). *Being “Dutch” in the Indies: A history of creolization and Empire, 1500-1920* (trans. Wendie Shaffer), Singapore: Ohio University Press and National University of Singapore
- Brocheux, Pierre and Hemery, Daniel. (2009). *Indochina: An Ambiguous Colonization, 1858-1954* (Translated by Ly Lan Dill-Klein, with Eric Jennings, Nora Taylor and Noemi Tousignant), Berkeley: University of California Press
- Breman, Jan. (2015). *Mobilizing Labour in the Global Coffee Market: Profits from an Un-free Work Regime in Colonial Java*, Amsterdam: Amsterdam University Press
- Breman, Jan. (1989). *Taming the Coolie Beast: Plantation Society and the Colonial Order in South East Asia*, Delhi: Oxford University Press
- Scott, James. (1976). *Moral Economy of the Peasant: Rebellion and Subsistence in Southeast Asia*, New Haven: Yale University Press
- Laffan, Michael. (2011). *The Makings of Indonesian Islam: Orientalism and the Narration of a Sufi past*, Princeton: Princeton University Press
- Ali, Muhammad. (2016). *Islam and Colonialism: Becoming Modern in Indonesia and Malaya*, Edinburgh: Edinburgh University Press

Unit-III: After completing this rubric, the students will demonstrate a detailed understanding of the nationalist and anti colonial movements in Southeast Asia through the case studies of Indonesia, Vietnam and Burma. They will also be expected to demonstrate an understanding of how the nationalist movements and post war politics in the region came to shape these countries in the early decades after independence (in the 1950s and 70s). **(Teaching time: 4 weeks Approx.)**

- Christie, Clive J. (2000). *A Modern History of Southeast Asia: Decolonization, Nationalism and Separatism*, London: I.B.Tauris
- Tarling, Nicholas. (1993). *Cambridge History of South East Asia, Volume II*, Cambridge: Cambridge University Press

- Tarling, Nicholas. (1998). *Nations and States in Southeast Asia*, Cambridge: Cambridge University Press
- Callahan, Mary P. (2003). *Making Enemies: War and State Building in Burma*, Ithaca: Cornell University Press
- Myint-U, Thant. (2001). *The Making of Modern Burma*, Cambridge: Cambridge University Press
- Vickers, Adrian. (2015). *A History of Modern Indonesia*, Cambridge: Cambridge University Press
- Elson, R.E. (2008). *The Idea of Indonesia: A History*, Cambridge: Cambridge University Press
- Kieran, Ben. (2017). *Vietnam: A History from earliest times to the present*, Oxford: Oxford University Press
- Wilcox, Wynn (Ed.). (2010). *Vietnam and the West: New Approaches*, Ithaca: Cornell Southeast Asia Program Publications

Unit-IV: At the end of this rubric the students will be expected to demonstrate an understanding of how the colonialism has impacted the nature of post colonial politics. Examining Malaysia and Singapore as case studies, they will show how, decolonization and modern state building have required certain approaches towards remembering the past and projecting the future. **(Teaching time: 2 weeks Approx.)**

- Harper, T.N. (1999). *The End of Empire and the Making of Malaya*, Cambridge: Cambridge University Press
- Ali, Muhammad. (2016). *Islam and Colonialism: Becoming Modern in Indonesia and Malaya*, Edinburgh: Edinburgh University Press
- Kevin Blackburn and ZongLun Wu. (2019). *Decolonising the History Curriculum in Malaysia and Singapore*, London: Routledge
- Ahmad, Abu Talib. (2015) *Museums, History and Culture in Malaysia*. Singapore: National University of Singapore Press

SUGGESTED READINGS:

- Adas, Michael. (1974). *Burma Delta: Economic Development and Social Change on the Rice Frontier, 1852-1941*, Wisconsin: University of Wisconsin Press
- Bloembergen Marieke. (2006). *Colonial Spectacles: The Netherlands and the Dutch East Indies at the World Exhibitions, 1880-1931*, (trans. Beverley Jackson) Singapore: Singapore National University Press

- Blusse, Leonard. (1981). 'Batavia, 1619-1740: The Rise and Fall of a Chinese Colonial Town', *Journal of Southeast Asian Studies*, Vol.12, No.1, *Ethnic Chinese in Southeast Asia*, pp.159-178
- Charney, Michael W. (2010). *A History of Modern Burma*, Cambridge: Cambridge University Press
- Christie, Clive. (2001). *Ideology and Revolution in Southeast Asia 1900-1980: Political Ideas of the Anti-Colonial era*, London: Curzon
- Day, Tony. (2002). *Fluid Iron: State formation in Southeast Asia*, Honolulu: University of Hawaii Press Honolulu
- Goscha, Christopher. (2016). *The Penguin History of Modern Vietnam*, London: Penguin
- Gouda, Francis. (2008). *Dutch Culture Overseas; Colonial Practice in the Netherlands Indies 1900-1942*, Jakarta: Equinox Publishing
- Keyes, Charles F., E. Jane Keyes and Nancy Donnelly. (1991). *Reshaping Local Worlds: Formal Education and Cultural Change in Rural Southeast Asia*, New Haven: Yale University Press
- Knapman, Gareth. (2016). *Race and British Colonialism in South-East Asia, 1770-1870: John Crawford and the Politics of Equality*, London: Routledge
- Laffan, Michael Francis. (2003). *Islamic Nationhood and Colonial Indonesia: The umma below the winds*, London: Routledge
- Owen, Norman G. (2014). *Routledge Handbook of Southeast Asian History*, London: Routledge
- Phongpaichit, Pasuk, Chris Baker, Christopher John Baker. (2005). *A History of Thailand*, Cambridge: Cambridge University Press
- Rachael Loew. (2016). *Taming Babel: Language in the Making of Malaysia*, Cambridge: Cambridge University Press
- Sardesai, D.R. (1997). *Southeast Asia: Past and Present*, New Delhi: Harper Collins
- Scott, James. (2009). *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia*, Yale University Press
- Seekins, Donald M. (2011). *State and Society in Modern Rangoon*, London: Routledge
- Segawa, Noriyuki. (2019). *National Identity, Language and Education in Malaysia: Search for a Middle Ground between Malay Hegemony and Equality*, London: Routledge
- Shiraishi, Saya and Takashi Shiraishi (ed.) (1993). *The Japanese in Colonial Southeast Asia*, Ithaca: Cornell University Press
- Tarling Nicholas. (2001). *Imperialism in Southeast Asia: A Fleeting, Passing Phase*, London: Routledge
- Tiffin Sarah. (2016). *Southeast Asia in Ruins: Empire in the early 19th century*, Singapore: National University of Singapore
- Trocki, Carl A. (2006). *Singapore: Wealth, Power and the culture of control*, London: Routledge
- Tucker, Shelby. (2002). *Burma: The Curse of Independence*, New Delhi: Penguin

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Dutch and English Colonialism, Malaka, Colonial State in Indonesia, French Indo China and Burma, Colonial Law, Education, Nationalist Movement, Post War, Language and Politics, Malay World, Port City, Singapore

DSE XIV

The Making of Contemporary India (c. 1950-1990s)

Course Objectives:

This course introduces the students to various perspectives on India's evolving political, economic and cultural situations from the 1950s to the 1990s. The course intends to familiarise the students with the dynamic transformation of Indian society and its political expressions. Students will study the transformation of political organizations, the emergence of new forms of political mobilization and emerging challenges to Indian democracy.

Learning Outcomes:

On completion of this course the student shall be able to

- Draw a broad outline of the history and politics of the early years of Independence, including the framing of the constitution and the linguistic reorganisation of states.
- Examine critically issues of economic development in the early years of Independence, particularly the problems of development
- Summarize critical issues pertaining to the history of Non-Alignment and Panch-sheel
- Trace the significant developments in the history of India, since 1947, including the history of the Congress party, the Naxalbari and the JP Movement, as well as political developments in the regional context
- Examine issues of critical relevance in the history of India from 1970s to 1990s, with special emphasis on caste assertion and mobilisation in politics and right-wing nationalism
- Outline and examine the major developments in the history of social reform around the question of 'Women and law'
- Evaluate the history of Environmental movements in India since Independence
- Examine the formation of a 'civil society' and the emergence of popular movements in North East India
- Trace the history of Judiciary in Independent India with special focus on Public Interest Litigation
- Construct a history of Media in modern India, a history of Modern Indian Art and one of Sports as well as evaluate the significance of these in the making of a Modern Nation

Course Content:

Unit I: Laying the foundation of independent India

- [a] Making of the Constitution
- [b] Linguistic re-organisation

Unit II: Envisioning a New Order

- [a] Economic Development: The Five Year Plans; problems of development - Punjab and Bihar
- [b] Indian Foreign Policy till 1964: Non -Alignment and Panchsheel

Unit III: Indian Politics: National and regional aspirations

- [a] Congress Party till 1977
- [b] The Emergency, Naxalbari; J.P. Movement
- [c] Regional political aspirations: Case study of Tamil Nadu: DMK; Maharashtra: Shiv Sena and the north-east: Assam/Nagaland

Unit IV: Indian Politics and Society: 1970s, 1980s and 1990s

- [a] The Political Voice of Caste: Non Brahmin and Dalit Assertions, the Mandal Commission
- [b] Women, Social Reform and the Law
- [c] Right-Wing Nationalist Politics: The Jan Sangh and the rise of the BJP

Unit V: Development, Environment and Peoples Rights

- [a] Environmental movements in India
- [b] Civil Society and Popular Movements in North East India
- [c] The Judiciary: Public Interest Litigation

Unit VI: The New Publics

- [a] Media in Modern India: Press, Cinema and Television
- [c] Modern Indian Art: The Progressive Artist Group
- [d] Sports and the Modern Nation

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: This unit deals with making of the constitution. The history and politics of the early years of Independence have been discussed. It also deals with the linguistic re-organisation of states. **(Teaching time: 2 weeks Approx.)**

- Chakrabarty, D., Rochona Majumdar & Andrew Sartori. (2007). *From the Colonial to the Post-Colonial: India and Pakistan in Transition*. New Delhi: Oxford University Press.
- Basu, B.D. (2011). *Introduction to the Constitution of India*. Delhi: Lexis Nexis. (20th Edition)
- Austin, Granville. (1999). *Working a Democratic Constitution: the Indian Experience*. New Delhi: Oxford University Press.
- De, Rohit. (2018). *A People's Constitution*, Delhi: Penguin.
- Ramaswamy, Sumathi. (1997). *Passions of the Tongue: Language Devotion in Tamil India, 1890-1970*. Berkeley: University of California Press.
- King, Robert D. (1997) *Nehru and the language politics in India*. Delhi: Oxford University Press

Unit-II: This unit deals with the history of economic developments in the early years of Independent India. It also deals with the problems of development with the case study of Punjab and Bihar. It also deals with the history of Non-Alignment and Panchsheel. **(Teaching time: 2 weeks Approx.)**

- Balakrishnan, P. (2005). *Economic Growth and its Distribution in India*. Hyderabad: Orient BlackSwan.
- Frankel, Francine R. (2005). *India's Political Economy*. New Delhi: Oxford University Press.
- Frankel, Francine R., (ed.). (2000). *Transforming India: Social and Political Dynamics of Democracy*. Oxford: Oxford University Press.
- Bhalla, G.S. (1995). "Agricultural Growth and Industrial Development in Punjab" in *Agriculture on the road to Industrialisation*. John, W. Mellor (ed.). Baltimore: International Food Policy Research Institute, pp. 67-112.
- GolamRasul and Eklabya Sharma, (2014). "Understanding the Poor Performance of Bihar and Uttar Pradesh in India: A Macro Perspective". *Regional Studies, Regional Science*. vol. 1:1, 221-239.

Unit-III: This unit deals with history of Indian Politics since 1947 with special reference to history of congress party till 1977. It also deals with history of Naxalbari, J P Movement. This unit also deals with regional political aspirations: Case study of Tamil Nadu: DMK; Maharashtra: Shiv Sena and the north-east: Assam/Nagaland. **(Teaching time: 3 weeks Approx.)**

- Misra, Udayon (2014). *India's North -East: Identity movements, state and civil society*. Delhi: Oxford University Press.
- Oinam, Bhagat and Dhiren A. Sadokpam (Ed.). (2018). *Northeast India: A Reader*. London: Routledge.
- Barnett, Marguerite Ross. (1976). *The Politics of Cultural Nationalism in South India*, New Jersey: Princeton.

- Ray, Rabindra. (1992). *The Naxalites and their Ideology*. Delhi: Oxford University Press
- Stanley, Kochanek. (1968). *The Congress Party of India: The Dynamics of One-Party Democracy*. Princeton: Princeton University Press.
- Chandra, Bipan (2017). *In the Name of Democracy: JP Movement and Emergency*. Delhi: Penguin Random House India.
- Tarlo, Emma. (2003). *Unsettling Memories: Narratives of the Emergency in Delhi*, Berkeley: University of California Press.
- Baru, S. (2000). "Economic Policy and the Development of Capitalism in India: The Role of Regional Capitalists and Political Parties". in Francine Frankel et al, (eds.). *Transforming India: Social and Political Dynamics of Democracy*. New Delhi: Oxford University Press

Unit-IV: This unit examines history of Indian Politics and Society from 1970s to 1990s with special reference to political mobilisation of caste. It also deals with history of Right-wing Nationalist politics and history of social reform with reference to Women and Law. **(Teaching time: 3 weeks Approx.)**

- Pandian, M.S.S. (2008). *Brahmin and Non Brahmin: Genealogies of the Tamil Political Present*. Delhi: Permanent Black.
- Kumar, Radha. (1993). *The History of Doing: An illustrated account of movements or women rights and feminism in India, 1800-1990*, New Delhi: Kali for Women.
- Menon, Nivedita. (2001). *Gender and Politics in India*. Delhi: Oxford University Press.
- Flavia Agnes. (2001). *Law and Gender Equality: The Politics of Women's Rights in India*. Delhi: Oxford University Press.
- Jaffrelot, Christophe. (1999). *The Hindu Nationalist Movement and Indian Politics 1925 to 1990s*. New Delhi: Penguin.
- Jaffrelot, Christophe (2003). *India's Silent Revolution: The Rise of the Lower Castes in North India*. London: Hurst.
- Hansen, Thomas Blum. (1999). *The Saffron Wave: Democracy and Hindu Nationalism in India*. Princeton: Princeton University Press.
- Das, Veena. (1996). *Critical Events: An Anthropological Perspective on Contemporary India*. Delhi: Oxford University Press.

Unit-V: This unit deals with the history of Environmental movements in India since Independence. It also deals with history of civil society and popular movements in North East India. It also deals with the history of Judiciary in Independent India with special reference to Public Interest litigation. **(Teaching time: 2 weeks Approx.)**

- Middleton Townsend and Sara Shneiderman (ed.) (2018). *Darjeeling Reconsidered: Histories, Politics, Environments*, Delhi: Oxford University Press

- Pachua, Joy L. K. (2014). *Being Mizo: Identity and Belonging in Northeast India*. Delhi: Oxford University Press.
- Bhuwania, Anuj. (2017). *Courting the People: Public Interest Litigation in Post Emergency India*. Delhi: Cambridge University Press.
- Baviskar, Amita. (2004). *In the Belly of the River: Tribal Conflicts Over Developments in the Narmada Valley*. Delhi: Oxford University Press.
- Guha, Ramachandra. (1989). *The Unquiet Woods: Ecological Change and Peasant Resistance*. Delhi: Oxford University Press.
- Sabharwal, Vasant & Mahesh Rangarajan (eds.). *Battles Over Nature: Science and the Politics of Conservation*. Delhi: Permanent Black.

Unit- VI: This unit deals with the history of Media in modern India along with an analysis of Modern Indian Art. It also examines history of Sports and making of a Modern Nation. **(Teaching time: 2 weeks Approx.)**

- Sen, Ronojoy (2015). *Nation at Play: History of Sport in India*, New York: Columbia University Press.
- Jeffrey, Robin. (200). *India's Newspaper Revolution: Capitalism, Politics and the Indian Language Press, 1977-1999*. London: Hurst.
- Rajagopal, Arvind. (2001). *Politics After Television: Hindu Nationalism and the Reshaping of the Public in India*. Cambridge: Cambridge University Press.
- Kapur, Geeta. (2000). *When was Modernism: Essays on Contemporary Cultural Practice in India*. New Delhi: Tulika.
- Velayutham, Selvaraj, (2008). *Tamil Cinema: The Cultural Politics of India's Other Film Industry*, New York: Routledge.
- Dwyer, Rachel. (2002). *Cinema India: The Visual Culture of Hindu Film*. New Jersey: Rutgers University Press.
- Ranganathan Maya & Usha M Rodrigues. (2010). *Indian Media in a Globalised World*, Sage Publications India Pvt. Ltd.
- Sinhaed, Gayatri. (2003). *Indian Art: An Overview*. Delhi: Rupa
- Dalmia, Yashodhara (2001). *The Making of Modern Indian Art: The Progressives*, Delhi: Oxford University Press

SUGGESTED READINGS:

- Beteille, A. (2012) *Democracy and Its Institutions*. New Delhi: Oxford University Press.
- Bhargava, Rajeev and Vanaik Achin (eds.). (2010). *Understanding Contemporary India*. Orient Black-swan
- Brass, Paul. (1997). *Politics of India since Independence*. Cambridge: Cambridge University Press.
- Chandra, Bipan. (2008). *India Since Independence*. Delhi: Penguin
- Chatterjee Partha (ed.). (1997). *State and Politics in India*. Delhi: Oxford University Press

- Damodaran, H. (2008). *India's New Capitalists: Caste, Business, and Industry in a Modern Nation*. Basingstoke: Palgrave Macmillan.
- Deshpande, Satish, (2003). *Contemporary India: A Sociological View*. Delhi: Viking
- Dhawan, Rajeev, (ed.). (1997). *Law and Society in Modern India*. New Delhi: Oxford University Press.
- Guha, Ramachandra. (2008). *India After Gandhi*. Delhi: Picador
- Hasan, Zoya. (2004). *Parties and Party Politics in India*. New Delhi: Oxford University Press.
- Jayal, Niraja Gopal & Pratap Bhanu Mehta (eds.). (2010). *The Oxford Companion to Politics in India*. Delhi: Oxford University Press.
- Kothari, Rajni. (1970). *Caste in Indian Politics*. New Delhi: Orient Longman.

Teaching Learning Process:

Classroom teaching, classroom discussions and student presentations in class and/or in tutorials. Presentations shall focus either on important themes covered in the class lectures, or on specific readings. As this is a paper tracing the history of regions outside the Indian subcontinent, supporting audio-visual aids like documentaries, maps and power point presentations shall be used widely. Overall, the Teaching Learning Process shall emphasise the interconnectedness of issues within the different rubrics to build a holistic view of the time period and region under study.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions and at least one presentation will be used for final grading of the students. As this is a discipline-specific elective paper actively chosen by the student, his/her engagement with the paper shall be assessed, preferably, through at least one project as a written submission. Overall, students will be assessed on their ability to engage with a sizeable corpus of readings assigned to the theme for written submissions, and to draw concrete connections between issues/events/debates discussed in this paper and the corresponding issues/events/debates discussed in their Core history papers.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Constitution, Nation, Linguistic Reorganisation, Development, Five Year Plans, Foreign Policy, Congress Party, Left Parties, Naxalbari, JP Movement, Regional Politics, Mandal Commission, Women, Jan Sangh, BJP, Popular Movements, Northeast, Judiciary, Media, Progressive Artist Group, Sports

Generic Elective

GE I

Delhi through the Ages: The Making of its Early Modern History

Course Objective:

The objective of the paper is to teach students about the changes in the city of Delhi from its early inception to the eighteenth century. The course teaches how the city grew into one of the largest cities in the world and was the capital of some of the great empires of its time. As the capital of these empires, Delhi profited from continuous immigration, state patronage and a vibrant cultural life. But the course also wants students to learn that the city was not merely dependent upon its rulers for cultural and political sustenance. It focuses on Sufis, litterateurs and merchants who also gave the city its unique character and resilience in the face of political turbulence. Other than recourse to readings the course tries to acquaint students with Delhi through project work and introspection of Delhi's presence and its uneasy relationship with its past.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Analyse different kinds of sources -- archaeological, architectural and a variety of textual materials.
- Use these materials and correlate their sometimes discordant information.
- Analyse processes of urbanization and state formation.
- Describe the difficulties in appropriating narratives of the state with the history of particular localities.

Course Content:

Unit I: Between Myth and History -- Delhi's Early Pasts: Indraprastha, Lalkot

Unit II: From settlements to cityscape – Understanding the Many cities of Delhi

Unit III: Delhi's 13th and 14th Century settlements

Case study of **any two**: 1) Dehli-ikuhna's *masjid-ijami* (old Delhi/Mehrauli), 2) Siri, 3) Ghiyaspur-Kilukhri, 4) Tughluqabad, 5) Jahanpanah, and 6) Firuzabad

Unit IV: Shajahanabad: Qila Mubarak (Red Fort) as a site of power and the morphology of the city.

Unit V: 18th century Delhi: political upheaval and social empowerment – complicated understandings of 'decline'.

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit 1: This unit will introduce students to the early history of Delhi, focusing on Indraprastha and the Tomara and Chauhan constructions. **(Teaching Time: 2 weeks Approx.)**

- Richard J. Cohen, “An Early Attestation of the Toponym Ḍhillī”, *Journal of the American Oriental Society*, Vol. 109 (1989), pp. 513-519.
- Singh, Upinder. (2006). *Ancient Delhi*, Delhi: Oxford University Press

Unit 2: This unit will study the proverbial ‘seven cities of Delhi’, focusing primarily on Sultanate settlements. It will discuss the possible reasons for the shift of capitals, how settlements of the 13th century gradually appeared as conjoined cities under the Tughluqs, and the differences between these urban spaces. **(Teaching Time: 3 weeks Approx.)**

- Ali, Athar. (1985). “Capital of the Sultans: Delhi through the 13th and 14th Centuries”, in R.E. Frykenberg, ed., *Delhi Through the Age: Essays in Urban History, Culture and Society*, Delhi: Oxford University Press, pp. 34-44
- Habib, Irfan. (1978). ‘Economic History of the Delhi Sultanate -- an Essay in Interpretation’, *Indian Historical Review* vol. 4, pp. 287-303.
- Kumar, Sunil. (2011). “Courts, Capitals and Kingship: Delhi and its Sultans in the Thirteenth and Fourteenth Centuries CE” in Albrecht Fuess and Jan Peter Hartung.(eds.). *Court Cultures in the Muslim World: Seventh to Nineteenth Centuries*, London: Routledge, pp. 123-148
- Kumar, Sunil. (2019) ”The Tyranny of Meta-Narratives; Re-reading a History of Sultanate Delhi”, in Kumkum Roy and NainaDayal.(Ed.). *Questioning Paradigms, Constructing Histories: A Festschrift for Romila Thapar*, Aleph Book Company, pp 222-235.

Unit 3: This unit will study any two of the six sites in Delhi in detail. Students will be encouraged to use the readings mentioned below and correlated to the teaching units in the course content to plan field trips. **(Teaching Time: 3 weeks Approx.)**

- Flood, Finbarr B. (2008). “Introduction” in Finbarr B. Flood, *Piety and Politics in the Early Indian Mosque*, Delhi: Oxford University Press, pp. xi-lxxviii
- Jackson, Peter. (1986). ‘Delhi: The Problem of a Vast Military Encampment’, in: R.E. Frykenberg (ed.). *Delhi Through the Ages: Essays in Urban History, Culture, and Society*, New Delhi: Oxford University Press, 1986), pp.18-33.
- Haidar, Najaf. (2014). ‘Persian Histories and a Lost City of Delhi’, *Studies in People's History*, vol. 1, pp. 163–171

- Pinto, Desiderios.j.. (1989). "The Mystery of the Nizamuddin Dargah: the Account of Pilgrims", in Christian W. Troll, ed., *Muslim Shrines in India*, Delhi: Oxford University Press, pp. 112-124.
- Kumar, Sunil. (2019) "The Tyranny of Meta-Narratives; Re-reading a History of Sultanate Delhi", in Kumkum Roy and NainaDayal ed, *Questioning Paradigms, Constructing Histories: A Festschrift for Romila Thapar*, Aleph Book Company, pp 222-235.
- Aquil, R. (2008). "Hazrat-i-Dehli: The Making of the Chishti Sufi Centre and the Stronghold of Islam." *South Asia Research* 28: 23–48.
- Welch, Anthony and Howard Crane. (1983). "The Tughluqs: Master Builders of the Delhi Sultanate": *Muqarnas*, vol. 1 pp. 123-166.
- Flood, Finbarr B. (2003). "Pillars, Palimpsests, and Princely Practices: Translating the past in Sultanate Delhi" *RES: Anthropology and Aesthetics*, No. 43, Islamic Arts, pp. 95-116.
- Anand Taneja, 'Saintly Visions: Other histories and history's others in the medieval ruins of Delhi' *IESHR*, 49 (2012).

Unit 4: This unit will study the Qila Mubarak (Red Fort) in detail as the site of power under Shah Jahan. It will also focus on Shahjahanabad (Old Delhi) as a mercantile and cultural centre. **(Teaching Time: 3 weeks Approx.)**

- Chandra, Satish. (1991). "Cultural and Political Role of Delhi, 1675-1725", in R.E. Frykenberg, *Delhi through the Ages: Essays in Urban History, Culture and Society*, Delhi: Oxford University Press, pp. 106-116.
- Gupta. Narayani. (1993). "The Indomitable City," in Eckart Ehlers and Thomas Krafft, eds., *Shahjahanabad / Old Delhi: Tradition and Change*. Delhi: Manohar, pp. 29-44.
- Koch, Ebba. (1994). "Diwan-i' Amm and ChihilSutun: The Audience Halls of Shah Jahan". *Muqarnas*, vol. 11, pp. 143-165.
- Rezavi, Syed Ali Nadeem, (2010). "'The Mighty Defensive Fort': Red Fort At Delhi Under Shahjahan -- Its Plan And Structures As Described By Muhammad Waris." *Proceedings of the Indian History Congress* 71, pp. 1108–1121.

Unit 5 This unit will discuss the complicated developments in Shahjahanabad in the 18th century. The 'decline' in the authority meant turbulence, perhaps, in the city, but it also empowered new groups of people and created a cultural and social dynamism that was embraced and seen as a challenge by different types of people. **(Teaching Time: 4 weeks Approx.)**

- Alam, Muzaffar. (2013) "Introduction to the second edition: Revisiting the Mughal Eighteenth Century" in *The Crisis of Empire in Mughal North India: Awadh and the Punjab 1707-1748*, Delhi: Oxford University Press, pp.xiii-lxiv
- Ataullah. (2006-2007). "Mapping 18th Century Delhi: the cityscape of a pre-Modern sovereign city" *Proceedings of the Indian History Congress*, vol. 67 pp. 1042-1057.

- Chenoy, Shama Mitra. (1998). *Shahjahanabad, a City of Delhi, 1638-1857*. New Delhi: MunshiramManoharlal Publishers.
- RaziuddinAquil, (2017) “Violating Norms of Conduct” in *The Muslim Question: understanding Islam and Indian History*, Delhi: Penguin Random House, pp. 133-156.

SUGGESTED READINGS:

- Anthony Welch, ‘A Medieval Center of Learning in India: the Hauz Khas Madrasa in Delhi’, *Muqarnas*, 13 (1996): 165-90;
- Anthony Welch, ‘The Shrine of the Holy Footprint in Delhi’, *Muqarnas*, 14 (1997): 116-178;
- Asher, Catherine B. (2000). “Delhi Walled: Changing Boundaries” in James D. Tracy, *City Walls: the Urban Enceinte in Global Perspective*, Cambridge: Cambridge University Press, pp. 247-281.
- Bayly, Christopher Alan. (1986). “Delhi and Other Cities of North India during the ‘Twilight’”, in *Delhi through the Ages: Essays in Urban History, Culture, and Society*, edited by Robert Eric Frykenberg, Delhi: Oxford University Press, pp. 221–36.
- Blake, Stephen Blake. (1985). “Cityscape of an Imperial City: Shahjahanabad in 1739”, in R.E. Frykenberg, *Delhi through the Ages: Essays in Urban History, Culture and Society*, Delhi: Oxford University Press, pp. 66-99.
- Blake, Stephen P. (1991). *Shahjahanabad: The Sovereign City in Mughal India, 1639-1739*. Cambridge; New York: Cambridge University Press.
- Chandra, Satish. (1991). “Cultural and Political Role of Delhi, 1675-1725”, in R.E. Frykenberg, *Delhi through the Ages: Essays in Urban History, Culture and Society*, Delhi: Oxford University Press, pp. 106-116.
- Hasan, S. Nurul. (1991). “The Morphology of a Medieval Indian City: A Case study of Shahjahanabad”, in Indus Banga, (Ed.). *The City in Indian History*, Delhi: Manohar, pp. 87-98.
- Hasan, Zafar. (1922). *A Guide to Nizamu-d Din*. New Delhi: Memoirs of the Archaeological Survey of India #10
- Matsuo, Ara. (1982). “The Lodi Rulers and the Construction of Tomb-Buildings in Delhi”. *Acta Asiatica*, vol. 43, pp. 61-80.
- Moosvi, Shireen. (1985) “Expenditure on Buildings under Shahjahan—A Chapter of Imperial Financial History.” *Proceedings of the Indian History Congress*, vol. 46 pp. 285–99.
- Page, J.A. (1926). *An Historical Memoir on the Qutb*. New Delhi: Memoirs of the Archaeological Survey of India #22
- Page, J.A. (1937). *An Memoir on Kotla Firoz Shah, Delhi*. New Delhi: Memoirs of the Archaeological Survey of India #52
- Shamsur Rahman Faruqi, (2001). “A True Beginning in the North” and “A Phenomenon called ‘Vali’” in *Early Urdu Literary Culture and History*, Delhi: Oxford University Press, pp. 109-126, 129-142.

- Shokoohy, Mehrdad. (2007). *Tughluqabad: a paradigm for Indo-Islamic Urban planning and its architectural components*. London: Araxus Books.
- Singh, Upinder. ed., (2006) *Delhi: Ancient History*, Delhi: Social Science Press

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Myth, history, settlements, cityscape, morphology, social empowerment, Delhi, urbanisation

GE II
Science, Technologies and Humans: Contested Histories

Course Objective

This course proposes to examine the histories of science and technology with respect to social acceptance, economic viability and politics associated with it. While dealing with the history of science and technology this paper challenges the notion of ‘modern origins of science in western societies’. Human instinct to understand unknown and need to predict future which often venture into providence has been explored through case study of astronomy and astrology. Paper analyses impact of hegemony of Colonial science on traditional knowledge systems. Paper proposes two case studies to highlight the highly contested heritage of science. The thin line between military and peaceful use of technology in the capitalist economy also constitute important component of paper. A brief discussion on Science and nation making has been introduced to highlight the role of important figures that shaped the nature of Scientific development in India.

Learning Outcomes:

After completing this course, students should be able to:

- Critique the prevalent dominant understanding of science and technology.
- Discuss the complex relations between science, technology and society.
- Examine the role of politics associated with scientific and technological developments and its economics in the capitalist economy
- Examine the character of ‘dual use’ technologies.
- Define various initiatives taken by government for promotion of science and technology.

Course Content

Unit 1: Science, technology and Society

- a. Revisiting ‘Scientific Revolution’
- b. Colonialism and Science

Unit 2: Contested ‘Scientific’ heritage

- a. Decimal and Zero
- b. Arch and Dome

Unit 3: Knowing unknown: Cross-cultural Exchanges

- a. Mitigating uncertainties: Popular saying and predictions
- b. Hegemony of documentation

Unit 4: Economics of Technologies: Questions of Ethics

- a. Generic Medicines
- b. Industrial Disasters

Unit 5: Science and the nation making

- a. Atomic Power
- b. Policies and Institutions
- c. Homi Jehangir Bhaba, Meghnad Shaha

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-1: Science and technology have a very complex relationship with Society. Popular understanding of ‘Science’ and ‘Technology’ will be unpacked to convey the role of colonial power in establishing the hegemony of western knowledge systems. **(Teaching Time: 3 weeks Approx.)**

- Pati, Biswamoy & Harrison, Mark. (2001). Introduction in Biswamoy Pati & Mark Harrison, eds., *Health, Medicine and Empire: Perspectives on Colonial India*. New Delhi: Orient Longman. pp. 1-24/36.
- मुले, गुणाकर. (२००५). भारतीय इतिहास में विज्ञान. दिल्ली: यात्री प्रकाशन. (अध्याय: विज्ञान और समाज; पृष्ठ ११-२९, ज्योतिषका आरम्भ और विकास; पृष्ठ ४१-४९, वैदिक गणित की समीक्षा; पृष्ठ ५०-६६).
- Bernal, J D. (1969). *Science in History Vol, I: The Emergence of Science*. Middlesex: Penguin Books, pp. 27-57.
- Raj, Kapil. (2017). ‘Thinking Without the Scientific Revolution: Global Interactions and the Construction of Knowledge’. *Journal of Early Modern History*, Vol. 21, No.5., pp. 445-458
- Habib, S Irfan and Raina, Dhruv. (2007). “Introduction” in S Irfan Habib & Dhruv Raina. (Eds.). *Social History of Science in Colonial India*. Delhi: Oxford University Press. pp. XII-XL. (Revised version published as S Irfan Habib & Dhruv Raina, ‘Introduction’ in *Social History of Science in Colonial India*, New Delhi: Oxford University Press, 2007, pp. XII-XL.)

Unit-2: Student will understand the politics associated with appropriation of ‘Scientific’ heritage through the case study of the decimal and Zero. It will also suggest that ‘superior’ technology may not always be economically viable and thus socially marginalised. **(Teaching Time: 3 weeks Approx.)**

- Nanda, Meera. (2016). Nothing that is: Zero’s Fleeting Footsteps, in idem, *Science in Saffron: Skeptical Essays on History of Science*. Delhi: Three Essays Collective. pp. 49-92.
- Kumar, Ravindra. (2012). Composite Culture: Portrayal in Architecture, in B L Bhadani, ed., *Medieval India 3: Researches in the History of India*. Delhi: Manohar. pp. 47-75. (Also

available in Hindi as IGNOU Reading material: EHI-03 Block-8 Unit-31 & 33 and EHI 04 Block-8 Unit-33).

Unit-3: This unit will teach students about the evolutionary character of scientific knowledge and understand the significance of traditional knowledge on which it was based. It will also teach them about the politics of documentation and its importance during early modern times. **(Teaching Time: 3 weeks Approx.)**

- Kumar, Mayank. (2013). Traditional Notions of Monsoon, in Mayank Kumar, *Monsoon Ecologies: irrigation, Agriculture and Settlement Patterns in Rajasthan during the Pre-Colonial Period*. Delhi: Manohar. pp. 105-118.
- कुमार, मयंक. (२०१५). मानसून से सामंजस्यबनाता समाज: सन्दर्भ राजस्थान. प्रतिमान, अंक-३(संख्या-३), पृष्ठ, ६०२-१६.
- Grove, Richard. (1996). Indigenous Knowledge and the Significance of South-West India for Portuguese and Dutch Constructions of Tropical Nature. *Modern Asian Studies*, Vol. 30 (No. 1), pp. 121-143.

Unit-4: This unit will make an attempt to convey that science and technology need to be carefully historicised in the context of the prevalent political-economy. It will also problematise associated questions of ethics in science. **(Teaching Time: 3 weeks Approx.)**

- Mazumdar, Pradip. (2017). The Generic manoeuvre. *Economic and Political Weekly*, Vol. LII(No.35), pp. 22-26.
- Nagaraj, Vijay K. and Raman, Nithya V. (2007). "Are we prepared for another Bhopal?" in Mahesh Rangarajan, ed., *Environmental Issues in India: A Reader*. Delhi: Pearson. pp. 530-43. (Also available in Hindi)

Unit-5: This unit will highlight the role of science in 'nation-making'. It will also examine the role of a few scientists and associated institutions and their contribution in nation making. **(Teaching Time: 2 weeks Approx.)**

- Kosambi, D. D. (2016). Atomic Energy for India, in Ram Ramaswamy, ed., *D.D.Kosambi: Adventures into the unknown*. Gurgaon: Three Essays Collective. pp. 59-70.
- Marshal, Eliot. (2007). Is the Friendly Atom Poised for a Comeback? in Mahesh Rangarajan, ed., *Environmental Issues in India: A Reader*. Delhi: Pearson. pp.544-49. Available in Hindi also
- Banerjee, Somaditya. (2016). MeghnadShaha: Physicist and Nationalists. *Physics Today*, Vol. 69(No.8), pp. 39-44.

- Wadia, Spenta R. (2009). Homi Jehangir Bhaba and the Tata Institute of Fundamental Research. *Current Science*, Vol.96(No.5), pp. 725-33.
- Krishna, V.V. (2013). Science, Technology and Innovation Policy 2013: High on Goals, Low on Commitment. *Economic and Political Weekly*, Vol. 48, No.16, pp. 15-19.

SUGGESTED READINGS:

- Bhattacharya, Nandini. (2018). Interrogating the Hegemony of Biomedicine. *Economic and Political Weekly*, Vol. LIII(No.9), pp. 45-47
- Chatterjee, Santimay. (1994). MeghnadShaha: The Scientist and the Institution maker. *Indian Journal of History of Science*, Vol.29(No.1), pp. 99-110.
- Habib, Irfan. (2008). *Technology in Medieval India. c. 650-1750*. New Delhi: Tulika(Also available in Hindi).
- Qaisar, A J. (1982). *Indian Response to European Technology and Culture AD 1498-1707*. Bombay: Oxford University Press.
- Rahman, A. (1979). Science and Culture in India: A socio-Historical Perspective, in B D Nag Chaudhuri, ed., *New Technological Civilisation and Indian Society*. New Delhi: Indian Institute of Advanced Study and Indus Publishing Company. pp.27-41.
- Science, Technology and Innovation Policy 2013, Government of India, India. (<http://www.dst.gov.in/sites/default/files/STI%20Policy%202013-English.pdf>) Available in Hindi also : (<http://www.dst.gov.in/sites/default/files/STI%20Policy%202013%20Hindi.pdf>).
- Zimmerman, F. (1987). Monsoon in Traditional Culture, in Jay S. Fein and Pamela L. Stephens, eds., *Monsoon*. New York, Chichester, Brisbane, Toronto, Singapore: John Wiley & Sons. pp. 51-76.

FILMS:

The Fugitive A movie featuring Harrison Ford.

The Effects of the Atomic Bomb on Hiroshima and Nagasaki(<https://www.youtube.com/watch?v=3wxWNAM8Cso>

and

<https://www.youtube.com/watch?v=n7fT6Mur6Gg&list=PLD7F1A06CE1780AD5&index=5>

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like

documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Scientific Revolution, Colonialism, Hegemony, Predictions, Cross-cultural, Documentation

GE III

The World After 1945

Course objectives

This course seeks to familiarise students with broad trends in politics, society and culture in the latter half of the twentieth century and the early part of the twenty first century. It seeks to familiarise the student to the historical processes that led to the dismantling of older powers and the formation of new political and cultural regimes. The emergence of the new social movements challenging these regimes and the move towards unipolarity by the end of the 20th century constitute important themes of study for students. In the end the course seeks to develop a critical understanding of globalization with its diverse implications across continents. It does so by encouraging students to critically engage with selected themes such as environment, social movements, art, digital media, etc.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Analyse the evolving polities, societies and cultures of an increasingly global world.
- Analyse diverse social movements and cultural trends.
- Analyse processes of Decolonisation and politics during Cold War era.
- Draw inferences to explain the inter-connectedness of various facets of culture; sports, music, cinema, etc.

Course Content:

Unit I: A New World Order

- a. De-colonisation and after (Focus on Algeria and Indonesia)
- b. Politics of Cold War: Super Power Rivalries (Focus on Korea and Vietnam)
- c. United Kingdom: The Challenge of the Welfare State
- d. South Africa: From Apartheid to Reconciliation

Unit II: Social Movements

- a. Environmental disasters and Struggles: Chipko Movement; Struggles for the Amazon; Bhopal; Chernobyl
- b. Student Movements: Paris 1968; Beijing 1989
- c. Civil Rights Movement: Martin Luther King and Malcom X
- d. Movements for Democracy: The Arab Spring

- e. Women's Movements: Issues and Debates (focus on Black feminism and Feminism in the Islamic World)

Unit III: A Global Culture:

- a. Spectator Sports
- b. Cinema and Digital Media
- c. Music: Cross Cultural Influences
- d. Food and Globalisation

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: This unit deals with the history of decolonisation and subsequent era when Super Power rivalries manifested in multiple ways. It will also examine the challenges of the welfare state with reference to United Kingdom. Unit also touches upon the important issue of Apartheid and history of reconciliation. **(Teaching time: 5 weeks Approx.)**

- Le Sueur, J.D. (2003). *The Decolonization Reader*. London and New York: Routledge.
- Betts, R.F. (1998). *Decolonization*. London and New York: Routledge.
- Kahin, George McTuman. (2003). *Nationalism and Revolution in Indonesia*, Cornell: Cornell University Press.
- Horne, Alistair. (1977/2006). *A Savage War of Peace: Algeria, 1954-1962*, New York: Books.
- Beresford, M. (1989). *National Unification and Economic Development in Vietnam*. New York: St. Martin's.
- Garland, David. (2016). *The Welfare state: A very Short Introduction*, Oxford: Oxford University Press.
- Guelke, Adrian. (2005). *Rethinking the rise and Fall of Apartheid: South Africa and World Politics*. Basingstoke and New York: Palgrave Macmillan.

Unit-II: This unit examine history of social movements with reference to questions of livelihood, students' perceptions, Civil rights movements. It also deals with history of movements for Democracy in Arab; The Arab Spring. It also examines women's movements. **(Teaching time: 5 weeks Approx.)**

- Joan Martinez-Alier. (2012). "The Environmentalism of the Poor: Its Origins and Spread" in *A Companion to Global Environmental History*, Eds. J. R. McNeill and Erin Stewart Mauldin, West Sussex: Wiley-Blackwell, pp. 455-73.
- Nagraj, Vijay K. & Nithya V Raman (2006). "Are we Prepared for Another Bhopal." in *Environmental Issues in India*, ed. Mahesh Rangarajan, Delhi: Pearson. (Available in Hindi also)
- Rodrigues, Gomercindo. (2007). *Walking the Forest with Chico Mendes: Struggle for Justice in the Amazon*. Austin: University of Texas Press.

- Dierenfield, Bruce J., (2008). *The Civil Rights Movement*, Revised ed., London: Routledge (Available as ebook:
http://staff.rentonschools.us/rhs/review-for-hl-seniors/civil-rights-and-social-movements-post-1945/download/The_Civil_Rights_Mov_by_Bruce_J_D_www_pdfbook_co_ke_pdf?id=446471)
- Bayat, Asef, (2017). *Revolution without Revolutionaries: Making Sense of the Arab Spring*. Stanford: Stanford University Press.
- Gillis, S., G. Howie and R. Munford (Eds.). (2004/07) *Third Wave Feminism: Critical Exploration*. Hampshire: Palgrave.
- Kemp, S. and J. Squires(1997). *Feminisms*. Oxford: Oxford University Press.
- Breines, Winifred. (2007). "Struggling to Connect: White and Black Feminism in the Movement Years." *Contexts* 6 (1), pp. 18-24.(Available online:
<https://journals.sagepub.com/doi/pdf/10.1525/ctx.2007.6.1.18>)
- Springer, Kimberly. (2005). *Living for the Revolution: Black Feminist Organizations, 1968–1980*. USA: Duke University Press (Ch.1 and Ch.4)
- Badran, Margot. (2009). *Feminism in Islam: Secular and Religious Convergences*. London: Oneworld Publications (Ch.5 and Ch.7).

Unit-III: This unit deals with history of culture in world after 1945 with specific reference to spectator sports, Cinema and digital Media. It also deals with cross cultural influences in Music and relations between food and Globalisation.(**Teaching time: 4 weeks Approx.**)

- Mangan. J. A. (Ed.). (2001). *Europe, Sport, World: Shaping Global Societies*. London: Frank Cass Publishers.
- Shove, Elizabeth, F. Trentmann and R. Wilk. (2009). *Time, Consumption and Everyday Life: Practice, Materiality and Culture*. London: Bloomsbury.
- Chapman, James. (2003). *Cinemas of the World: Film and Society from 1895 to the Present*. London: Reaktion Books.
- Inglis, David and Gimlin Debra (eds.) (2009). *The Globalisation of Food*. New York: Berg Publishers.
- Hoffman, Frank W, (2015). *History of Popular Music; From Edison to the 21st Century*, Create Space Independent Publishing Platform.

SUGGESTED READING:

- Hobsbawm, Eric. (1996). *Age of Extremes*. Delhi: Rupa. (translated into Hindi by Lal Bahadur Verma, Allahabad, 2013)
- Lowe, Norman. (2013). *Mastering World History*. London: Palgrave Macmillan.
- Winders, James A. (2001). , *European Culture since 1848: From modern to postmodern and Beyond*, New York: Palgrave
- Heywood, Andrew. (2011). *Global Politics*. New York: Palgrave Macmillan.

- Mahajan, Sneha. (2009). *Issues in Twentieth Century World History*. Delhi: Macmillan. (available in Hindi)
- Fage, J.D. (1993). *A History of Africa*. London: Unwin and Hyman.
- Hobsbawm, Eric. (2013). *Fractured Times: Social and Cultural History of the Twentieth Century*. New York: New Press.
- Lancaster, R.N. and M.D. Leonardo. (1997). *The Gender/ Sexuality Reader: Culture, History, Political Economy*. London: Routledge.
- Appadurai Arjun. (1996). *Modernity at Large: Cultural Dimensions of Globalisation*. Minneapolis: University of Minnesota Press.
- Gorbachev, Mikhail. (1996). *Memoirs*. New York: Doubleday.
- Guha, Ramchandra. (2000). *Environmentalism: A Global History*. Delhi: Oxford University Press.
- Oulette, L., (ed.) (2013). *The Media Studies Reader* New York: Routledge, 2013.
- Stiglitz, Joseph (2003). *Globalisation and its Discontents*. Delhi: Penguin India.
- Parker, R. and P. Aggleton (Ed.). (2007). *Culture, Society and Sexuality: A Reader*. London: Routledge.
- Safranski, Rudiger. (2003). *How Much Globalization can we bear?* Cambridge and Malden: Polity. (pp. 1-25 & 42-69.)
- Mathews, Jessica T. (2000). "The Information Revolution", *Foreign Policy*, Vol.119. pp. 63-65.
- Choudhary, Kameshwar. (2014). "Globalization and Culture" in *Indian Sociology: Identity, Communication and Culture*. (Ed.) Yogender Singh. Delhi: Oxford University Press, pp.223-230, 238-242, 251-52 & 255-57, 283-90. Music: 294-97)
- Ross, Robert. (1997). *Concise History of South Africa*. Cambridge: Cambridge University Press.
- Smith, Sharon. (2013-14). "Black Feminism and Intersectionality." *International Socialist Review* 91 (Available online: <https://isreview.org/issue/91/black-feminism-and-intersectionality>)

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

De-colonisation, Cold War, Apartheid, Environment, Feminism, Welfare State, Student Movements, Arab Spring, Cinema, Sports, Food

GE IV

History and Culture: Representations in Texts, Objects & Performance

Course Objective:

The objective of the course is to teach culture through its intangible and tangible attributes that are discussed in four themes including traditions of kingship and courtly culture; inter-cultural perceptions of 'other' religious communities and gender; performing ritual devotions by recitation of songs and processions; and exploring performance of narrative traditions using inanimate objects like, masks, puppets and cloth/paper scrolls. This course requires students to explore the continuity of cultural patterns, iconic representations, and styles of performance into our present times. For example, the iconic *raja* (king) of the pre-modern times continues to perform royal ritual and sacrificial ceremonies, into contemporary times when India is a republic. The court jester of the past lingers on into the present as represented by HajariBhand. The complex nature of inter-cultural discourse between the Hindus and Muslims continues into the present and we know that neither community represents monolithic form. What shall we make of these multifaceted representations? How do performative traditions evolve over time? The pedagogy of an interdisciplinary approach is thus inbuilt into the structure of this course. Readings and audio-visual material have been knitted into themes to encourage active participation and discussion in the classroom.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Identify complex nature of kingship in medieval times through the case study of Krishnadevaraya of Vijayanagara.
- Discuss the nature of identities and interactions between different groups of people in the past and the present.
- Examine the complex nature of religious communities in the past and their fluid participation in ritual and culture.
- Illustrate how culture is communicated through narrative strategies and performative acts.
- Distinguish that textuality and performativity are not binary opposites and are mutually interactive.
- Develop analytical skills that are necessary for students of literature, sociology, anthropology, religion, psychology, political science and South Asian studies.

Course Content:

Unit I: Kings, *bhanda*s and politicians

Unit II: Perceiving cultures and negotiating identities

Unit III: Performing Devotion: rituals, songs & processions

Unit IV: Storytelling with objects: Masks, puppets & scrolls

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit- I: Kingship is identified as a key component of India's civilizational ethos. In the years following Indian Independence, kingdoms were dissolved, but this did not provoke the disappearance of 'royal' rituals which continued to be celebrated in different ways and court jesters lingered on as buffoons. **(Teaching Time: 4 weeks Approx.)**

- Shulman, David Dean. (1985). *The King and the Clown in South Indian Myth & Poetry*, Princeton: Princeton University Press. (Excerpt from Chapter 4, "The Kingdom of Clowns: Brahmins, Jesters & Magicians", pp. 152-213, available in Meenakshi Khanna (ed.), (2007). *The Cultural History of Medieval India*. New Delhi: Social Science Press, pp. 3-24
शुलमन, डेविड दीन (2007). "मसखरों का राज्याः ब्राह्मण, मसखरे और जादूगर", मध्यकालीन भारत का सांस्कृतिक इतिहास, मीनाक्षी खन्ना, (संपादित) (अनुवाद उमाशंकर शर्मा 'ऋषि'), नयी दिल्ली: ओरिएण्टल ब्लैकस्वान, पृष्ठ. 3-25.
- Emigh, John and Ulrike Emigh, (1986). "Hajari Bhand of Rajasthan: A Joker in the Deck", *The Drama Review: TDR*, vol. 30, No. 1, pp. 101-130.
- Berti, Daniela. (2006). "Kingship, divine bureaucracy and electoral politics in Kullu", *European Bulletin of Himalayan Research*, vol, 29-30, pp. 39-61

Unit II: This rubric draws on four essays based on multilingual textual sources such as inscriptions, poetic texts, chronicles and travellers accounts composed during 8th to 19th centuries. The historians have problematised issues relating to cultural perceptions and identities of religion and gender and presented a complex understanding of identities that were not monolithic. These readings will clarify the methodological approaches used by historians to unravel narratives from the past in the quest for explaining the present. **(Teaching Time: 4 weeks Approx.)**

- Chattopadhyaya, Brajadulal. (1998). "Images of Raiders and Rulers" in B. D. Chattopadhyaya, (ed.), *Representing the Other: Sanskrit Sources and the Muslims, Eighth to Fourteenth Century*, New Delhi: Manohar, pp. 101-125

चट्टो पाध्याय, बृज दुलाल . (2 0 0 7) . “ आ क्राम कों और शा स कों की छ वियां” , मध्यकालीनभारतकासांस्कृतिकइतिहास.मीनाक्षीखन्ना, (संपादित) (अनुवादउमाशंकरशर्मा ऋषि), नयीदिल्ली: ओरिएण्टलब्लैकस्वान, पृष्ठ, 107-133

- Behl,Aditya. (2003). “The Magic Doe: Desire and Narrative in a Hindavi Sufi Romance, circa 1503” in Richard M. Eaton (ed.), *India’s Islamic Traditions: 711-1750*, Oxford: Oxford University Press, pp. 180-208
बहल, आदित्य (2007) “मायावीमृगः एकहिंदीसूफीप्रे माख्यानमेंका मनाऔरआख्यान (1503 ईसवी)”, मध्यकालीनभारतकासांस्कृतिकइतिहास.मीनाक्षीखन्ना, (संपादित) (अनुवादउमाशंकरशर्मा ऋषि), नयीदिल्ली: ओरिएण्टलब्लैकस्वान, पृष्ठ 185-216
- Eaton.R. M.. (2002). “Multiple Lenses: Differing Perspectives of Fifteenth Century Calicut”, R. M. Eaton (ed.), *Essays on Islam and Indian History*, New Delhi: OUP, pp. 76-93.
- Petievich,Carla. (2001). “Gender politics and the Urdu ghazal: Exploratory observations on *Rekhta* versus *Rekhti*”, *The Indian Economic & Social History Review*, vol. 38, no.3, 223–248.
पेटिएविच, कार्ला. (2007). “लिंगकीराजनी तितथाउर्दू गज़लः रखताबनामरखतीकाखोजपरकअवलोकन”, मध्यकालीनभारतकासांस्कृतिकइतिहास.मीनाक्षीखन्ना, (संपादित) (अनुवादउमाशंकरशर्मा ऋषि), नयीदिल्ली: ओरिएण्टलब्लैकस्वान, पृष्ठ 154-184
- Jenny.Nilsson. (2004). “The Sense of a Lady’: An Exploration of Transvestite Roles in Kathakali and their Relation to Kerala Gender Constructions”, *The Cambridge Journal of Anthropology*, vol. 24, no. 3, pp. 1-40

Unit III: The acts of devotion, whether these are observed in private spaces or in public sphere, formulate expressions of religious identities. Many rituals, like the recitation of songs dedicated to Siva or the procession of icons in the temple at Madurai; lamentation over the martyrdom of Husain and parading of the replica of his tomb shrine during Muharram, developed during medieval times. Political patronage was necessary for such devotional acts in the past as well as in the present.(**Teaching Time: 3 weeks Approx.**)

- Champakalakshmi, R. (1994). “PatikamPātuvār: Ritual Singing as a Means of Communication in Early Medieval South India”, *Studies in History*, vol.10, no.2, pp. 199–215.
चंपकलक्ष्मी, राधा. (2007). “पाटीकम्पटुआरः आधुनिकमध्यकालीन दक्षिणभारतमेंसंवाद-माध्यमकेरूपमेंधार्मिकगायन”, मध्यकालीनभारतकासांस्कृतिकइतिहास.मीनाक्षीखन्ना, (संपादित) (अनुवादउमाशंकरशर्मा ऋषि), नयीदिल्ली: ओरिएण्टलब्लैकस्वान, पृष्ठ, 50-75
- Orr.Leslie. (2004). “Processions in the Medieval South Indian Temple: Sociology, Sovereignty and Soteriology”, in *South Indian Horizons: Felicitation Volume for François Gros on the Occasion of his 70th Birthday*, ed. Jean-Luc Chevillard and Eva Wilden, Pondichéry: Institutfrançais de Pondichéry/ Ecole française d’Extrême-orient, pp. 437-470.

- Qureshi, Regula Burckhardt. (1981). "Islamic Music in an Indian Environment: The Shi'a Majlis" in *Ethnomusicology*, vol. 25, No. 1, pp. 41-71
- Cole, J.R.I. (1988). *Roots of North Indian Shi'ism in Iran and Iraq: Religion and State in Awadh, 1722-1859*. Berkley: University of California Press. (Chapter 4, "Popular Shi'ism", pp. 92-119.)
- कोल, जे.आर.आई. (2007). "लोकप्रचलित शियाधर्म", मध्यकालीन भारत का सांस्कृतिक इतिहास. मीनाक्षी खन्ना, (संपादित) (अनुवाद उमाशंकर शर्मा 'ऋषि'), नयी दिल्ली: ओरिएण्टल ब्लैकस्वान, पृष्ठ, 76-104.

Unit IV: In the three narrative traditions discussed in this rubric the human agency (*Purusha*) exists in a specific kind of relation with inanimate objects used in different types of dramatic performances. These objects have meanings embedded in the social and political contexts of various cultural traditions and express processes by which notions of 'self'/'selves' are constructed and reconstructed. **(Teaching Time: 3 weeks Approx.)**

- Vishalakshi, Nigam Chandra and Veronica Chishi. (2010). "Tradition of Story Telling in India through Masks" in *Akhyan Celebration of Masks, Puppets and Picture Showmen Traditions of India*, New Delhi: IGNCA, pp. 28-33
- Emigh, John. (2013). "Crisis and Contestation in the Prahlada Nataka of Ganjam", in Hermann Kulke, (ed.), *Imaging Orissa*, Bhubaneswar: Prafulla Publication, 2013.
- Sarma, Dhurjjati and Ahanthem Homen Singh. (2010). "Storytelling and Puppet Traditions of India" in *Akhyan Celebration of Masks, Puppets and Picture Showmen Traditions of India*. New Delhi: IGNCA, 2010, pp. 34-41
- Sorensen, Niels Roed. (1975). "Tolu Bommalu Kattu: Shadow Theater Re: Andhra Pradesh". *Journal of South Asian Literature*, vol. 10, No. 2/4, Special Issue: Theatre in India, pp. 1-19
- * For illustrations <https://www.sahapedia.org/tag/shadow-puppetry>
- Jyotindra, Jain. (2010). "Indian Picture Showmen: Tradition and Transformation" in *Akhyan Celebration of Masks, Puppets and Picture Showmen Traditions of India*, New Delhi: IGNCA, pp. 14-27.
- Wickett, Elizabeth. (2010). "The epic of Pabujiki par in performance", *World Oral Literature Project. Voices of Vanishing Worlds, Occasional Paper 3*, Cambridge: University of Cambridge, pp. 1-27.
- Short documentary https://www.youtube.com/watch?v=f4EiAdeKi_E

SUGGESTED READINGS:

- Clark, Bradford. (2005). "Putul Yatra: A Celebration of Indian Puppetry", in *Asian Theatre Journal*, vol. 22, no. 2, pp. 334-347.

- Eaton, Richard. M. (2007). "The Articulation of Islamic Space in the Medieval Deccan", reprinted in *Cultural History of Medieval India*, (ed.), Meenakshi Kanna. New Delhi: Social Science Press, pp. 126-141.
ईटन, रिचर्ड . (2 0 0 7) " म ध्य काली न द क्कनमें इ स्लामिक स्था न की अ भि व्य क्ति " , मध्यकालीनभारतकासांस्कृतिकइतिहास.मीनाक्षीखन्ना, (संपादित) (अनुवादउमाशंकरशर्मा ऋषि), नयीदिल्ली: ओरिएण्टलब्लैकस्वान, पृष्ठ, 134-151.
- Fischer-Lichte,Erika. (2009). "Culture as Performance" *Modern Austrian Literature*. vol. 42, no. 3, Special Issue: Performance, pp. 1-10.
- Foley, Kathy and DadiPudumjee "India" in *World Encyclopedia of Puppetry Arts called "WEPA" or "EMAM" for EncyclopédieMondiale des Arts de la Marionnette*, a project of International Unima)
Available in English <https://wepa.unima.org/en/india/>
Available in Hindi at <https://wepa.unima.org/en/india/>
- Katz, Marc. (2004). *Banaras Muharram and the Coals of Karbala*. Written, produced, and narrated by Marc J. Katz. DVD, color, 70 minutes; 2004.
- Khanna, Meenakshi. (2007). "Introduction", in *Cultural History of Medieval India*. (ed.). Delhi: New Delhi: Social Science Press, pp. ix-xxxiv.
खन्ना, मीनाक्षी. (2007). "भूमिका", मध्यकाली नभारतकासांस्कृतिकइतिहास.मीनाक्षीखन्ना, (संपादित) (अनुवादउमाशंकरशर्मा ऋषि), नयीदिल्ली: ओरिएण्टलब्लैकस्वान, पृष्ठ, ix-xxxiv.
- Lochtefeld,James G. (2004). "The Construction of the Kumbha Mela", *South Asian Popular Culture*. vol. 2 Nno. 2, pp. 103-126.
- Sarkar,Pabitra. (1975). "Jatra: The Popular Traditional Theatre of Bengal", in *Journal of South Asian Literature*, Vol. 10, No. 2/4, Special Issue: Theatre in India, pp. 87-107.
- Schomer,Karine. (1990). "The "Ālhā" Epic in Contemporary Performance", *The World of Music* Vol. 32, No. 2, pp. 58-80.
- Singh, Karan. (2016). "Structural Peripheries and Ideological Underpinnings: Performative Narration in Par of Pabuji", *Dialogue: A Journal Devoted to Literary Appreciation*, vol. XII, no. 1, pp. 35-45.
- Sivasankaran,Sreekala. (2010). "Akhyān: Masks, Puppets and Picture Showmen Traditions of India - An Introduction" in *Akhyān Celebration of Masks, Puppets and Picture Showmen Traditions of India*, New Delhi: IGNCA, 2010, pp. 8-11.
- Smith, John D. *The Epic of Pābūjī. A study, transcription and translation*, second revised edition available electronically at <http://bombay.indology.info/pabuji/statement.html>

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical ap-

proach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Bhand, Vidushak, Kullu, Masks, Puppets, Tolu BommaluKattu, Scrolls, Picture Showmen, PatikamPatuvar, Muharram, Kathakali

Politics of Nature

Course Objective:

This introductory course familiarises students with the major themes in the history of human organization of nature -- for food, energy and raw materials. It studies the long-term transformations in the organization of Nature by the state and to manage energy production, plant and animal transfers, circulation of commodities and people, urbanization and industrialization of production. This will help students understand the ecological articulation of social inequalities including class, gender, ethnicity, caste, and nationality. By focusing on the planetary scale of ecological interconnectedness students will learn how to situate the politics of Nature that integrates extremes: poverty in the fertile plains, the development of cities and related environmental degradation elsewhere, scarcity of energy where dams and mines exist, and inequalities produced by carbon-energy regimes. Unit 5 will introduce the students to the issues and debates related to the ecological predicaments of the twenty-first century in a historical perspective.

Learning Outcomes

Upon completion of this course the student shall be able to:

- Critique an understanding of environmental concerns based on a narrow scientific/ technological perspective
- Discuss environmental issues within a social and political (or *social scientific?*) framework
- Examine the role of social inequality. How does unequal distribution of and unequal access to environmental resources help understand the environmental crisis of the world - from the global to the local
- Examine the complexities of resource distribution and inequalities of resource use, locating these within specific social contexts, with reference to case studies regarding water rights and forest rights
- Locate solutions to environmental problems within a framework of greater democratisation of resource use
- Problematised (or *critique?*) the notion of a pristine past - of perfect balance between human societies and nature in pre-modern times.

Course Content:

Unit 1: ‘Spaceship called earth’ – competition for bounded resources and livelihoods

Unit 2: Energy in Human History: –

- a. Before the era of coal, gas and oil
- b. Era of fossil energy

Unit 3: Ecological Imperialism

- a. Flora-fauna transfer
- b. Diseases and Migration

Unit 4: Unequal access and Industrial Production,

- a. Industrial Agriculture
- b. Gendered access to natural resources
- c. Cities and inequalities

Unit 5: Anthropocene

- a. Climate change and writing ecological histories
- b. Debating the Anthropocene / Capitalocene

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-1: This unit introduces student to conflict over natural resources and changing livelihood patterns. **(Teaching Time: 2 weeks Approx.)**

- Bhattacharya, Neeladri. (1995). “Pastoralists in a Colonial World”, in David Arnold & Ramachandra Guha, eds., *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia*. Delhi: Oxford University Press. pp. 49-85. (Available in Hindi also)
- Swaminathan, M S. (2008), ‘Agriculture on Spaceship Earth’, in Mahesh Rangarajan, ed., *Environmental Issues in India*. Delhi: Pearson. pp.161-183. (Available in Hindi also)

Unit-2: Introduces the emerging field of energy studies to understand the way societies fulfilled their energy requirements. In-depth reading of the use of forest, pastures, agricultural land and related issues on environmental changes will enable students to critique the predominant notion of harmony that existed between man and nature in the pre-modern societies. **(Teaching Time: 3 weeks Approx.)**

- Burke III, Edmund. (2009), “The Big Story: Human History, Energy Regime and the Environment” in Edmund Burke III and Kenneth Pomeranz, eds., *The Environment and World History*. Berkeley: University of California Press. pp. 33-53.
- Bulliet, Richard. (2005). *Hunters, Herders and Hamburgers: The Past and Future of Human-Animal Relationships*. New York: Colombia University Press.

- Urry, John. (2013). 'The Century of Oil', in *Societies Beyond Oil: Oil Dregs and Social Futures*. London: Zed Books. pp. 36-52.
- Crosby, Alfred W. (2006). *Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy*. New York: W. W. Norton. pp. 159-166 & pp. 117-158.

Unit-3: This unit explores how Empires of the New World transferred flora and fauna across continents, affected the demography of local societies and completely transformed landscapes. The second rubric explains how colonialism generated new patterns of consumption by appropriating global resources and fossil fuels for industry, to produce an inter-connected but unequal world. **(Teaching Time: 4 weeks Approx.)**

- Crosby, Alfred W. (1988), "Ecological Imperialism: The Overseas Migration of Western Europeans as a Biological Phenomenon" in Donald Worster, ed., *The Ends of the Earth*. New York: Cambridge University Press. pp. 104-105.
- Cronon, William. (1983). *Changes in the Land: Indians, Colonists and the Ecology of New England*. New York: Hill and Wang, pp. 3-18.
- Crosby, Alfred W. (1967). "Conquistadory Pestilencia: The First New World Pandemic and the Fall of the Great Indian Empires". *The Hispanic American Historical Review*, Vol. 47 (No. 3), pp. 321-337.

Unit-4: This unit studies the new energy regimes of the modern world, with a special focus on industrial agriculture. It offers a historical perspective on increasing inequality of access to natural resources for women and the poor (within their own locations and across the world). It also critically examines the new forms of deprivation. **(Teaching Time: 3 weeks Approx.)**

- Kroese, Ron. (2002). "Machine Logic: Industrialising Nature and Agriculture", in Andrew Kimbrell, ed., *The Fatal Harvest Reader: The Tragedy of Industrial Agriculture*. London: Island Press. pp. 87-91
- McKittrick, Meredith. (2012). "Industrial Agriculture", in J. R. McNeill & E. S. Maudlin, eds., *Companion to Global Environmental History*. Oxford: Blackwell. pp. 411-432.
- Agarwal, Bina. (1992). "The Gender and Environment Debate: Lessons from India". *Feminist Studies*, Vol. 18 (No. 1), pp. 119-158.
- Merchant, Carolyn. (2017). 'Gender and Environmental History', in J. R. McNeill and Alan Roe, eds., *Global Environmental History*. London: Routledge. pp. 82-87.
- Bauer, Jordan and Melosi, Martin V. (2012). "Cities and the Environment" in J. R. McNeill and E. S. Maudlin, eds., *Companion to Environmental History*. Oxford: Blackwell. pp. 360-376.
- Heynen, Nik, Kaika, Maria and Swyngedouw, Erik. (2006). 'Urban Political Ecology: Politicizing the production of Urban nature' in Nik Heynen et al. eds., *In the Nature of Cities: Urban Political Ecology and Politics of Urban Metabolism*. London: Routledge. pp. 1-19.

Unit-5: Introduces the concept of Anthropocene to discuss emergent concerns regarding the influence of humans on the planet's history. This provides a long-term historical perspective on contemporary environmental issues including global warming and need for innovation, policy change at the international level and the production of post humanist histories. **(Teaching Time: 2 weeks Approx.)**

- White, Sam. (2012). 'Climate Change in Global Environmental History' in J. R. McNeill and E. S. Maudlin, eds., *Companion to Environmental History*. Oxford:Blackwell. pp. 394-410.
- Lewis, Simon L. and Maslin, Mark A. (2015). "Defining the Anthropocene", *Nature*, Vol. 519, pp. 171-80.
- Steffen, Will, Crutzen, Paul J. and McNeill, J. R. (2008). "The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature". *Ambio*, Vol. 36(No,8), pp. 614-621
- Moore Jason W. (ed.,) (2016) *Anthropocene or Capitalocene?: Nature, History and the Crisis of Capitalism*. Oakland: PM Press.
- Morrison, Kathleen D. (2015). "Provincializing the Anthropocene". *Seminar*, Vol.673 (Sept), pp. 75-80.

SUGGESTED READINGS:

- Altvater, Elmer. (2007). 'The Social and Natural Environment of Fossil Capitalism'. *Socialist Register*, Vol. 43, pp. 37-59.
- Brockway, Lucile H. (1979). "Science and Colonial Expansion: The Role of the British Royal Botanic Gardens". *American Ethnologist*, Vol. 6(No. 3), pp. 449-465.
- Chakrabarty, Dipesh. (2016). "Whose Anthropocene? A Response" In: "Whose Anthropocene? Revisiting Dipesh Chakrabarty's 'Four Theses,'" Robert Emmett and Thomas Lekan, eds., *RCC Perspectives: Transformations in Environment and Society*. No. 2, pp.103–113.
- Hugo, G. (1996). "Environmental Concerns and International Migration". *International Migration Review*, Vol.30(No. 1), pp. 105-31.
- Jodha, N. S. (1986). 'Common Property Resources and Rural Poor in Dry Regions of India. *Economic and Political Weekly*, Vol. XXI(No. 27) pp. 1169-1181.
- Kalof, Linda. (2007). *Looking at Animals in Human History*. London: Reaktion Books. pp. 1-71
- Lübken, Uwe. (2012). "Chasing a Ghost? Environmental Change and Migration in History". *Global Environment: A Journal of History and Natural and Social Sciences*, No.9 pp. -25.
- Malm, Andreas. (2016), 'In the Heat of the Past: Towards a History of the Fossil Economy' in Andres Malm, *The Rise of Steam Power and the Roots of Global Warming*. London: Verso, pp. 1-32.

- Prasad, Archana. (1998). The Baiga: Survival strategies and local economy in the Central Provinces. *Studies in History*, Vol. 14(No. 2), pp. 325-348.
- Shiva, Vandana. (1988). 'Women in the Food Chain' (Ch.5) in Vandana Shiva, *Staying Alive: Women, Ecology and Survival in India*. New Delhi: Kali for Women. pp. 96-178.
- Tucker, Richard. (2007). 'The Tropical Cost of the Automotive Age: Corporate Rubber Empires and the Rainforest', in Richard Tucker, *Insatiable Appetite: The United States and the Ecological Degradation of the Tropical World*. Plymouth: Rowman & Littlefield Publishers. pp. 113-50.
- Vaclav Smil. (1994). "Preindustrial Prime Movers and Fuels", in Vaclav Smil, *Energy in World History*. Boulder: Westview, pp. 92-156.
- John Tully. (2011). *The Devil's Milk: A Social History of Rubber*. New York: Monthly Review Press, pp, 17-26 and 35-50.

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Energy, Fossil, Ecological Imperialism, Inequalities, Anthropocene, Capitalocene,

GE – VI

Making of Post Colonial India

Course Objectives:

The course provides various perspectives on India's evolving political, economic and cultural situations from 1950-1990s and tracks a dynamic trajectory of contemporary India. The course seeks to familiarise students with the trajectory of growth of the Indian state, politics and economy and the shaping of the Indian public following the country's independence in 1947.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Explain the complexities involved in the making of constitution.
- Analyse the reasons behind the linguistic reorganisation of states.
- Analyse foreign policy of India during formative stages of independent India.
- Draw inferences to explain the functioning of different political parties.
- Explain the character of emergency and its consequences.
- Discern the nuances of Indian judicial system.

Course Content:

Unit I: Laying the foundation of independent India

- [a] Making of the Constitution
- [b] Linguistic re-organisation

Unit II: Envisioning a new order

- [a] Economic Development: five year plans; Problems of Development case study of Punjab and Bihar
- [b] Indian Foreign Policy till 1964

Unit III: Democracy at Work

- [a] Congress and other political formations
- [b] (i) Left parties (ii) Caste politics (iii) Dravidian movement
- [c] Women and politics (i)Hindu Code Bill (ii)Status of Women in India Report

Unit IV: Turning Point: Emergency and After

- [a] Railway Strike, J.P. Movement and Emergency

- [b] Developments in the 1980's: (i) Coalition politics; (ii) Mandal Commission and aftermath
- [c] Judiciary, Civil Society and Rights: Judicial Activism and Public Interest Litigation
- [d] Popular and parallel Cinema

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: This unit deals with making of the constitution. The history and politics of the early years of Independence have been discussed. It also deals with the linguistic re-organisation of states. **(Teaching Time: 3 weeks Approx.)**

- Chakrabarty, D., Rochona Majumdar & Andrew Sartori. (2007). *From the Colonial to the Post-Colonial: India and Pakistan in Transition*. New Delhi: OUP.
- Basu, B.D. (2011). *Introduction to the Constitution of India*. Delhi: Lexis Nexis. (20th Edition)
- Austin, Granville. (1999). *Working a Democratic Constitution: the Indian Experience*. New Delhi: OUP.
- De, Rohit. (2018). *A People's Constitution*, Delhi: Penguin.
- Ramaswamy, Sumathi. (1997). *Passions of the Tongue: Language Devotion in Tamil India, 1890-1970*. Berkeley: University of California Press.
- King, Robert D. (1997) *Nehru and the language politics in India*. Delhi: OUP

Unit-II: This unit deals with the history of economic developments in the early years of Independent India. It also deals with the problems of development with the case study of Punjab and Bihar. It also deals with the history of Non-Alignment and Panchsheel. **(Teaching Time: 3 weeks Approx.)**

- Balakrishnan, P. (2005). *Economic Growth and its Distribution in India*. Hyderabad: Orient BlackSwan.
- Frankel, Francine R. (2005). *India's Political Economy*. New Delhi: OUP.
- Frankel, Francine R., (ed.). (2000). *Transforming India: Social and Political Dynamics of Democracy*. Oxford: OUP.
- Bhalla, G.S. (1995). "Agricultural Growth and Industrial Development in Punjab" in *Agriculture on the road to Industrialisation*. John, W. Mellor (ed.). Baltimore: International Food Policy Research Institute, pp. 67-112.
- GolamRasul and Eklabya Sharma, (2014). "Understanding the Poor Performance of Bihar and Uttar Pradesh in India: A Macro Perspective". *Regional Studies, Regional Science*. vol. 1:1, 221-239, <http://dx.doi.org.2014.943804>

Unit-III: This unit deals with history of working of democracy in India 1947 with special reference to history of congress party and other political formations. It also deals with history of Left parties, J P Movement and Dravidian movements. It also examines history of social reform with reference to Women and Hindu Code Bill. **(Teaching Time: 4 weeks Approx.)**

- Barnett, Marguerite Ross. (1976). *The Politics of Cultural Nationalism in South India*, New Jersey: Princeton.
- Ray, Rabindra. (1992). *The Naxalites and their Ideology*. Delhi: OUP
- Stanley, Kochanek. (1968). *The Congress Party of India: The Dynamics of One-Party Democracy*. Princeton: Princeton University Press.
- Pandian, M.S.S. (2008). *Brahmin and Non Brahmin: Genealogies of the Tamil Political Present*. Delhi: Permanent Black.
- Kumar, Radha. (1993). *The History of Doing: An illustrated account of movements or women rights and feminism in India, 1800-1990*, New Delhi: Kali for Women.
- Menon, Nivedita. (2001). *Gender and Politics in India*. Delhi: OUP.
- Flavia Agnes. (2001). *Law and Gender Equality: The Politics of Women's Rights in India*. Delhi: OUP.
- Jaffrelot, Christophe. (1999). *The Hindu Nationalist Movement and Indian Politics 1925 to 1990s*. New Delhi: Penguin.
- Jaffrelot, Christophe (2003). *India's Silent Revolution: The Rise of the Lower Castes in North India*. London: Hurst.
- Baru, S. (2000). "Economic Policy and the Development of Capitalism in India: The Role of Regional Capitalists and Political Parties". in Francine Frankel et al, (eds.). *Transforming India: Social and Political Dynamics of Democracy*. New Delhi: Oxford University Press

Unit- IV: This unit deals with history of Indian Politics since Emergency with special reference to Railway Strike, and J P Movement. It examines history of Coalition politics It also deals with the history of Judiciary in Independent India with special reference to Public Interest litigation. It also deals with the history of Media in modern India along with an analysis of popular Cinema and alternatives. **(Teaching Time: 4 weeks Approx.)**

- Chandra, Bipan (2017). *In the Name of Democracy: JP Movement and Emergency*. Delhi: Penguin Random House India.
- Tarlo, Emma. (2003). *Unsettling Memories: Narratives of the Emergency in Delhi*, Berkeley: University of California Press.
- Das, Veena. (1996). *Critical Events: An Anthropological Perspective on Contemporary India*. Delhi: OUP.
- Bhuwania, Anuj. (2017). *Courting the People: Public Interest Litigation in Post Emergency India*. Delhi: Cambridge University Press.

- Ranganathan Maya & Usha M Rodrigues. (2010). *Indian Media in a Globalised World*, Sage Publications India Pvt. Ltd.
- Dwyer, Rachel. (2002). *Cinema India: The Visual Culture of Hindu Film*. New Jersey: Rutgers University Press.
- Kapur, Geeta. (2000). *When was Modernism: Essays on Contemporary Cultural Practice in India*. New Delhi: Tulika.

SUGGESTED READINGS:

- Chandra, Bipan. (2008). *India Since Independence*. Delhi: Penguin
- Bhargava, Rajeev and VanaikAchin (eds.). (2010). *Understanding Contemporary India*. Orient Blackswan
- Damodaran, H. (2008). *India's New Capitalists: Caste, Business, and Industry in a Modern Nation*. Basingstoke: Palgrave Macmillan.
- Deshpande, Satish, (2003). *Contemporary India: A Sociological View*. Delhi: Viking
- Guha, Ramachandra. (2008). *India After Gandhi*. Delhi: Picador
- Jayal, Niraja Gopal & Pratap Bhanu Mehta (eds.). (2010). *The Oxford Companion to Politics in India*. Delhi: Oxford University Press.
- Kothari, Rajni. (1970). *Caste in Indian Politics*. New Delhi: Orient Longman.
- Beteille, A. (2012) *Democracy and Its Institutions*. New Delhi: Oxford University Press.
- Hasan, Zoya. (2004). *Parties and Party Politics in India*. New Delhi: Oxford University Press.
- Dhawan, Rajeev, (ed.). (1997). *Law and Society in Modern India*. New Delhi: Oxford University Press.
- Brass, Paul. (1997). *Politics of India since Independence*. Cambridge: Cambridge University Press.
- Chatterjee Partha (ed.). (1997). *State and Politics in India*. Delhi: Oxford University Press

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Constitution, Linguistic re-organisation, Development, foreign policy, national and state politics, the Emergency, Mandal, Judicial activism, popular cinema

GE-VII

Religion and Religiosity

Course Objectives:

This course seeks to provide an understanding of (a) multiple religious traditions that flourished through the ages in the Indian subcontinent; (b) how each religious tradition is dynamic and changing in relation to each other and in relation to its own past; (c) the ways in which each expanded or contracted; (d) how the modern Indian state and its constitution dealt with the issue of multiplicity of beliefs; and (e) to understand the varied scholarly approaches to each of the issues outlined above.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Describe the basic chronological, spatial and substantive contours of each of the religious traditions as well as certain intellectual currents that questioned them.
- Analyse and articulate the long-term changes that each religious tradition undergoes in a dynamic relationship with its own past, with non-religious aspects of life, and with other religious traditions.
- Identify and describe the formation of religious boundaries, identities and the scope for the liminal spaces in between.
- Appreciate, examine and relate to the debates on the ways in which modern Indian state and its constitution must deal with the issue of plurality of religious beliefs and practices.

Course Content:

Unit-I: Major Religious Traditions through the Ages I

- a. Textual Vedic and Puranic traditions
- b. Buddhism, Jainism and Ajivikas

Unit-II: Major Religious Traditions through the Ages II

- a. Juridical and Mystical Islam
- b. Emergence of Sikhism

Unit-III: Socialisation and Dissemination in the Medieval and Early Modern Era

- a. Scholarly Approaches to Brahmanization in the Early Medieval Era
- b. Scholarly Approaches to Islamisation (or 'Conversion to Islam') in the Medieval Period

- c. Religious Identities in the Medieval Period; Representation of the Self and the Other

Unit-IV: Plurality and Political Mobilisation of Religion

- a. Religious Boundaries and Liminal Spaces
- b. Construction of Modern Religious Identities

Unit-V: Religion, Secularism and Nation-State

- a. Debates on Secularism and the Indian Constitution
- b. Beyond Communal and Secular Discourse

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I. The unit should familiarise students with diverse religious traditions that originated in the Indian –subcontinent. It also explores intellectual currents that questioned them. **(Teaching Time: 3 weeks Approx.)**

- Shrimali, K. M. (1998). 'Religion, Ideology and Society', *Proceedings of Indian History Congress*, General Presidential Address, 66th Session. यह लेख हिंदी में प्रो. श्रीमाली की ही एक किताब में संकलित है:
- श्रीमाली, कृष्णमोहन. (2005). धर्म, समाज और संस्कृति, नई दिल्ली: ग्रंथशिल्पी. (अध्याय 6: धर्म, विचारधारा और समाज, pp.196-258.)
- Chakrabarti, Kunal. (2001). *Religious Process: The Puranas and the Making of a Regional Tradition*, New Delhi: Oxford University Press, Chapter 2, pp. 44-80.
- Basham, A. L. (1954). *The Wonder that was India*, Calcutta: Rupa. Reprint, 1982. (Available online at the url: <https://archive.org/details/TheWonderThatWasIndiaByALBasham>).
- बाशम, ए.एल. (1996). अद्भुत भारत, आगरा: शिवलाल अग्रवाल एंड कंपनी।
- Schopen, G. (1997). *Bones, Stones, and Buddhist Monks: Collected Papers on the Archaeology, Epigraphy, and Texts of Monastic Buddhism in India*, Honolulu: University of Hawaii Press. Relevant part is in Chapter on 'Archaeology and the Protestant Presuppositions in the Study of Indian Buddhism', pp 1 – 22.
- Jaini, P. S. (1979). *The Jaina Path of Purification*, Berkeley: University of California Press. (The most relevant portion is to be found in the 'Introduction').
- Bailey, G. & I. Mabbett. (2003). *The Sociology of Early Buddhism*, Cambridge: CUP. (The Introduction (pp. 1-12) and Chapter 1: The Problem: Asceticism and Urban Life, (pp. 13-26) of the book are most relevant.)

Unit.2. The unit equips students to analyse and articulate the long-term changes that each religious tradition undergoes in a dynamic relationship with its own past, with non-religious aspects

of life, and with other religious traditions. **(Teaching Time: 3 weeks Approx.)**

- Rizvi, S.A.A. (1978). *A History of Sufism*, vol. 1. Delhi: MunshiramManoharlal. (The chapters on Chishtiyya and Suhrawardiyya are useful)
- Digby, Simon. (1986). 'The Sufi Shaykh as a Source of Authority in Medieval India', *Purushartha*, vol. 9, pp. 57-78. Reprinted in *India's Islamic Traditions, 711-1750*, edited by Richard M. Eaton, New Delhi: Oxford University Press, 2003, pp. 234-62.
- Digby, Simon. (1990). 'The Sufi Shaykh and the Sultan: A Conflict of Claims to Authority in Medieval India', *Iran*, vol. 28, pp. 71-81.
- Grewal, J. S. (1993). *Contesting Interpretations of the Sikh Traditions*, Delhi: Manohar.

Unit-3. The segment enquires into varied scholarly approaches to the issues pertaining to multiple religious traditions that flourished through the ages and how each religious tradition is changing in relation to each other and in the ways in which each expanded or contracted. **(Teaching Time: 3 weeks Approx.)**

- Eaton, Richard. (1987). 'Approaches to the Study of Conversion to Islam in India', in *Islam in Religious Studies*, edited by Richard C. Martin, New York: One World Press, pp. 106-23.
- Chakrabarti, Kunal. (1992). 'Anthropological Models of Cultural Interaction and the Study of Religious Process', *Studies in History*, vol. 8 (1), pp. 123-49.
- Eck, Diana L. (1981). "India's 'Tirthas': 'Crossings' in Sacred Geography", *History of Religions*, vol. 20 (4), pp. 323-44.
- Wagoner, Philip. (1996). 'Sultan among Hindu Kings: Dress, Titles, and the Islamicization of Hindu Culture at Vijayanagara,' *Journal of Asian Studies*, vol. 55, no. 4, pp. 851-80.
- Chattopadhyaya, B. D. (1998). *Representing the Other: Sanskrit Sources and the Muslims (Eighth to Fourteenth Centuries)*, Delhi: Manohar.
- चट्टोपाध्याय, बृज दुलाल . (2 0 0 7) . “ आक्रामकों और शासकों की छवियाँ ” , मध्यकालीनभारतकासांस्कृतिकइतिहास.मीनाक्षीखन्ना, (संपादित) (अनुवादउमाशंकरशर्मा ऋषि), नयीदिल्ली: ओरिएण्टलब्लैकस्वान, पृष्ठ, 107-133
- Talbot, Cynthia. (1995). 'Inscribing the Other, Inscribing the Self: Hindu-Muslim Identities in Pre-colonial India', *Comparative Studies in Society and History*, vol. 37, no. 4, pp. 692-722.

Unit-4: This section should apprise students to identify and describe the formation of religious boundaries, identities and the scope for the liminal spaces in between. **(Teaching Time: 3 weeks Approx.)**

- Green, Nile. (2011). *Bombay Islam: The Religious Economy of the West Indian Ocean*, Delhi: Cambridge. (Particularly relevant is pp. 49-89)

- Oberoi, Harjot. (1994). *The Construction of Religious Boundaries: Culture, Identity and Diversity in the Sikh Tradition*, Delhi: OUP. (Particularly relevant is pp. 1-40).
- Pandey, Gyanendra. (2006). *The Construction of Communalism in Colonial North India*, Delhi: OUP. (Especially relevant portion is pp. 201-261).

Unit-5. The focus is on how the modern Indian state and its constitution dealt with the issue of multiplicity of beliefs and practices. **(Teaching Time: 2 weeks Approx.)**

- Kesavan, Mukul. (2001). *Secular Commonsense*, Delhi: Penguin.
- Sen, Amartya. (2005). 'Secularism and Its Discontents', in idem, *The Argumentative Indian*, Penguin, pp. 294-316.
- Jha, Shefali. (2002). 'Secularism in the Constituent Assembly Debates, 1946-1950', *Economic and Political Weekly*, vol. 37, no. 30, pp. 3175-3180.
- Pandey, Gyanendra. (2000). 'Can a Muslim be an Indian', *Comparative Studies in Society and History*, vol. 41, no. 4, pp. 608-629.

SUGGESTED READINGS:

- Eaton, Richard. (1997). 'Comparative History as World History: Religious Conversion in Modern India', *Journal of World History*, vol. 8, No. 2, pp. 243-71.
- Ernst, Carl. (1992). *The Eternal Garden: Mysticism, History and Politics at a South Asian Sufi Shrine*, Albany: State University of New York. (The relevant parts are Chapter 1 (entitled, Sufism) and Chapter 4 (The Textual Formation of Oral Teachings in the Early Chishti Order), pp. 5-17 and pp. 62-84 respectively.)
- Mukul, Akshay. (2015). *Geeta Press and the Making of Hindu India*, Delhi: Harper Collins. (More important portions on pp. 287-344.)
- Pandey, Gyanendra. (2006). 'The Time of the Dalit Conversion', *EPW*, vol. 41, No. 18, May 6-12, pp. 1779+1781-788.
- Rodrigues, Hillary P. (ed.). (2011). *Studying Hinduism in Practice*, Abingdon: Routledge (especially Chapter 4).
- Sahu, B. P. (2015). *Society and Culture in Post-Mauryan India, c. 200 BC – AD 300*. New Delhi: Tulika Books. (See especially the Chapter on Religion, pp. 20 – 37. And sections on Buddhism, Jainism, Brahmanism, their chronologies and extracts from the Dhammapada. Also, 2.1. – 'Religion in History' and, 2.2. – Bibliographical Note.)
- Thapar, Romila. (1989). 'Imagined Religious Communities? Ancient History and the Modern Search for a Hindu Identity', *Modern Asian Studies*, vol. 23, part II, pp. 209-223.
- Varma, Supriya and Jaya Menon. (2008). 'Archaeology and the Construction of Identities in Medieval North India', *Studies in History*, vol. 24, no. 2, pp. 173-93

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Puranic, Buddhism, Jainism, Ajivikas, Brahmanization, Islamisation

GE-VIII

Inequality and Difference

Course Objective

Even as India evolved a composite culture within a notion of civilizational unity, differences persisted and were maintained. Using a variety of primary and secondary texts, key issues in ancient Indian social history such as varna, jati, class caste, gender and perceptions of cultural difference are explored. In the Middle ages, with the formation of authoritarian regimes, the expansion of agrarian societies, and the emergence of pan-regional market economics, rather unique ways of articulating individual and collective identities, noting differences, formulating, displaying and reproducing social and economic inequalities came into being. In the modern period, under the impact of colonialism and a renewed engagement with tradition by indigenous intellectuals as well as the conscious attempt to frame the history of India in terms of equality and justice, differences were negotiated and transformed. The course looks at the persisting search for equality and for a politics that engages with the idea of difference within evolving political frameworks. Paper makes a conscious attempt to convey historical process through which ‘categories’ emerge and thereby emphasis the fluid character of categories. Paper critically engages with the political mobilization on the basis of inequalities/‘identity politics’ in an era of participatory form of government.

Learning Outcomes:

After completing this course, students should be able to:

- Critique the prevalent dominant understanding of Caste, Gender, and Tribe.
- Discuss the complex relations between differences and inequalities.
- Examine the inherent politics in the creation of inequalities and differences.
- Outline various initiatives taken by government to prohibit caste-gender atrocities and uplift of deprived sections of society and its limitations.

Course Content:

Unit I:Structure of Inequalities: Caste; Normative and historical experiences

Unit II:Race, Tribe and colonial knowledge

Unit III:Gender, household and Public Sphere

IV:Forms of bondage: Ganikas, slavery and servitude

Unit V:Social distancing and exclusion; Forest dwellers and untouchables

Unit VI:Indian Constitution and questions of Equality

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-1: This unit introduce students to structures of Inequalities with special reference to Caste system. Fluidity of category visible over long historical past is examined to show the role of socio-politico-economic structures of the time in shaping the character of inequalities.(Teaching Time:3 weeks Approx.)

- Jaiswal, Suvira. (1998). *Caste: Origins, functions and dimensions of change*. Delhi: Manohar. pp. 1-25.
- जायसवाल, सुबीरा. (२००४), वर्ण-जातिव्यवस्था: उद्भव, प्रकार्य और रूपांतरण (अनुवादक: आदित्य नारायण सिंह). नई दिल्ली: ग्रंथशिल्पी. पृष्ठ १५-४३.
- Singh, Upinder. (2014). "Varna and Jati in Ancient India" in Veluthat, Keshvan and D R Davis, EDS., *Irreverent History: Essays for M G S Narayanan*. Delhi: Primus, pp. 205-214.
- Singh, Yogender. (1977). "Sociology of Social Stratification", in Yogender Singh, *Social Stratification and Change in India*. Delhi: Manohar. pp.1-90
- Documentary film by V Stalin, "India Untouched".

Unit-2: In their efforts to govern Colonial power tried to map the social relations and social systems in India. Furthermore, relying on understanding of their own society, often they used categories which were alien to the region. This colonial knowledge needs to be unpacked. (Teaching Time: 3 weeks Approx.)

- Metcalf, Thomas. (2005). *Ideology of the Raj, The New Cambridge History of India*, Vol.-III. 4. Cambridge: Cambridge University Press, pp.66-112 & 113-159.
- नंदी, आशिस. (२०१९). जिगरी दुश्मन: उपनिवेशवाद के साये में आत्म-छय और आत्मोद्धार. (अनुवादक: अभय कुमार दुबे). नई दिल्ली: वाणी प्रकाशन. पृष्ठ, ९५-१५६.
- Singh, Chetan. (1988), Conformity and Conflict: Tribes and the 'agrarian system' of Mughal India. *Indian Economic and Social History Review*, Vol. 23, No.2, pp. 319-340.
- Xaxa, V. (2014). Sociology of Tribes, in Y Singh, *Indian Sociology: Identity, Communication and Culture*. New Delhi: Oxford University Press. pp. 53-105.
- रमणिकागुप्ता, (संपादक), (२००८). आदिवासीकौन. नईदिल्ली: राधाकृष्णप्रकाशन, पृष्ठ, १३-२४, २५-२८ एवं २९-४०.

Unit-3: This unit will exemplify how gender identities constitute one of the most prevalent forms of inequalities. These are most fervently enforced and reinforced in the household. **(Teaching Time: 2 weeks Approx.)**

- Chakravarti, Uma. (2006). “Conceptualising Brahmanical Patriarchy in Early India: Gender, Caste, Class and State”, in Uma Chakravarti, *Everyday Lives, Everyday Histories: Beyond the Kings and Brahmanas of Ancient India*. Delhi: Tulika. pp. 138-55.
- चक्रवर्ती, उमा. (२०११). जातिसमाजमेंपितृसत्ता: नारीवादीनजरियेसे, (अनुवादक: विजयकुमारझा). नईदिल्ली: ग्रन्थशिल्पी. पृष्ठ, ४३-६६.
- Gupta, Charu. (2001). “Mapping the Domestic Domain”, in Charu Gupta, *Sexuality, Obscenity, Community: Women, Muslims and the Hindu Public in Colonial India*, Delhi: Permanent Black. pp.123-195.

Unit-4: Differences have often constituted the basis on which inequalities are created, but inequalities are not absolute. Inequalities are defined in terms of socio-political context which by character is dynamic. This unit will exemplify it with the help of forms of bondage: Ganikas, and slavery in medieval India. **(Teaching Time: 2 weeks Approx.)**

- Kumar, Sunil. (2019). “Theorising Service with Honour: Medieval and Early Modern (1300-1700) responses to Servile labour”, in Nitin Verma, Nitin Sinha and Pankaj Jha (Eds.), *Servants’ Pasts*. Delhi: Orient Blackswan, pp. 227-253.
- Saxena, Monika. (2006). “Ganikas in Early India: Its genesis and dimensions”. *Social Scientist*, Vol. 34(No. 11-12), pp. 2-17.

Unit-5: This unit examines, in what ways dominant mode of social structure has used/uses social distancing and exclusion to reinforce their hegemony through the case study of forest dwellers and untouchables. **(Teaching Time: 2 weeks Approx.)**

- Jha, Vivekanand. (1973). Stages in the History of Untouchables. *Indian Historical Review*, Vol.2 (No.1), pp 14-31.
- Punalekar, S P. ‘Dalit Consciousness and Sociology’ in *Social Sciences: Communications, anthropology and sociology*, Ed. Y Singh, Project of History of Indian Science, Philosophy and Culture, Centre for studies in Civilisation, Longman, Pearson, Delhi 2010, pp.491-518.
- Rodrigues, V. Ed. (2005). *The Essential Writings of B.R. Ambedkar*. New Delhi: Oxford University Press. pp. 1-44.
- आंबेडकर, भीमराव. (२००६). अछूत: कौनऔरकैसे (अनुवादक:जुगलकिशोरबौद्ध). नईदिल्ली: सम्यकप्रकाशन. पृष्ठ३१-४६एवं११७-१२४.

Unit-6: Indian Constitution envisaged a society based on social and political equality and enacted several acts to achieve this objective. Present unit evaluates the functioning of constitutional provision through the prism of their stated objectives. **(Teaching Time: 2 weeks Approx.)**

- Austin, Granville. (2011). *Working a Democratic Constitution: The Indian Experience*. New York: Oxford University Press. (Introduction).
- Chaube, ShibaniKinkar. (2009). *The Making and Working of the Indian Constitution*. Delhi: National Book Trust. pp. 1-67.

SUGGESTED READINGS:

- Banerjee-Dube, Ishita. (Ed.). (2008). "Introduction: Questions of Caste". in Ishita Banerjee-Dube. (Ed.). *Caste in History*. New Delhi: Oxford University Press. pp. xv- lxii.
- Basu, Swaraj. (2016). "Contested History of Dalits", in Swaraj Basu, (Ed.). *Readings on Dalit Identity*. Hyderabad: Orient BlackSwan. pp. 134-150.
- Beteille, Andre. (1966). *Caste Class and Power: Changing Patterns of Stratification in a Tanjore Village*. Bombay: Oxford University Press, pp. 1-18, 185-225("Introduction", and "Conclusion")
- Buckler, F.W. (1927). "The Oriental Despot", *Anglican Theological Review*, vol. 10, 11-22, reprinted in M.N. Pearson (1985). *Legitimacy and Symbols: the South Asian Writings of F.W. Buckler*, Ann Arbor: Michigan Papers on South and South East Asian Studies, pp. 176-188.
- Chanana, Dev Raj. (2007). *Slavery in Ancient India: As Depicted in Pali and Sanskrit Texts.*" In AlokaParasher Sen. (Ed.). *Subordinate and Marginalized groups in early India*, New Delhi: Oxford University Press, pp. 96-124.
- Cohn, Bernard. (2008). "The Census, Social Structure and Objectification in South Asia", in Ishita Banerjee-Dube, (Ed.). *Caste in History*. New Delhi: Oxford University Press. pp. 28-38.
- Dirks, Nicholas. (2004). "The Ethnographic State", in Saurabh Dube, (Ed.). *Postcolonial Passages*. New Delhi: Oxford University Press, pp 70-88.
- Ghure, G S. (2008). Caste and British Rule, in Ishita Banerjee-Dube, (Ed.). *Caste in History*. New Delhi: Oxford University Press, pp. 39-45.
- Hardiman, David. (2011). "Introduction", in *Histories for the Subordinated*. Ranikhet: Permanent Black, pp. 1-17.
- Kumar, Dharma. (2015). "Caste and Landlessness in South India", in Sumit Sarkar and Tanika Sarkar, (Eds.). *Caste in Modern India*, Ranikhet: Permanent Black, vol.2, pp 30-63.
- Narain, Badri. (2016). Inventing Caste History: Dalit Mobilisation and Nationalists Past, in Swaraj Basu, (Ed.). *Readings on Dalit Identity*, Hyderabad: Orient BlackSwan. pp. 81-110.
- Parasher-Sen, Aloka. (2007). Naming and Social Exclusion: The Outcaste and the Outsider, in Patrick Olivelle, (Ed.). *Between the Empires: Society in India 300 BCE to 400CE*. New Delhi: Oxford University Press. 415-455.

- Risley, H H. (2008). Caste and Nationality, in Ishita Banerjee-Dube, ed., *Caste in History*. New Delhi: Oxford University Press, pp. 70-75.
- Sharma, K L. (2014). Caste: Continuity and Change, in Y Singh, eds., *Indian Sociology: Emerging concepts, structural and change*. New Delhi: Oxford University Press. pp 197-262.
- शर्मा, रामशरण. (१९९०), प्राचीनभारतमेंभौतिकप्रगतिएवंसामाजिकसंरचनाएं(अनुवादक: पूरनचंदपंत). नईदिल्ली: राजकमलप्रकाशन. पृष्ठ, २९-५२.
- सरकार, सुमित. (२००९). सामाजिकइतिहासलेखनकीचुनौती (अनुवादक: एन. ए. खां'शाहिद'). नईदिल्ली: ग्रंथशिल्पी. पृष्ठ, ३७७-४०९.

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Inequalities, Race, Gender, Bondage, Untouchables, Constitution

GE –IX

Delhi through the Ages: From Colonial to Contemporary Times

Course Objectives:

This course examines physical and social transformation of Delhi from the colonial to the contemporary times. Focusing on the echoes of political developments on urban form and social experience, it aims to explore the historical antecedents of some of the capital's contemporary dilemmas.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Contextualize contemporary questions with regard to the city in the light of its colonial past and lived present.
- Analyse the political developments and their legacy for the shaping of the city.
- Discern importance of 'local' social, ecological and cultural processes that shape and reshape the city
- Explain the historical roots of the problems of sustainable urbanization with regards to Delhi.

Course Contents:

Unit I: Delhi before 1857: Company Raj, Mughal Court and Literary Culture

Unit II: 1857 in Delhi: Rebel violence and British re-conquest

Unit III: Making of New Delhi: Imperial ideology and Urban Morphology

Unit IV: Delhi in 1947: Partition and its Aftermath

Unit V: Making of Contemporary Delhi: Displacement and Resettlement

Unit VI: Capital Culture: Public Spaces and Socialities

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-1. This unit should familiarise students with the city in light of the colonial past and the present. It will also help them locate the political developments for shaping of the city. **(Teaching time: 3 weeks Approx.)**

- Gupta, Narayani. (1999). *Delhi between the Empires: 1803-1931*. Delhi: OUP, pp. 1-20
- Farooqui, Amar. (2013). *Zafar and the Raj: Anglo-Mughal Delhi, 1800-1850*, Delhi: Primus Books, pp.106-133, (chap. 6: "The Palace and the City")
- C. M. Naim. (2004). ‘
- "Ghalib's Delhi: A Shamelessly Revisionist Look at Two Popular Metaphors," in *Urdu Texts and Contexts: The Selected Essays of C. M. Naim*, Delhi: Permanent Black, pp. 250-279.
- Gail Minault. (2003). "Master Ramchandra of Delhi College: Teacher, Journalist, and Cultural Intermediary," *Annual of Urdu Studies*, vol. 18, pp. 95-104

Unit-2. The unit examines political developments and their legacy during 1857 and how the rebellion in Delhi influenced its evolution. **(Teaching time: 3 weeks Approx.)**

- Gupta, Narayani. (1999). *Delhi between the Empires: 1803-1931*. Delhi: Oxford University Press, pp. 20-31, 50-66
- Lahiri, Nayanjot. (2003). "Commemorating and Remembering 1857: The Revolt in Delhi and its Afterlife," *World Archaeology*, vol. 35, no.1, pp. 35-60
- Dalrymple, William, (2006). *The Last Mughal: The Fall of A Dynasty*, Delhi: Penguin/Viking, pp. 193-229, 346-392. (Chap 6 "The Day of Ruin and Riot" and Chap. 10 "To Shoot Every Soul").

Unit-3. This segment enquires into the historical antecedents of some of the capital's contemporary issues. The section should apprise the students of the historical roots of the problems of sustainable urbanization with regards to Delhi. **(Teaching time: 2 weeks Approx.)**

- Metcalf, Thomas. (1989). *Imperial Visions*. Delhi: Oxford University Press, pp. 211-239, (Ch. 7 'New Delhi: The Beginning of the End').
- Johnson, David A. (2015). *New Delhi: The Last Imperial City*. Basingstoke: Palgrave 2015. (Chap. 8, "Land Acquisition, Landlessness and the Building of New Delhi").
- Mann, Michael. (2007). "Delhi's Belly: On the Management of Water, Sewage and Excreta in a Changing Urban Environment during the Nineteenth Century," *Studies in History*, Vol. 23:1, pp. 1-30

Unit-4. This section explores and reflects Delhi during and post-Partition. It examines physical and social transformation of Delhi from the colonial to the contemporary times.

(Teaching time: 2 weeks Approx.)

- Pandey, Gyan. (2001). *Remembering Partition*, Cambridge: Cambridge University Press. (Chapter 6: Folding the National into the Local: Delhi 1947-1948, pp. 121-151)
- Datta, V N. (1986). "Punjabi Refugees and the Urban Development of Greater Delhi," in Robert Frykenberg (ed), *Delhi Through the Ages: Essays in Urban History Culture and Society*. Delhi: OUP, pp 442-462
- Tan, Tai Yong and Gyanesh Kudaisya. (2000). *The Aftermath of Partition in South Asia*. New York: Routledge, pp 193-200, (Chap. 7, "Capitol Landscapes")

Unit-5: The unit examines and locates 'local' social, ecological and cultural processes that shape and reshape the city. **(Teaching time: 2 weeks Approx.)**

- Emma. Tarlo. (2000). "Welcome to History: A Resettlement Colony in the Making," in Veronique Dupont *et al* ed. *Delhi: Urban Spaces and Human Destinies*. Delhi: Manohar, pp. 75-94
- Soni, Anita. (2000). "Urban Conquest of Outer Delhi: Beneficiaries, Intermediaries and Victims", in Veronique Dupont *et al* (Ed.). *Delhi: Urban Spaces and Human Destinies*, Delhi: Manohar, pp. 75-94
- Ghosh, Amitav. (1985)., 'The Ghosts of Mrs Gandhi,' *The New Yorker*, (Available online: <https://www.amitavghosh.com/essays/ghost.html>)

Unit-6: The aim of this unit is to explore the historical antecedents of some of the capital's contemporary dilemmas. **(Teaching time: 2 weeks Approx.)**

- Beg, Mirza Farhatullah. (2012). *Bahadur Shah and the Festival of Flower-Sellers*, tr., Mohammed Zakir, Hyderabad: Orient Blackswan.
- Basu, Aparna. (1986). "The Foundations and Early History of Delhi University," in Robert Frykenberg ed, *Delhi Through the Ages: Essays in Urban History Culture and Society*, Delhi: Oxford University Press, pp 401-430
- Gupta, Narayani. (1994). 'From Kingsway to Rajpath-the Democratization of Lutyens' New Delhi,' in C. Asher and T.R. Metcalf, eds. *Perceptions of South Asia's Visual Past*. Delhi: Oxford University Press
- Sharma, Ravikant. (2016). "Architecture of intellectual sociality: Tea and coffeehouses in post-colonial Delhi," *City, Culture and Society*, vol. 7, 275-28

SUGGESTED READINGS:

- Farooqui, Mahmood. (2013). *Besieged: Voices from Delhi, 1857*. Delhi: Penguin. (Dateline pp. xix-xxvii; *In the Name of the Sarkar*, pp 407-432.)

- Mann, Michael and Samiksha Sehrawat. (2009). “A City with a View: The Afforestation of the Delhi Ridge, 1883-1913”, *Modern Asian Studies*, Vol. 43, No. 2, pp. 543-570
- Mann, Michael. (2005). ‘Turbulent Delhi: Religious Strife, Social Tension and Political Conflicts, 1803-1857,’ *South Asia: Journal of South Asian Studies*, vol.28, no.1, pp. 5-34
- Pilar, Maria Guerrieri, (2017). ‘The Megacity of Delhi: Colonies, Hybridisation and Old-New Paradigms,’ in *Rethinking, Reinterpreting and Restructuring Composite Cities* edited by Gülsün Sağlamer, Meltem Aksoy, Fatima Erkök, Cambridge: Cambridge Scholars Publishing, pp. 18-33
- Russell, Ralph. (1998). “Ghalib: A Self Portrait”, in Ralph Russell, *Ghalib: The Poet and His Age*. Delhi: OUP. Also available at:
http://www.columbia.edu/itc/mealc/pritchett/00ghalib/texts/txt_ralphrussell_1972.pdf
- Vazira, Fazila Yacoobali Zamindar. (2007). *The Long Partition and the Making of South Asia: Refugees, Boundaries, Histories*. New York: Columbia University Press. (Chapter I: Muslim Exodus from Delhi.)

Teaching Learning Process:

Classroom teaching supported by group discussions or group presentations on specific themes/readings. Given that the students enrolled in the course are from a non-history background, adequate emphasis shall be given during the lectures to what is broadly meant by the historical approach and the importance of historicising various macro and micro-level developments/phenomena. Interactive sessions through group discussions or group presentations shall be used to enable un-learning of prevailing misconceptions about historical developments and time periods, as well as to facilitate revision of issues outlined in the lectures. Supporting audio-visual aids like documentaries and power point presentations, and an appropriate field-visit will be used where necessary.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Two written submissions; one of which could be a short project, will be used for final grading of the students. Students will be assessed on their ability to explain important historical trends and thereby engage with the historical approach.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Imperial, British, Morphology, Contemporary History, Displacement, Resettlement, Capital

Skill Enhancement Course

SEC I

Understanding Heritage

Course Objectives:

The aim of this paper is to make students familiar with the concept of heritage and its numerous forms. It will develop the contested character of heritage and why and it needs to be conserved. Paper will also acquaint students with the evolution of heritage legislation and the ways in which its institutional framework developed. Accessing monumental or cultural heritage can be a very difficult task and economic and commercial consideration play an important role. The paper will be of particular value to those who are interested in seeking a career in the travel industry and art and cultural studies.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Explain the complex character of heritage.
- Analyse the historical processes which result into the making of heritage.
- Describe the significance of cultural diversity in the creation of heritage.
- Illustrate how heritage can be a medium to generate revenue
- Discern the nuances of heritage and will appreciate its importance.

Course Content:

Unit I: Defining heritage:

Meaning of ‘antiquity’, ‘archaeological site’, ‘tangible heritage’, ‘intangible heritage’ and ‘art treasure’

Unit II: Evolution of heritage legislation and the institutional framework:

- [a] Conventions and Acts -- national and international
- [b] Heritage-related government departments, museums, regulatory bodies
- [c] Conservation initiatives

Unit III: Challenges facing tangible and intangible heritage

Development, antiquity smuggling, conflict (specific cases studies)

Unit IV: Heritage and travel:

- [a] Viewing heritage sites
- [b] The relationship between cultural heritage, landscape and travel; recent trends

Unit V: A visit to a heritage site is an essential part of this course.

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: This unit will introduce the meaning/s of heritage and associated politics. For a better understanding students will be encouraged to engage with terms like the meaning of ‘antiquity’, ‘archaeological site’, ‘tangible heritage’, ‘intangible heritage’ and ‘art treasure’. **(Teaching time: 4 weeks Approx.)**

- Lowenthal, D. (2010). *Possessed By The Past: The Heritage Crusade and The Spoils of History*. Cambridge: Cambridge University Press.
- Lahiri, N. (2012). *Marshalling the Past- Ancient India and its Modern Histories*. Ranikhet: Permanent Black. (Chapter 4 and 5)
- Singh, U. (2016). *The Idea of Ancient India: Essays on Religion, Politics and Archaeology*. New Delhi: Sage. (Chapters 7, 8).

Unit-II: This unit deals with the history of heritage legislation. It also elaborates upon the institutional framework which manages heritage in India and at the global level. It will also examine the nature and relevance of conservation initiatives. **(Teaching time: 4 weeks Approx.)**

- Biswas, S.S. (1999). *Protecting the Cultural Heritage* (National Legislation and International Conventions). New Delhi: INTACH,
- Layton, R.P. Stone and J. Thomas. (2001). *Destruction and Conservation of Cultural Property*. London: Routledge.

Unit-III: This unit addresses the challenges posed in the conservation of tangible and intangible heritage. It also elaborates on the global character of the smuggling of antiquities and challenges faced by the national governments. **(Teaching time: 3 weeks Approx.)**

- Biswas, S.S. (1999). *Protecting the Cultural Heritage* (National Legislation and International Conventions). New Delhi: INTACH.
- Lowenthal, D. (2010). *Possessed By The Past: The Heritage Crusade and The Spoils of History*. Cambridge: Cambridge University Press.

Unit-IV: This unit deals with social efforts to identify heritage as something personal or national. Over time antiquities have frequently ‘travelled’ from their place of origin, the questions of ‘belonging’ are contentious and complex. **(Teaching time: 3 weeks Approx.)**

- Agrawal, O.P. (2006). *Essentials of Conservation and Museology*. Delhi: Motilal Banarsidas.

- Chainani, S. (2007). *Heritage and Environment*. Mumbai: Urban Design Research Institute.

SUGGESTED READINGS:

- Acts, Charters and Conventions are available on the UNESCO and ASI websites (www.unesco.org; www.asi.nic.in)

Teaching Learning Process:

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work towards pointing out the advantages of an interdisciplinary approach as students come in contact with field work and step into the shoes of critical observers of the remnants of the past and complex present conditions.

Assessment Methods:

Students will be assessed on the basis of regular group presentations and a detailed (individual) project submission-cum-presentation. The project should be a professionally written and referenced one, as well as creatively put together. The project has to be based on active field and library work and should reflect an analysis of primary source material and an engagement with secondary material.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Defining Heritage, National and International legislation, Government departments, Conservation, Tangible and intangible heritage, Travel

SEC-II

Archives and Museums

Course Objective:

The aim of this course is to make students familiar with the structure and functioning of archives and museums with a view to understand how history is written. The special focus of the paper will be India and it will enlarge on the relationship between the reading, writing and interpretation of history and the preservation and display of its manuscripts, art objects and heritage. It will show how carefully archives and museums organise their materials to create particular interpretations of the past. The paper will be of particular value to those who are interested in seeking careers as archivists or working in museums, art galleries and keepers of private and public collections.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Examine these two repositories of history from close quarters.
- Discuss the role of Colonialism in the growth of Archives and Museums.
- Explain how the documents and artefacts are preserved and the difficulties faced in the process.
- Demonstrate the way in which museums are organised and managed.
- Examine the considerations which govern the way exhibitions in museums are managed.

Course Content:

Unit 1: The Archive:

- a. Early Manuscript Collections (Jain, Persian, Sitamau Library)
- b. Colonialism and collections
- c. National project and the archive
- d. Taxonomies and cataloguing
- e. Project work: learn the cataloguing system of your college library and compare with the catalogue of a major collection (see online catalogues of Etne and Rieu).

Unit 2: The Museum

- a. The colonial gaze
- b. Artefacts

- c. The post-colonial state and the museum – project work: National Museum and National Gallery of Modern Art

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: This unit introduces students to the concept of Archive. It traces the history and nature of collections maintained since early times. It also deals with the impact of Colonial policies. The course examines the context for the establishment and maintenance of archives, and questions their purpose and institutions to manage it are examined. It also elaborates on the questions of access to the archival materials. Students will also be exposed to taxonomies and cataloguing. **(Teaching Time: 9 weeks Approx.)**

- Bhattacharya, Sabyasachi. (2018). *Archiving the Raj: History of Archival Policy of the Govt. of India with Selected Documents 1858- 1947*. Delhi: OUP
- Kathpalia, Y. P. (1973). *Conservation and Restoration of Archive Material*. Paris: UNESCO 1973
- Singh, Kavita. (2003). "Museum is National: The Nation as Narrated by the National Museum New Delhi" in Geeti Sen, (ed.), *India: A National Culture*. Delhi: Sage.
- Carol Breckenridge. (1989). "Aesthetics and Politics of Colonial Collecting India at World Fairs", *Comparative Studies in Society and History*, vol. 31, No 2 April, pp. 195-216
- Ravindran, Jayaprabha. (2013). 'Liberalization of access policy and changing trends of research in the National Archives of India, 1947–2007', *Comma*, vol. 2013, Issue 2, pp. 103-19. (<https://doi.org/10.3828/comma.2013.2.11>)
- Aziz, Sana. (2017). 'The Colonisation of Knowledge and Politics of Preservation', *Economic and Political Weekly*. Vol. 52, No.16 pp.

Unit-II: This unit introduces students to the concept of Museum. It traces the history of collection of artefacts and subsequent display in Museums. It also deals with the impact of Colonial policies. This unit elaborates upon distinct characteristics of collection. This unit tells the way museum are organised or presented. It also examines the considerations which govern the way exhibitions in museums are organised. Unit also examine the ways in which collections and Museums have catered to national project. **(Teaching time: 5 weeks Approx.)**

- Guha-Thakurta, Tapati. (2004). *Objects, Histories: Institution of Art in Colonial India*, New York: Columbia University Press.
- Choudhary, R. D. (1988). *Museums of India and their Maladies*. Calcutta: AgamPrakashan.
- Aggarwal, O. P. (2006). *Essentials of Conservation and Restoration and Museology*, Delhi: Sundeep Prakashan.
- Nair, S. N. (2011). *Bio-Deterioration of Museum Materials*, Calcutta: AgamPrakashan

- Mathur, Saloni.(2000). “Living Ethnological Exhibits: The Case of 1886”, *Cultural Anthropology*, Vol. 15 No. 4, pp 492-524
- Mathur, Saloni. (2007).*India by Design: Colonial History and Cultural Display*.Berkley: University of California.

Teaching Learning Process:

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work towards pointing out the advantages of an interdisciplinary approach as students come in contact with field work and step into the shoes of critical observers of the remnants of the past and complex present conditions.

Assessment methods:

Students will be assessed on the basis of regular group presentations and a detailed (individual) project submission-cum-presentation. The project should be professionally written and referenced, as well as creatively put together. The project has to be based on active field and library work and should reflect an analysis of primary source material and an engagement with secondary material.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Manuscripts, Collections, National Archives, Cataloguing, Artefacts, National Museum National Gallery of Modern Art

SEC-III

Indian Art and Architecture

Course Objective

This course aims to provide an understanding of Indian art forms from ancient to contemporary times, fostering appreciation of its diversity and plurality of aesthetic richness. The course begins with how Indian art was perceived in the west and the construction of the orientalist canon, laying stress on the primacy of religion and race in Indian art and superiority of Western aesthetics. It also explores the nationalist response, underlining the transcendental and metaphysical aspects of Indian art, which gave it its 'Indianess' and reviews new concerns in Indian art studies regarding its social context. The course studies three vital manifestations of Indian art, keeping in view the transitions in terms of style, material, historical contexts, regional variations, elite/popular art, patterns of patronage, representation of gender and the study of iconography of different works of art.

Learning Outcomes:

At the end of the course, the student should be able to:

- Explain how Indian art was perceived and received in the west under colonial rule and its changing perspectives. This will set the template for examining its various manifestations.
- Through specific examples the student will be able to identify the historical context, socio-economic processes that went in the formation of art and architectural forms.
- Identify the stylistic features of different genres of art.
- Discuss the iconography of art forms.
- Differentiate between high/courtly art, popular art/folk, and tribal art.
- Point out the continuity in patterns and regional variations.
- Elaborate patronage patterns, artist-patron relations and representation of gender.

Course Content

Unit I: Perspectives on Indian Art and Architecture.

- a. Historiography of Indian art: orientalist, nationalist and the making of 'Indian' art.
- b. Categories of classical/high/elite and popular/folk/tribal art and crafts; regional variations.

Unit II: Sculpture: styles, iconography.

- a. Gandhara and Mathura.
- b. Chola bronzes.
- c. Terracotta art.

Unit III: Architecture: forms, contexts.

- a. Sanchi: stupa and monastery architecture, pattern of patronage.
- b. Brihadeshwara: the Dravida style, imperial iconography.
- c. Khajuraho temple complex: the Nagar style, iconic scheme, patterns of patronage.
- d. Jama Masjid: the mosque of Shahjahanabad.
- e. Humayun's Tomb: Timurid prototype, introduction of the Persian chaharbagh.
- f. Sufi Dargahs: Nizamuddin Auliya dargah at Delhi.
- g. Construction of New Delhi and the imperial vision.

Unit IV: Painting: styles, representation, popular and folk.

- a. Ajanta Murals: characteristics, material culture.
- b. Mughal painting: formation of the school, features, themes, artist-patron relationship.
- c. Kangra painting: spectatorship and femininity.
- d. Colonial art and modernism in India: Raja Ravi Verma; the Bengal school; Amrita Sher-Gil; M. F. Husain.
- e. Folk, tribal art: Maithili painting.

Unit V: Field trips as a part of the Project work are strongly recommended: Visit the National Museum to see the differences in the treatment of:

- a. the human figure in Gandhara and Mathura art;
- b. iconography of Chola bronzes, religious and secular; terracotta figurines from different regions and time spans.
- c. Visit the National Museum to do a study of the sculptures from the gateway of the Sanchi stupa; temple sculptures from different regions.
- d. Visit the National Museum to study the palm leaf Buddhist illustrations and their comparison with Ajanta tradition.
- e. Visit the National museum to compare Mughal with other art of the book schools to understand their themes and aestheticism; to document the representation of the feminine in Kangra painting.
- f. Visit the National Gallery of Modern Art to study the original works of academic art of Raja Ravi Verma, the Bengal school and the modernists.
- g. Visit the National Crafts museum for folk arts and crafts, especially the work of Gangadevi, the Maithili artist.

- h. Visit DilliHaat/Surajkund Mela for studying the themes and technique of Maithili paintings.
- i. Field trips to modern day temples, like the Birla Mandir and the Malai Mandir. Consider how they are different or similar to the Khajuraho assemblage and the Brihadeshwara?
- j. Field trip to Jama masjid to study the architectural features and its comparisons with earlier mosques of Delhi.
- k. Do the Sufi dargah trail in Delhi.
- l. Compare Humayun's tomb with Nizamuddin dargah.
- m. Compare Humayun's tomb with Tughluq and Lodi tombs in Delhi, bringing out the new Mughal architectural features.
- n. Visit Mughal gardens at Rashtrapati Bhawan for modern renditions of the Persian chaharbagh.
- o. Field trip to Lutyens Delhi for a sense of a carefully designed capital. Compare with a post-independence neighbourhood – Model Town, for example.

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit-I: This unit introduces student to the historiographical issues related to study of Indian Art and how these have altered over time. Students will also be introduced to different categories of art; classical/high/elite and popular/folk/tribal art and crafts. **(Teaching Time: 2 Weeks Approx.)**

- Mitter, Partha. (2011). *Indian Art*, Delhi: Oxford University Press
- Dhar, P. P. (2011). ed. *Indian Art History Changing Perspective*, New Delhi: DK. (Introduction)
- Mitter, Partha. (1977). *Much Maligned Monsters: A History of European Reactions to Indian Art*, New Delhi: Oxford University Press

Unit-II: This unit examines historical development in the evolution of sculpture with special reference to stone, metal and terracotta. **(Teaching Time: 3 Weeks Approx.)**

- Huntington, Susan. (1985). *The Art of Ancient India: Buddhist, Hindu, Jain*, New York and Tokyo: John Weather Hill Inc.
- Mitter, Partha. (2011). *Indian Art*, Delhi: Oxford University Press
- Gupta S. P. (2006). *Elements of Indian Art*, Delhi: D.K. Print world
- Sivaramamurti C. (1962). *Indian Bronzes*, Bombay: Marg Publications
- Michell, George. (1977). *The Hindu Temple: An Introduction to its Meaning and Forms*, New Delhi, B.I Publications

- Dahejia, Vidya. (1992). 'Collective and Popular Bases of Early Buddhist Patronage: Sacred Monuments, 100 BC-AD 250, in Barbara Stoler Miller ed., *The Powers of Art: Patronage in Indian Culture*, New Delhi: OUP

Unit-III: This unit examines developments in architecture in India with reference to temples, mosques, forts and colonial buildings. Students are also introduced to the differing ideological underpinnings noticeable in architectural constructions. **(Teaching Time: 5 Weeks Approx.)**

- Thapar, Romila. (1992). "Patronage and Community", in Barbara Stoler Miller ed., *The Powers of Art: Patronage in Indian Culture*, New Delhi: Oxford University Press
- Mitter, Partha. (2011). *Indian Art*, Delhi: Oxford University Press
- Trainor, Kevin. (1996), 'Constructing a Buddhist Ritual Site: Stupa and Monastery Architecture', in Vidya Dehejia, ed., *Unseen Presence: The Buddha and Sanchi*, Bombay: Marg Publications
- Willis, Janice D. (1992). 'Female Patronage in Indian Buddhism', in Barbara Stoler Miller. (Ed.). *The Powers of Art: Patronage in Indian Culture*, New Delhi: Oxford University Press
- Champakalakshmi, R. (2011). 'Iconographic Programme and Political Imagery in Early Medieval Tamilakam: The Rajasimhesvara and Rajarajeshvara', in R. Champakalakshmi, *Religion, Tradition, and Ideology: Pre Colonial South India*, New Delhi: Oxford University Press
- Desai, Devangana. (1992). 'The Patronage of Lakshamana Temple at Khajuraho', in Barbara Stoler Miller ed., *The Powers of Art: Patronage in Indian Culture*, New Delhi: Oxford University Press
- Desai, Devangana. (2013). 'The Temple as an Ordered Whole – The Iconic Scheme at Khajuraho', in Devangana Desai, ed., *Art and Icon – Essays on Early Indian Art*, New Delhi: Aryan Books International
- Asher, Catherine B. (1992). *The New Cambridge History of India: Architecture of Mughal India, I.4*, Cambridge: Cambridge University Press
- Dehlvi, Sadia. (2012). *The Sufi Courtyard – Dargahs of Delhi*, New Delhi: Harper Collins
- Metcalf, Thomas R. (1986). 'Architecture and Empire – Sir Herbert Baker and the Building of New Delhi' in R. E. Frykenberg, ed., *Delhi Through the Ages: Essays in Urban History, Culture and Society*, Delhi: OUP
- Sharma, Y. D. (2001). *Delhi and its Neighbourhood*, New Delhi: ASI (also in Hindi: *Dilli Aur Uska Aanchal*, Delhi: ASI).

Unit-IV: This unit deals with the traditions of Painting in India with reference to Mural, miniature; Mughal and Rajputs. It also examines major trends of painting during the national movement and in contemporary India. **(Teaching Time: 4 Weeks Approx.)**

- Huntington, Susan. (1985). *The Art of Ancient India: Buddhist, Hindu, Jain*, New York and Tokyo: John Weather Hill Inc.
- Gupta S. P. (2006). *Elements of Indian Art*, Delhi: D.K. Print world
- Verma, S. P. (2005), *Painting the Mughal Experience*, Delhi: Oxford University Press
- Chaitanya, Krishna. (2002). *A History of Indian Painting: Pahari Traditions*, Delhi: Abhinav Publications
- Jain, Jyotindra. (1994). 'Gangadevi: Tradition and Expression in Mithila (Madhubani) Painting', in Catherine B. Asher and Thomas R. Metcalf eds., *Perception of South Asia's Visual Past*, New Delhi: AIIS, Oxford University Press
- Mitter, Partha. (2011). *Indian Art*, Delhi: Oxford University Press

SUGGESTED READINGS:

- Dhar, Parul Pandya. (2011). "Introduction – A History of Art History: The Indian Context", in Parul Pandya Dhar, (Ed.). *Indian Art History: Changing Perspectives*, New Delhi: D. K. Printworld and National Museum Institute
- Thakurta, Tapati Guha. (1994). "Orientalism, Nationalism and the Reconstruction of 'Indian' Art in Calcutta", in Catherine B. Asher and Thomas R. Metcalf. (Eds.). *Perception of South Asia's Visual Past*, New Delhi: AIIS, Oxford University Press, pp. 46-65.
- Desai, Devangana. (1990). 'Social Dimensions of Art', *Social Scientist*, vol. 18, no. 202, pp. 3-32.
- Ray, N.R. (1974). *An Approach to Indian Art*, Chandigarh: Publication Bureau
- Nehru, Lolita. (1989). *Origins of the Gandhara style: A study of Contributory Influences*, Delhi: Oxford University Press
- Dar, S. R. (1994). 'Classical Approaches to the Study of Gandhara Art', in Catherine B. Asher and Thomas R. Metcalf eds., *Perception of South Asia's Visual Past*, New Delhi: AIIS, Oxford University Press
- Srinivasan Doris M. (1989). (Ed.). *Mathura: The Cultural Heritage*, New Delhi: American Institute of Indian studies and Manohar Publishers
- Sivaramamurti, C. (1962). *Indian Bronzes*, Bombay: Marg Publications
- Poster, Amy G. (1986). *From Indian Earth: 4000 Years of Terracotta Art*, New York: the Brooklyn Museum
- Misra, Neeru and Tanay Misra (2003). *The Garden Tomb of Humayun: An Abode in Paradise*, Delhi: Aryan Books International
- Metcalf, T. R. (1989). 'New Delhi: The Beginning of the End', in T. R. Metcalf, *An Imperial Vision, Indian Architecture and Britain's Raj*, Delhi: OUP. pp 211-39.
- M.K. Dhavalikar, M. K. (1994). *Ajanta: The Perception of the Past* in Catherine B. Asher and Thomas R. Metcalf eds., *Perception of South Asia's Visual Past*, New Delhi: AIIS, OUP

- Aitken, Molly Emma. (1997). 'Spectatorship and Femininity in Kangra Style Painting', in Vidya Dehejia ed., *Representing the Body: gender issues in Indian Art*, New Delhi: Kali for Women in association with the Book Review Literary Trust
- Mitter, Partha. (1999). *Art and Nationalism in Colonial India 1850-1922: Occidental Orientations*, Delhi: Cambridge University Press
- Gupta, Dr. Parmeshwari Lal. (2006). *Bhartiya Vastukala*, Varanasi: VishvidalayaPrakashan
- Singh, Arvind Kumar and Shivakant Dwivedi. (2005). *Bhartiya Vastutatha Kala keMooltatva*, Bhopal: M. P. Hindi Granth Academy
- Agarwal, Dr. Vasudeva. (2008). *PracheenBharatiya Stupa, Guha aivam Mandir*, Patna: Bihar Granth Academy
- Srinivas, K. R. *Dakshin Bharat keMandir*, Delhi: NBT
- Dev, Krishna. *Uttar Bharat ke Mandir*, Delhi: NBT
- Guide Books published by ASI on Ajanta , Sanchi.
- Shivramamurthy, C. *BharatiyaChitrakala*, Delhi: NBT.
- Tarak Nath Barediya, Tarak Nath. (2004), *BharatiyaChitrakala Ka Itihas*, Delhi: National Publishing House
- Goswami, Premchand. (1999). *BharatiyaChitrakala ka Itihas*, Jaipur: PanchsheelPrakashan
- Thakran, R. C., Shiv Kumar and Sanjay Kumar. (2013). (Eds.). *BharatiyaUpmahadwipkiSanskritiya*, Vol.I &II, Delhi: Hindi MadhyamKaryanvayaNideshalaya
- Kashyap, Krishna Kumar and Shashbala. *Mithila Lokchitra*, Delhi: NBT.

Teaching Learning Process:

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work towards pointing out the advantages of an interdisciplinary approach as students come in contact with field work and step into the shoes of critical observers of the remnants of the past and complex present conditions.

Assessment Methods:

Students will be assessed on the basis of regular group presentations and a detailed (individual) project submission-cum-presentation. The project should be a professionally written and referenced one, as well as creatively put together. The project has to be based on active field and library work and should reflect an analysis of primary source material and an engagement with secondary material.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Indian Art, Sculpture, Gandhara, Mathura, Chola Bronze, Architecture, Sanchi, Dravida and Nagara, Jama Masjid (Shahjahanabad), Humayun's Tomb, Dargahs Paintings, Murals, Ajanta, Miniature, Mughal, Kangra, Raja Ravi Verma, Amrita Sher-Gil, M.F. Husain, Painting

SEC-IV

Understanding Popular Culture

Course Objective:

The course aims to provide an overview of the various forms of the subcontinent's popular cultural practices, expressed through oral, visual and other mediums. Exploring the interface between various forms of popular culture and their historical evolution, the objective would be to sensitize learners to the rapidly evolving domain of popular culture. The course will enable students to grasp significant differences in cultural types as well as assess the impact of different types of cultural expressions on society.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Discuss the range of theoretical perspectives that define popular culture,
- Describe the methodological issues involved in a historical study of popular culture,
- Identify the relevant archives necessary for undertaking a study of popular culture, while pointing out the problems with conventional archives and the need to move beyond them
- Interpret these theoretical concerns through a case study,
- Examine the role of orality and memory in popular literary traditions,
- Demonstrate the evolution of theatre and dance within the popular performative traditions,
- Analyse the role of technology in the transformation of music from elite to popular forms,
- Examine the relationship between recipes/recipe books and the construction of national/regional identities,
- Discuss the history of the cultures of food consumption and its relationship with the constitution of a modern bourgeoisie.
- With specific reference to art, media and cinema, examine the processes through which a pattern of 'public cultural consumption' emerged in contemporary times

Course Content:

Unit 1: Defining Popular Culture: Popular Culture as Folk Culture, Mass Culture- High Culture, People's culture

Unit 2: Visual expressions: folk art, calendar art, photography, advertisements

Unit 3: Oral culture/ performances: folktales, folk theatre with social messages and themes- *swang* and *nautanki*; music- folksongs and folkdances

Unit 4: The audio-visual medium: cinema, television and internet

- (a) Indian cinema: major themes and trends like freedom struggle and nation building
- (b) Television: Case study of televised serials, Ramayana, Women and Family

Unit 5: Fairs, festivals and rituals, pilgrimage: disentangling mythological stories; patronage; religion as culture

Unit 6: Food Cultures: Regional cuisines and the National Project

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit I: This unit will introduce students to the ways popular culture has been defined and also make them understand different sub-categories of popular culture. **(Teaching Time: 3 weeks Approx.)**

- Storey, J. (2001). *Cultural Theory and Popular Culture*. London: Routledge. (Chap. 1, 'What is Popular Culture', pp. 1-17)
- Burke Peter, (1978). *Popular Culture in Early Modern Europe*. New York: New York University Press. pp. 3-88. (Chap. 1, 'The Discovery of the People'; Chap. 2, 'Unity and Variety in Popular Culture' Chap. 3, 'An Elusive Quarry')

Unit II: This unit will explore the Visual expressions with specific reference to folk art, calendar art, photography, and advertisements to explain the manifestations of popular culture. **(Teaching Time: 3 weeks Approx.)**

- Princy C. (1998). *Camera Indica: The Social Life of Indian Photographs*. Chicago: University of Chicago Press. (Introduction and Conclusion)
- Uberoi Patricia. (2006). 'Unity in Diversity? Dilemmas of Nationhood in Indian Calendar Art', in Dilip M. Menon (ed), *Readings in History: Cultural History of Modern India*. Delhi: Social Science Press, pp.113-153
- ओबेरॉय,पेट्रीशिया. (2010). 'अनेकतामेंएकता?भारतीयकैलेंडरआर्टमेंराष्ट्रीयताकीदुविधा' inदिलीप. एम. मेनन, आधुनिकभारतकासांस्कृतिकइतिहास, देहली:ओरियंटब्लेकस्वान.
- Jayakar, Pupa. (1980). *The Earthen Drum : an Introduction to the Ritual Arts of Rural India*, Delhi: National Museum of India.
- <http://visionsofindia.blogspot.in/p/history-of-photography-in-india.html>
- <https://lens.blogs.nytimes.com/2015/06/18/indias-earliest-photographers/>
- <http://www.bjp-online.com/2015/06/the-new-medium-exhibiting-the-first-photographs-ever-taken-in-india/>

Unit III: This unit will introduce students to the world of Oral culture and performances. Multiple mediums like folktales, folk theatre; *swang* and *nautanki*, along with folksongs and folk-dances will be examined. **(Teaching Time: 2 weeks Approx.)**

- शुक्लध्रुव. (2015). 'लोक - आख्यान : यशकीघोषणा', तानाबाना, प्रवेशांक, pp. 19-26
- Islam, Mazharul. (1985). Folklore, "The Pulse of the People (in the context of Indic Folklore)", *Ranchi Anthropology Series – 7*, New Delhi: Concept Publishing Company.
- Bharucha, Rustam. (2003). *Rajasthan: An Oral History, Conversations with Komal Kothari*, Delhi: Penguin, chap 1, 'The Past in the Present: Women's Songs', pp. 16-35
- <http://ccrtindia.gov.in/performingart.php>

Unit IV: This unit will explore the audio-visual medium: cinema, television and internet. In what ways has the audio-visual medium shaped the popular? **(Teaching Time: 3 weeks Approx.)**

- Raghavendra, M.K. (2016). *Bollywood, Oxford India Short Introductions*, Delhi: OUP.
- श्रीवास्तव, संजीव. (2013). 'समय, सिनेमा और इतिहास: हिंदी सिनेमा के सौ साल', नई दिल्ली: प्रकाशन विभाग, सूचना और प्रसारण मंत्रालय, भारत सरकार.
- Chakravarty Sumita S. (2006). 'National Identity and the Realist Aesthetic' in Dilip M. Menon ed, *Readings in History: Cultural History of Modern India*, Delhi: Social Science Press, pp. 81-112.
- चक्रवर्ती, सुमिता. एस. (2010). 'राष्ट्रीय पहचान और यथार्थवाद: दीर्घासौन्दर्य बोध' in दिलीप. एम. मेनन, आधुनिक भारत का सांस्कृतिक इतिहास, देहली: ओरियंट ब्लैकस्वान, pp. 101-29.
- Dissanayake W. and K.M. Gokul Singh, (1998). *Indian Popular Cinema, A Narrative of Cultural Change*. New Delhi : Orient Longman,
- Fiske, John. (2001). *Television Culture: Popular Pleasures and Politics*. London: Routledge. (This edition published in the Taylor & Francis e-Library, 2001) Chap. 1, pp. 1-20
- Spracklen, Karl. (2015). *Digital Leisure, the Internet and Popular Culture: Communities and identities in a Digital Age*. London: Palgrave Macmillan, pp. 1-52.

Unit V: This unit will explain the complex relationship between religion, myth and popular culture and discuss how fairs, festivals, rituals and pilgrimage have shaped popular culture. **(Teaching Time: 2 weeks Approx.)**

- Jha, Makhan. *Dimensions of Pilgrimage, An Anthropological Appraisal*. New Delhi: Inter – India Publications.
- Bharadwaj, R.M. (2015). *Vratas and Utsavas in North and Central India*, New Delhi: Eastern Book Linkers.

- Visual Pilgrim Project: Mapping Popular Visuality with Devotional Media at Sufi Shrines and other Islamic Institutions in South Asia

Unit VI: This unit will examine the multiple ways in which regional cuisines have marked cultural and social diversity and the ways in which these have been appropriated in the process of nation making. **(Teaching Time: 1 week Approx.)**

- Appadurai, Arjun. (1988). 'How to Make a National Cuisine: Cookbooks in Contemporary India', *Comparative Studies in Society and History*, Vol. 30, No. 1, pp. 3-24
- Ray, Utsa. (2014). *Culinary Culture in Colonial India: A Cosmopolitan Platter and the Middle Class*, Cambridge: Cambridge University Press.

SUGGESTED READINGS:

- Ahmed, Omar. (2015). *Studying Indian Cinema*, UK: Auteur.
- Chandra, Nandini. (2008). *The Classic Popular Amar Chitra Katha, 1967-2007*, Delhi: Yoda Press.
- Gujral, Diva and Nathaniel Gaskell. (2019). *Photography in India: A Visual History from the 1850s to the Present*. London: Prestel
- Henderson, Carol. E. (1954). *Culture and Customs of India*. Westport: Greenwood Press, South Asian edition.
- Kasbekar, Asha. (2006). *Popular Culture India!: Media, Arts and Lifestyle*. Santa Barbara: ABC-CLIO, 2006
- Oberoi, Patricia. (2009). *Freedom and Destiny: Gender, Family and Popular Culture in India*. Delhi: Oxford University Press.
- Storey, John. (1996). *Cultural Studies and the Study of Popular Culture: Theories and Methods*, Edinburgh: Edinburgh University Press.
- Vatuk, Ved Prakash. (1979). *Studies in Indian Folk Traditions*, New Delhi: Manohar, 1979.
- Vidyarthi, L. P. ed. (1973). *Essays in Folklore* (Papers presented at the Centenary Festival of Rai Bahadur S. C. Roy). Calcutta: Indian Publications.
- कुमार, इला (2015). 'संस्कृतिकामूल्यबोध', तानाबाना, प्रवेशांक, pp. 102-104.

Teaching Learning Process:

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work

towards pointing out the advantages of an interdisciplinary approach as students come in contact with field work and step into the shoes of critical observers of the remnants of the past and complex present conditions.

Assessment Methods:

Students will be assessed on the basis of regular group presentations and a detailed (individual) project submission-cum-presentation. The project should be a professionally written and referenced one, as well as creatively put together. The project has to be based on active field and library work and should reflect an analysis of primary source material and an engagement with secondary material.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Folk Culture, High Culture, Folk Art, Photography, Cinema, Television, Regional and National Cuisine

Skill Enhancement Paper V

Historian's Craft

Course Objective:

This course aims to familiarise students with what it means to historicize human activities. It seeks to equip students with an understanding of what historians do, i.e. exploring causation, contingency, understanding human experiences, comprehending factors affecting human life and its surroundings, identifying structuring social forces. It examines how historians choose a historical frame, contextualize, and use different social categories like class, caste, gender, race, region, religion when producing a historical narrative. The course also discusses how to locate a source for history writing, check the credibility of sources, and distinguish between different kinds of sources. By familiarising the students with the essential tools of historical analysis, the course shall enable them to examine primary sources and their application to address a historical issue, problem or interpretation.

Learning outcomes:

On successful completion of this course, the students shall be able to:

- Outline / illustrate the need for historical perspective
- Explain the historical nature of all human activities and social sphere
- Distinguish essential features of historical inquiry
- Identify a social phenomenon and use a historical perspective to contextualize the concerned phenomenon, i.e. trace its changing nature / dynamics.
- Delineate sources that can be used to describe and interpret a social issue, an event, a given time period, or a wider social development.
- Differentiate between sources and assess their credibility in defining a historical development
- Demonstrate the ability to interpret sources, and to identify biases and blind spots in a historical narrative.

Contents

Unit 1: Historicizing Human Activities

Unit 2: The Historian's Craft

Unit 3: Sources and interpretations

Unit 4: Primary sources in application

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit 1: This unit shall explore the meaning of historical thinking/historical perspective. **(Teaching time: 2 weeks Approx.)**

- Schlabach, Gerald. *A Sense of History: Some Components*
- <http://www.geraldschlabach.net/about/relationships/benedictine/courses/handouts/sense-of-history/>
- Bloch, Marc. (1992). *The Historian's Craft*, Manchester University Press. Reprint ("Introduction", pp. 1-19).
- Hobsbawm, Eric J. (1998). *On History*, UK: Abacus (Ch.2, "A Sense of the Past", and Ch. 3, "What Can History Tell Us About Contemporary Society").
- Daniels, Robert V. (1981), *Studying History: How and Why*, third edition, Englewood Cliffs, N.J.: Prentice-Hall, pp.11-13 and 25-39.

Unit-II: This unit shall help students identify historical contexts, arguments, causation, facts and generalization. **(Teaching time: 3 weeks Approx.)**

- Carr, E.H. (1991). *What is History*. Penguin. Reprint. (Ch.1, "The Historian and His Facts", Ch.3, "History, Science and Morality", and Ch.4, "Causation in History").
- Daniels, Robert V. (1981), *Studying History: How and Why*, third edition, Englewood Cliffs, N.J.: Prentice-Hall, pp.47-61.

Unit-III: This Unit shall introduce students to essential aspects about sources and their application; namely, differing sources, truth, bias, discourse, questions and analytical frameworks. **(Teaching time: 5 weeks Approx.)**

- Jordonova, Ludmilla. (2000). *History in Practice*, London/New York: Arnold and Oxford University Press Inc., pp.27-57, 92-112 and 184-193 (Ch.2, "Mapping the Discipline of History", Ch.4, "The Status of Historical Knowledge", and Ch.7, "Historians' Skills").
- Daniels, R. V. (1981). *Studying History: How and Why*. Third edition. Englewood Cliffs, N.J.: Prentice-Hall, pp.76-97 and 104-110.
- Tosh, J. (2002). *In Pursuit of History*. Revised third edition. London, N.Y., New Delhi: Longman (Ch.4, "Using the Sources").

Unit-IV: This unit shall make students apply their understanding of historical analysis to examine sources from ancient, medieval, modern and contemporary time periods. [*Students are*

to choose from the list of sources given below and should examine any two sources.] (Teaching time: 4 weeks Approx.)

- Buitenen, J.A.B. van. (Trans.) (1973). "Chapters 62 to 69 - Adi parvan." in *The Mahabharata –Volume I, The Book of the Beginning*. Chicago: Chicago University Press; Johnson, W.J. (Trans.) (2001). "Acts 4, 5 and 6." *The Recognition of Śakuntala: A Play in Seven Acts; Śakuntala in the Mahabharata*. Oxford: Oxford University Press. With secondary reading Thapar, Romila. (1999), *Shakuntala: Texts, Readings, Histories*. New York: Columbia University Press, pp. 22-62.
- "Allahabad posthumous stone pillar inscription of Samudragupta." in Fleet, J.F. (Ed.). (1888). *Corpus Inscriptionum Indicarum Vol. III*. Calcutta: Superintendent of Government Printing, pp.1-17. With secondary reading Goyal, S.R. (1967). *History of the Imperial Guptas*. Allahabad: Central Book Depot (Chapter 2).
- Interface between settled communities and the forest as reflected in:
 - (A) "Section CCXXVIII to Section CCXXXI: Khandava-daha Parva." In *Mahabharata*. Available at <https://www.sacred-texts.com/hin/m01/m01232.htm> With secondary reading Thapar, Romila. (2007). "Forests and Settlements, in Mahesh Rangarajan, (ed.). *Environmental Issues in India*. New Delhi: Pearson, pp.33-41 (Also available in Hindi translation). Zimmerman, F. (1987). *Jungle and the Aroma of Meats: An Ecological Theme in Hindu Medicine*. Berkeley: University of California Press ("Introduction").
 - (B) *Āṅgulimālasutta* of the *Majjhima Nikāya* in *The Collection of the Middle Length Sayings – Three Volumes*. Translated by I.B. Horner. (1957, 1996). Volume II. London: The Pali Text Society, pp. 284-292, n.86. With secondary reading Brancaccio, P. (1999). "Āṅgulimāla or the Taming of the Forest." *East and West* 49 (1/4), pp. 105-118.
- "X 1-90." *Manusmṛiti*. Translated by G. Buhler. (1886). Oxford: Clarendon Press. pp. 401-421. With secondary reading Sahu, B. P. (2009). "Brahmanical Conception of the Origin of Jatis: A Case Study of the Manusmṛiti" in B. D. Chattopadhyaya. (2009). *A Social History of Early India*. Delhi: Pearson Longman, pp. 43-53.
- See the Vijayanagara inscriptions in Rao, T.A. Gopinatha. (1915-16). "Triplicane Plates of Panta-Mailara, dated Saka-Samvat 1350, in the reign of Devaraya II", Vol 13, pp.1-11. See also online:
- <https://ia801606.us.archive.org/9/items/in.ernet.dli.2015.56662/2015.56662.Epigraphia-Indica-Vol13.pdf> – see pp.1-11 in this document. With secondary reading Wagoner, Philip. (1996). "Sultan among Hindu Kings: Dress, Titles, and the Islamicization of Hindu Culture at Vijayanagara." *Journal of Asian Studies* 55 (4), pp. 851-80.
- Abu'lFazlAllami. *Ain-i Akbari*. Translated by H.S. Jarrett. (1949, 2006). Vol. III. Delhi: Low Price Publications, pp. 1-11, with secondary reading Ali, Athar. (1980). "Sulh-i Kul and the Religious Ideas of Akbar." in *Proceedings of Indian History Congress* 41, pp. 326-39.

- Malik Muhammad Jaisi. *Padumawat*. Translated by V.S. Agrawal (2010). Allahabad: Lok Bharti Prakashan, pp. 508-556. With secondary reading Sreenivasan, Ramya. (2007). *The Many Lives of a Rajput Queen: Heroic Pasts in India C. 1500–1900*. Washington: University of Washington Press (Ch.2, “Sufi Tale of Rajputs in Sixteenth century Avadh”); Saksena, Banarsi Prasad. (1992). “The Khaljis: AlauddinKhalji.” in Mohammad Habib and Khaliq Ahmad Nizami, (Eds.). *A Comprehensive History of India: The Delhi Sultanat (A.D. 1206-1526)*. Second edition. New Delhi: The Indian History Congress / People's Publishing House.
- Emmanuel-Joseph Sieyès (1789). *What is the Third Estate?* [Available at: <https://pages.uoregon.edu/dluebke/301ModernEurope/Sieyes3dEstate.pdf>]. With secondary reading Bossenga, Gail. (1997), “Rights and Citizens in the Old Regime.” *French Historical Studies* 20 (2), pp. 217-243.
- “The 1905 Revolution.” in Gregory L. Freeze (1988). *Supplication to Revolution: A Documentary Social History of Imperial Russia*. Oxford University Press, pp. 274-285.
- The Azimgarh Proclamation (25 August 1857).” in Mukherjee, Rudrangshu. (2018). *The Year of Blood: Essays on the Revolt of 1857*. N.Y.: Routledge and Social Science Press, pp. 23-27. With secondary reading Mukherjee, Rudrangshu. (2018). *The Year of Blood: Essays on the Revolt of 1857*. N.Y.: Routledge and Social Science Press (“Introduction” and “The Azimgarh Proclamation and Some Questions on the Revolt of 1857 in the Northwestern Provinces”).
- “The Personal Becomes Public: Dilliwalas and the Uprising.” In Mahmood Farooqui (2010), (trans.). *Besieged: Voices from Delhi 1857*. New Delhi: Penguin Books/Viking.
- H. H. Risley. (1908). *The People of India*. Calcutta, London: Thacker, pp. xi-xxi; 5-17; 128-148; 178-213. With secondary reading Dirks, Nicholas. (2001). *Castes of Mind: The Enumeration of Caste: Anthropology as Colonial Rule*. New Jersey: Princeton University Press (“The Enumeration of Caste: Anthropology as Colonial Rule”).
- “Mr. DadabhaiNaoroji at Walthamstow-‘India must be bled’.” (*Poverty and un-British Rule in India*. Available at: http://historydepartmentphilos.weebly.com/uploads/2/6/6/1/26612531/poverty_and_unbritish_rule_in_india_by_dadabai_naoroji.pdf. With secondary reading Chandra, Bipin. (2010), *The Rise and Growth of Economic Nationalism in India*, Har-Anand Publishers, revised edition.
- “Chapter 14: Statement in the Sessions Court” (Bhagat Singh’s writings). In *Inquilab: Bhagat Singh on Religion and Revolution*. Irfan, Habib, S. (Ed.). (2018). Delhi: Yoda Press.
- “Chapters 2, 3 and 7.” *Report of the Kanpur Riots Enquiry Committee, 1931*. Delhi: National Book Trust, pp. 19-52 and pp.123-140. With secondary reading Chandra, B. (2008). *Communalism in Modern India*. Delhi: Har-Anand, and Pandey, G. (1994). in David Arnold and David Hardiman, (ed.). *Subaltern Studies VIII: Essays in Honour of Ranajit Guha*. New Delhi: Oxford University Press, pp.195-203 (“Prose of Otherness”).

- Begum Anis Kidwai. *Azadi ki Chaon Mein*. Translated by Ayesha Kidwai. (2011). In *Freedom's Shade*. New Delhi: Penguin, pp. 19-34; 215-246 and pp. 281-296. With secondary reading Pandey, G. (1994). in David Arnold and David Hardiman, (eds.). *Subaltern Studies VIII: Essays in Honour of Ranajit Guha*. New Delhi: Oxford University Press, pp.213-221 ("Prose of Otherness").
- B.R. Ambedkar, *Twenty-Two Vows Administered on Conversion*. in Omvedt, Gail. (2003). *Buddhism in India: Challenging Brahmanism and Caste*. New Delhi: Sage Publications, pp. 261–262, with secondary reading Rodrigues, V. (Ed.). (2002). *The Essential Writings of B. R. Ambedkar*. New Delhi: Oxford University Press.
- Press note on the special camp in Kasturba Hospital, inaugurated on Dec. 26, 1975; Press note on the application of incentives to sterilization, Apr. 19, 1976; Office order on measures to be taken to ensure officers comply with sterilization laws, Apr. 15, 1976, with sterilization targets for Apr. 14 to 30, 1976; Request of sterilization certificate made to all Civil Line Municipal Corporation's eligible employees, Apr. 26, 1976, uploaded by John Dayal on <https://qz.com/india/296395/heres-proof-that-india-has-been-in-a-state-of-emergency-for-37-years/>. With secondary reading Tarlo, Emma. (2000). in Veronique Dupont et al, (eds.). *Delhi: Urban Spaces and Human Destinies*. Delhi: Manohar Publishers and Distributors, pp.75-94 ("Welcome to History: A Resettlement Colony in the Making"). (r) "Introduction". *Report of Justice Verma Committee, 2013*. Available at <http://apneap.org/wp-content/uploads/2012/10/Justice-Verma-Committee-Report.pdf>. With secondary reading, i.e. Cagna, Paola and Nitya Rao. (2016). "Feminist Mobilisation for Policy Change on Violence Against Women: Insights from Asia." *Gender and Development* 24 (2), pp. 277-290.

SUGGESTED READINGS:

- Tosh, John. (2002). *In Pursuit of History*. Revised third edition. London, N.Y., New Delhi: Longman ("Historical Awareness", Ch.5, "The Themes of Mainstream History" and Ch.6, "Writing and Interpretation").
- Becker, Carl. (1931). *American Historical Review* 37 (January), pp. 221-36, reprinted in Adam Budd (Ed.). (2009). *The Modern Historiography Reader*. London and N.Y: Routledge ("Everyman His Own Historian", Presidential Address).
- Bloch, Marc. (1992). *The Historian's Craft*, Manchester: Manchester University Press, reprint, pp. 190-197; 60-69 and 138-144.
- Jordonova, Ludmilla. (2000). *History in Practice*. London/New York: Arnold and Oxford University Press Inc., pp. 163-171 and 173-183 (Ch.6, "Public History" and "Ch.7, "Historians' Skills").
- Postan, M.M. (1971). *Facts and Relevance: Essays on Historical Method*. Cambridge: Cambridge University Press ("Fact and Relevance, History and the Social Sciences in Historical Study").

- Topolski, Jerzy. (1976). *Methodology of History*, translated by Olgierd Wojtasiewicz, D. Reidel Publishing Company (Ch.10, “Historical Facts”, Ch.11, “The Process of History” – the section on Causality and Determinism, Ch.18, “The Authenticity of Sources and the Reliability of Informants”, Ch.19, “Methods of Establishing Historical Facts.”)
- Arnold, J.H. (2000). *History: A Very Short Introduction*. Oxford: Oxford University Press (Ch.3. & Ch.7)
- Smith, Bonnie G. (1998). *The Gender of History: Men, Women and Historical Practice*. Cambridge, M.A.: Harvard University Press, reprinted in Adam Budd. (Ed.). (2009). *The Modern Historiography Reader*. London and N.Y: Routledge, pp. 70-79, 81-87, 89-91 (“What is a Historian?”).
- Hobsbawm, Eric J. (1998). *On History*. UK: Abacus (Ch. 21, “Identity History is Not Enough”).
- Kosambi, D.D. (2005). *Combined Methods in Indology and Other Writings*, compiled, edited and introduced by Brajadulal Chattopadhyaya. New Delhi: Oxford University Press.

Teaching Learning process:

The course will be taught through classroom lectures which will cover subjects on historical awareness, sense of the past, contours of the historical approach, varied nature of sources and categories/historical frames used by historians. These lectures shall be combined with group discussions on specific readings, screening of interviews of historians who explain how they began researching on/revisiting a particular issue/period/event, etc. Regular student presentations, short write-ups and a project shall be assigned on themes like myth and history; history and memory; the past vs study of the past, history as a social science; delineating sources that can be used for a historical inquiry on themes such as everyday life in a bustling city, an educational institution, labour migration, censorship and Indian cinema, the Aravallis, the Northern Ridge (Delhi), family heirloom, an industrial tragedy, Ghazipur landfill, refugee communities in Delhi, etc.; and experience with reading a primary source.

Assessment Methods:

Students will be regularly assessed for their grasp on debates and discussions covered in class. Student presentation/group discussion and two written submissions; one of which could be a project, will be used for final grading of the students. Students will be assessed on their ability to distinguish the historical perspective and explain important tools of historical analysis.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Historical Thinking, Perspectives, Facts, Historical Contexts, Interpretation of Sources, Discourses, Analysis

SEC-VI
History, Sociology and Anthropology

Course Objective

The purpose of this course is to introduce students to the interdisciplinary field of Sociological-Anthropological History. Through this course students will (a) explore the historical relationship between History, and Sociology-Anthropology, and (b) familiarise themselves with the challenges of archival and field-work for historical research. The course will equip students to undertake historical study that is sensitive to the underlying structures and meanings of texts, practices/performances and oral traditions of historical value.

Learning Outcomes:

Upon completion of this course the student shall be able to:

- Analyse the cultural meanings of texts and undertake field-work relating to oral and social practices
- Distinguish between the history, theory and practice of Sociological-Anthropological History.
- Discuss the relevance of historical ethnography applicable to a variety of vocational areas.
- Describe the significance of Sociological-Anthropological History to examine the questions of gender, religion and environment.

Course Content

Unit 1: The Field of Sociological-Anthropological History: Beginnings, history and present configurations, with special reference to nature of archives, oral traditions, and dynamics of ritual practice and performance.

Unit 2: Sociological-Anthropological Histories: State, Society and Economy

Unit 3: Sociological-Anthropological Histories: Religion, Gender and Environment

Unit 4: Case Study

ESSENTIAL READINGS AND UNIT WISE TEACHING OUTCOMES:

Unit 1: In this unit, students will be introduced to a brief history of the field of Sociological-Anthropological History through a study of its origins, developments and present directions. They will be given a sense of the field's interdisciplinarity, and importance for historical research and study. **(Teaching time: 4 weeks Approx.)**

- Dube, Saurabh. (2009). *Historical Anthropology*. (“Introduction)
- Cohn, B. (1980). “History and Anthropology: The State of Play,” *Comparative Studies in Society and History*, vol. 22 (2), pp. 198-221.
- Geertz, C. (1990). History and Anthropology. *New Literary History*, 21(2), 321-335.
- Mathur, S. (2000). History and Anthropology in South Asia: Rethinking the Archive. *Annual Review of Anthropology*, 29, 89-106.

Unit 2: In this unit, through a study of three well-known articles on the anthropological histories of state, society and economy, the students will be given a view of how questions are framed and answered through research in this field. **(Teaching time: 4 weeks Approx.)**

- Guha, Ranajit. (1983). *Elementary Aspects of Peasant Insurgency in Colonial India*. Delhi: Oxford University Press.
- Dirks, Nicholas (2009). *The Hollow Crown: The Ethnohistory of an Indian Kingdom*. Cambridge: Cambridge University Press.
- Guha, Ranajit. (1987). *Subaltern Studies No.5: Writings on South Asian History and Society*. Delhi: Oxford University Press.

Unit 3: In this unit, through a study of four articles on anthropological histories of three themes – religion, gender and environment – the students will be given a view of how questions are framed and answered through research in this field. **(Teaching time: 3 weeks Approx.)**

- Das, Veena ed.(1990). *Mirrors of Violence: Communities, Riots and Survivors in South Asia*. Delhi: Oxford University Press.
- Butalia, Urvashi. (1998) *The Other Side of Silence: Voices from the Partition of India*. Delhi: Penguin India.
- Skaria, Ajay. (1999). *Hybrid Histories: Forests, Frontiers and Wilderness in Western India*. Delhi: Oxford University Press.
- Guha, Ranajit. (1987). *Subaltern Studies No.5: Writings on South Asian History and Society*. Delhi: OUP.

Unit 4: In this unit, keeping what has been studied in mind, students will eventually be asked to undertake research on one of the themes of their choice from those discussed in units 2 and 3, which will involve either a close reading of a historical document or ethnographic fieldwork in relation to a historically rich social practice. **(Teaching time: 3 weeks Approx.)**

- As required by case study, to be decided in consultation with teacher.

Teaching Learning Process

Classroom lectures on the key concepts, case studies and important arguments/debates reflected in the course readings. Classroom lectures shall be combined with group discussions on specific readings and presentations stemming from field work. Overall, the Teaching Learning Process shall be geared towards closely linking essential theoretical assessments with active practical work, i.e. the practical/application aspect of historical analysis. Moreover, the process shall work towards pointing out the advantages of an interdisciplinary approach as students come in contact with field work and step into the shoes of critical observers of the remnants of the past and complex present conditions.

Assessment Methods:

Students will be assessed on the basis of regular group presentations and a detailed (individual) project submission-cum-presentation. The project should be a professionally written and referenced one, as well as creatively put together. The project has to be based on active field and library work and should reflect an analysis of primary source material and an engagement with secondary material.

Internal Assessment: 25 Marks

Written Exam: 75 Marks

Total: 100 Marks

Keywords:

Archive, Oral Traditions, Ritual Practices, State, Religion, Gender and Environment

HISTORY DEPARTMENT FACULTY MEMBERS ASSOCIATED WITH COURSE REVISIONS

The list below includes the names of faculty members of the Department of History who were involved in different ways in the LOCF Course Revision exercise of the History CBCS Undergraduate Honours and Programme curricula. Other than these members, members of the faculty of College Teachers met in two General Body meetings on 15th March 2019 and 10th June and there were wide ranging discussions regarding these courses. Unfortunately we could not record the names of all those participants but would like to record our gratitude for their help and support. This work was possible with the help and cooperation of the Departmental Administrative Support Staff listed below; we would like to record our gratitude:

Support Staff:

Durga Rai
Ankita
Madhu Chanda Yadav
Shivprasad
Sarita Gupta

Alphabetised list of Faculty Members:

Aditya Pratap Deo (St. Stephen's College)
Alka Saikia (Gargi College)
Amar Farooqui (Department of History, University of Delhi)
AmitaPaliwal (Jesus and Mary College)
Amrit Kaur Basra (Delhi College of Arts of Commerce)
Amrita Singh (Shyama Prasad Mukherjee College for Women)
Amrita Tulika (St. Stephen's College)
Anubhuti Maurya (Bharati College)
Aparna Balachandran (Department of History, University of Delhi)
Archana Ojha (Kamala Nehru College)
Archana Verma (Hindu College)
Asha Shukla Choubey (Indraprastha College for Women)
Ataullah (Zakir Husain Delhi College)
Bhairabi P. Sahu (Department of History, University of Delhi)
Bharati Jagannathan (Miranda House)
Chander Pal (PannalalGirdharlal Dayanand Anglo-Vedic College)
Charu Gupta (Department of History, University of Delhi)
Debatri Bhattacharjee (Lady Shri Ram College for Women)

Deeksha Bhardwaj (Gargi College)
Gayatri Bhagwat Sahu (Rajdhani College)
Gopika Bhandari (Vivekananda College)
Ismail V. (Lady Shri Ram College for Women)
Justin Mathew (Hansraj College)
Kalpana Malik (Motilal Nehru College)
Khurshid Khan (Shivaji College)
Levin (Bharati College)
Madhuri Sharma (Bharati College)
Mahesh Gopalan (St. Stephen's College)
Manisha Agnihotri (Janki Devi Memorial College)
Manoj Sharma (Kirori Mal College)
Maya John (Jesus and Mary College)
Mayank Kumar (Satyawati College Evening)
Meena Bhargava (Indraprastha College for Women)
Meenakshi Khanna (Indraprastha College for Women)
Meera Khare (PannalalGirdharlal Dayanand Anglo-Vedic College)
Mihir Kumar Jha (Atma Ram Sanatan Dharma College)
Mita Hussain (Shaheed Bhagat Singh College)
Monika Saxena (Ramjas College)
Mukul Manglik (Ramjas College)
Nagendra Sharma (PannalalGirdharlal Dayanand Anglo-Vedic College Evening)
NainaDayal (St. Stephen's College)
Namrata Singh (Rajdhani College)
Narottam Vinit (Dyal Singh College)
Nayana Dasgupta (Lady Shri Ram College for Women)
Neeraj Sahay (Shri Venkateswara College)
Neerja Singh (Satyawati College Evening)
NeeruAilawadi (Delhi College of Arts and Commerce)
Nirmal Kumar (Shri Venkateswara College)
Nishtha Srivastava (Shivaji College)
O. P. Singh (Delhi College of Arts and Commerce)
Padma Negi (Motilal Nehru College)
Pallavi Prasad (Satyawati College)
Pankaj Jha (Lady Shri Ram College for Women)
Parul Lau Gaur (Ram Lal Anand College)
Prabha Rani (Lady Shri Ram College for Women)
Prabhu Mohapatra (Department of History, University of Delhi)
Pragati Mohapatra (Indraprastha College for Women)
Prem Kumar (Motilal Nehru College Evening)

Puneet Yadav (Kirori Mal College)
Rachna Singh (Hindu College)
Radha Madhav Bharadwaj (Deen Dayal Upadhyaya College)
Radhika Chadha (Miranda House)
Rahul Govind (Department of History, University of Delhi)
Rajesh Kumar (Motilal Nehru College Evening)
Rajiv Verma (Satyawati College Evening)
Rakesh Kumar (Ram Lal Anand College)
Ranjan Anand (Zakir Husain Delhi College Evening)
Ranjan Mehra (Swami Shraddhanand College)
Rashmi Pant (Indraprastha College for Women)
Rashmi Seth (Rajdhani College)
Richa Raj (Jesus and Mary College)
Rim Jhim Sharma (Pannalal Girdharlal Dayanand Anglo-Vedic College)
Saba Khan (Zakir Husain Delhi College)
Sandhya Sharma (Vivekananda College)
Sangeeta Luthra Sharma (St. Stephen's College)
Sanghamitra Misra (Department of History, University of Delhi)
Sanjay Kumar (Pannalal Girdharlal Dayanand Anglo-Vedic College Evening)
Saumya Gupta (Janki Devi Memorial College)
Saumya Varghese (Jesus and Mary College)
Shabnam Suri (Mata Sundri College for Women)
Shahana Bhattacharya (Kirori Mal College)
Shalini Shah (Department of History, University of Delhi)
Sharmila Shrivastava (Hansraj College)
Shobhana Warriar (Kamala Nehru College)
Shobhika Mukul (Sri Guru Nanak Dev Khalsa College)
Shubhra Sinha (Kamala Nehru College)
Smita Sahgal (Lady Shri Ram College for Women)
Sneh Jha (Miranda House)
Snigdha Singh (Miranda House)
Srimanjari (Miranda House)
Sunil Kumar (Department of History, University of Delhi)
Suraj Bhan Bhardwaj (Motilal Nehru College)
Sutapa Das (Bharati College)
Suvritta Khatri (Deshbandhu College)
Syed Mubin Zehra (Atma Ram Sanatan Dharma College)
Tasneem Suhrawardy (St. Stephen's College)
Vandana Chaudhary (Kirori Mal College)
Vasudha Pande (Lady Shri Ram College for Women)

Vijjika Pandey Singh (Atma Ram Sanatan Dharma College)
Vikram Chaudhary (Kirori Mal College)
Vinita Malik (Kamala Nehru College)
Vipul Singh (Department of History, University of Delhi)
Vishwamohan Jha (Atma Ram Sanatan Dharma College)
Vivek Mohan (Delhi College of Arts and Commerce)
Yuthika Mishra (Vivekananda College)

UNIVERSITY OF DELHI
BACHELOR OF SCIENCE (HONS.) IN MATHEMATICS
(B.Sc. (Hons.) Mathematics)

Learning Outcomes based Curriculum Framework (LOCF)

2019



Table of Contents

1. Introduction	3
2. Learning Outcomes-based approach to Curriculum Planning	3
2.1. Nature and extent of Bachelor's Degree Programme	3
2.2. Aims of Bachelor's Degree Programme in Mathematics	4
3. Graduate Attributes in Mathematics	4
3.1. Disciplinary knowledge	4
3.2. Communications skills	5
3.3. Critical thinking and analytical reasoning	5
3.4. Problem solving	5
3.5. Research-related skills	5
3.6. Information/digital literacy	5
3.7. Self-directed learning	5
3.8. Moral and ethical awareness/reasoning	5
3.9. Lifelong learning	5
4. Qualification descriptors for B.Sc. (Hons) Mathematics	5
5. Programme Learning Outcomes of B.Sc. (Hons) Mathematics	7
6. Structure of B.Sc. (Hons.) Mathematics	7
Semester wise Details of B.Sc. (Hons.) Mathematics Course & Credit Scheme	7
List of Discipline Specific Elective (DSE) Courses	9
Semester-I	
BMATH101: Calculus	10
BMATH102: Algebra	13
Semester-II	
BMATH203: Real Analysis	16
BMATH204: Differential Equations	19
Semester-III	
BMATH305: Theory of Real Functions	22
BMATH306: Group Theory-I	24
BMATH307: Multivariate Calculus	26
SEC-1: LaTeX and HTML	30
Semester-IV	
BMATH408: Partial Differential Equations	32
BMATH409: Riemann Integration & Series of Functions	35
BMATH410: Ring Theory & Linear Algebra-I	38
SEC-2: Computer Algebra Systems and Related Software	40
Semester-V	
BMATH511: Metric Spaces	43
BMATH512: Group Theory-II	45
DSE-1 (i): Numerical Analysis	47
DSE-1 (ii): Mathematical Modeling and Graph Theory	50
DSE-1 (iii): C++ Programming for Mathematics	53
DSE-2 (i): Probability Theory and Statistics	56
DSE-2 (ii): Discrete Mathematics	59
DSE-2 (iii): Cryptography and Network Security	62
Semester-VI	
BMATH613: Complex Analysis	64
BMATH614: Ring Theory and Linear Algebra-II	68
DSE-3 (i): Mathematical Finance	70
DSE-3 (ii): Introduction to Information Theory and Coding	72
DSE-3 (iii): Biomathematics	75
DSE-4 (i): Number Theory	78
DSE-4 (ii): Linear Programming and Applications	81
DSE-4 (iii): Mechanics	84
Acknowledgments	86

1. Introduction

The current focus in higher education is to shift from teacher-centric approach to learner-centric approach. For this as one of the aims, UGC has introduced the learning outcomes-based curriculum framework for undergraduate education. The learning outcomes-based curriculum framework for B.Sc. (Hons.) Mathematics is prepared keeping this in view. The framework is expected to provide a student with knowledge and skills in mathematics along with generic and transferable skills in other areas that help in personal development, employment and higher education in the global world. The programme-learning outcomes and course learning outcomes have been clearly specified to help prospective students, parents and employers understand the nature and extent of the degree programme; to maintain national and international standards, and to help in student mobility.

2. Learning Outcomes based approach to Curriculum Planning

The learning outcomes-based curriculum framework for B.Sc. (Hons.) Mathematics is based on the expected learning outcomes and graduate attributes that a graduate in mathematics is expected to attain. The curriculum for B.Sc. (Hons.) Mathematics is prepared keeping in mind the needs and aspirations of students in mathematics as well as the evolving nature of mathematics as a subject. The course learning outcomes and the programme learning outcomes specify the knowledge, understanding, skills, attitudes and values that a student completing this degree is expected to know. The qualification of B.Sc. (Hons.) Mathematics is awarded to a student who can demonstrating the attainment of these outcomes.

2.1 Nature and extent of the B.Sc. (Hons.) Mathematics

Mathematics is usually described as the abstract science of number, quantity and space along with their operations. The scope of Mathematics is very broad and it has a wide range of applications in natural sciences, engineering, economics and social sciences. B.Sc. (Hons.) Mathematics Programme aims at developing the ability to think critically, logically and analytically and hence use mathematical reasoning in everyday life. Pursuing a degree in mathematics will introduce the students to a number of interesting and useful ideas in preparations for a number of mathematics careers in education, research, government sector, business sector and industry.

The B.Sc. (Hons.) Mathematics programme covers the full range of mathematics, from classical Calculus to Modern Cryptography, Information Theory, and Network Security. The course lays a structured foundation of Calculus, Real & Complex analysis, Abstract Algebra, Differential Equations (including Mathematical Modelling), Number Theory, Graph Theory, and C++ Programming exclusively for Mathematics.

An exceptionally broad range of topics covering Pure & Applied Mathematics: Linear Algebra, metric Spaces, Statistics, Linear Programming, Numerical Analysis, Mathematical Finance, Coding Theory, Mechanics and Biomathematics cater to varied interests and

ambitions. Also hand on sessions in Computer Lab using various Computer Algebra Systems (CAS) softwares such as Mathematica, MATLAB, Maxima, **R** to have a deep conceptual understanding of the above tools are carried out to widen the horizon of students' self-experience. The courses like Biomathematics, Mathematical Finance etc. emphasize on the relation of mathematics to other subjects like Biology, Economics and Finance.

To broaden the interest for interconnectedness between formerly separate disciplines one can choose from the list of Generic electives for example one can opt for economics as one of the GE papers. Skill enhancement Courses enable the student acquire the skill relevant to the main subject. Choices from Discipline Specific Electives provides the student with liberty of exploring his interests within the main subject.

Of key importance is the theme of integrating mathematical and professional skills. The well-structured programme empowers the student with the skills and knowledge leading to enhanced career opportunities in industry, commerce, education, finance and research.

2.2 Aims of Bachelor's degree programme in Mathematics

The overall aims of B.Sc.(Hons) Mathematics Programme are to:

- inculcate strong interest in learning mathematics.
- evolve broad and balanced knowledge and understanding of definitions, key concepts, principles and theorems in Mathematics
- enable learners/students to apply the knowledge and skills acquired by them during the programme to solve specific theoretical and applied problems in mathematics.
- develop in students the ability to apply relevant tools developed in mathematical theory to handle issues and problems in social and natural sciences.
- provide students with sufficient knowledge and skills that enable them to undertake further studies in mathematics and related disciplines
- enable students to develop a range of generic skills which will be helpful in wage-employment, self-employment and entrepreneurship.

3. Graduate Attributes in Mathematics

Some of the graduate attributes in mathematics are listed below:

3.1 Disciplinary knowledge: Capability of demonstrating comprehensive knowledge of basic concepts and ideas in mathematics and its subfields, and its applications to other disciplines.

3.2 Communications skills: Ability to communicate various concepts of mathematics in effective and coherent manner both in writing and orally, ability to present the complex mathematical ideas in clear, precise and confident way, ability to explain the development and importance of mathematics and ability to express thoughts and views in mathematically or logically correct statements.

3.3 Critical thinking and analytical reasoning: Ability to apply critical thinking in understanding the concepts in mathematics and allied areas; identify relevant assumptions, hypothesis, implications or conclusions; formulate mathematically correct arguments; ability to analyse and generalise specific arguments or empirical data to get broader concepts.

3.4 Problem solving: Capacity to use the gained knowledge to solve different kinds of non-familiar problems and apply the learning to real world situations; Capability to solve problems in computer graphics using concepts of linear algebra; Capability to apply the knowledge gained in differential equations to solve specific problems or models in operations research, physics, chemistry, electronics, medicine, economics, finance etc.

3.5 Research-related skills: Capability to ask and inquire about relevant/appropriate questions, ability to define problems, formulate hypotheses, test hypotheses, formulate mathematical arguments and proofs, draw conclusions; ability to write clearly the results obtained.

3.6 Information/digital literacy: Capacity to use ICT tools in solving problems or gaining knowledge; capacity to use appropriate softwares and programming skills to solve problems in mathematics,

3.7 Self-directed learning: Ability to work independently, ability to search relevant resources and e-content for self-learning and enhancing knowledge in mathematics.

3.8 Moral and ethical awareness/reasoning: Ability to identify unethical behaviour such as fabrication or misrepresentation of data, committing plagiarism, infringement of intellectual property rights.

3.9 Lifelong learning: Ability to acquire knowledge and skills through self-learning that helps in personal development and skill development suitable for changing demands of work place.

4. Qualification descriptors for B.Sc. (Hons.) Mathematics

Students who choose B.Sc. (Hons.) Mathematics Programme, develop the ability to think critically, logically and analytically and hence use mathematical reasoning in everyday life.

Pursuing a degree in mathematics will introduce the students to a number of interesting and useful ideas in preparations for a number of mathematics careers in education, research, government sector, business sector and industry.

The programme covers the full range of mathematics, from classical Calculus to Modern Cryptography, Information Theory, and Network Security. The course lays a structured foundation of Calculus, Real & Complex analysis, Abstract Algebra, Differential Equations (including Mathematical Modeling), Number Theory, Graph Theory, and C++ Programming exclusively for Mathematics.

An exceptionally broad range of topics covering Pure & Applied Mathematics: Linear Algebra, Metric Spaces, Statistics, Linear Programming, Numerical Analysis, Mathematical Finance, Coding Theory, Mechanics and Biomathematics cater to varied interests and ambitions. Also hands-on sessions in Computer Lab using various Computer Algebra Systems (CAS) softwares such as Mathematica, MATLAB, Maxima, **R** to have a deep conceptual understanding of the above tools are carried out to widen the horizon of students' self-experience.

To broaden the interest for interconnectedness between formerly separate disciplines one can choose from the list of Generic electives for example one can opt for economics as one of the GE papers. Skill enhancement courses enable the student to acquire the skill relevant to the main subject. Choices from Discipline Specific Electives provides the student with liberty of exploring his interests within the main subject.

Of key importance is the theme of integrating mathematical and professional skills. The well-structured programme empowers the student with the skills and knowledge leading to enhanced career opportunities in industry, commerce, education, finance and research. The qualification descriptors for B.Sc. (Hons.) Mathematics may include the following:

- i. demonstrate fundamental/systematic and coherent knowledge of the academic field of mathematics and its applications and links to engineering, science, technology, economics and finance; demonstrate procedural knowledge that create different professionals like teachers and researchers in mathematics, quantitative analysts, actuaries, risk managers, professionals in industry and public services.
- ii. demonstrate educational skills in areas of analysis, geometry, algebra, mechanics, differential equations etc.
- iii. demonstrate comprehensive knowledge about materials, including scholarly, and/or professional literature, relating to essential learning areas pertaining to the field of mathematics, and techniques and skills required for identifying mathematical problems.
- iv. Apply the acquired knowledge in mathematics and transferable skills to new/unfamiliar contexts and real-life problems.
- v. Demonstrate mathematics-related and transferable skills that are relevant to some of the job trades and employment opportunities.

5. Programme Learning Outcomes in B.Sc. (Hons.) Mathematics

The completion of the B.Sc. (Hons.) Mathematics Programme will enable a student to:

- i) Communicate mathematics effectively by written, computational and graphic means.
- ii) Create mathematical ideas from basic axioms.
- iii) Gauge the hypothesis, theories, techniques and proofs provisionally.
- iv) Utilize mathematics to solve theoretical and applied problems by critical understanding, analysis and synthesis.
- v) Identify applications of mathematics in other disciplines and in the real-world, leading to enhancement of career prospects in a plethora of fields and research.

6. Structure of B.Sc. (Hons.) Mathematics

The B.Sc. (Hons.) Mathematics programme is a three-year, six-semester course. A student is required to complete 148 credits for completion of the course.

		Semester	Semester
Part – I	First Year	Semester I: 22	Semester II: 22
Part – II	Second Year	Semester III: 28	Semester IV: 28
Part - III	Third Year	Semester V: 24	Semester VI: 24

Semester wise Details of B.Sc. (Hons.) Mathematics Course & Credit Scheme

Sem-ester	Core Course(14)	Ability Enhancement Compulsory Course (AECC)(2)	Skill Enhancement Course (SEC)(2)	Discipline Specific Elective (DSE)(4)	Generic Elective (GE)(4)	Total Credits
I	BMATH101: Calculus (including practicals)	(English Communication/MIL)/ Environmental Science			GE-1	
	BMATH102: Algebra					
L+T/P	4 + 2 = 6; 5 + 1 = 6	4			5+1 = 6	22
II	BMATH203: Real Analysis	(English Communication/MIL)/ Environmental Science			GE-2	
	BMATH204: Differential Equations (including practicals)					
L+T/P	5 + 1 = 6; 4 + 2 = 6	4			5+1 = 6	22

III	BMATH305: Theory of Real Functions		SEC-1 LaTeX and HTML		GE-3	
	BMATH306: Group Theory-I					
	BMATH307: Multivariate Calculus (including practicals)					
L+T/P	5 + 1 = 6; 5 + 1 = 6; 4 + 2 = 6		4		5 + 1 = 6	28
IV	BMATH408: Partial Differential Equations (including practicals)		SEC-2 Computer Algebra Systems and Related Software		GE-4	
	BMATH409: Riemann Integration and Series of Functions					
	BMATH410: Ring Theory and Linear Algebra-I					
L+T/P	4 + 2 = 6; 5 + 1 = 6; 5 + 1 = 6		4		5 + 1 = 6	28
V	BMATH511: Metric Spaces			DSE-1 (including practicals) DSE-2		
	BMATH512: Group Theory-II					
L+T/P	5 + 1 = 6; 5 + 1 = 6			4 + 2 = 6; 5 + 1 = 6		24
Sem-ester	Core Course(14)	Ability Enhancement Compulsory Course (AECC)(2)	Skill Enhancement Course (SEC)(2)	Discipline Specific Elective (DSE)(4)	Generic Elective (GE)(4)	Total Credits
VI	BMATH613: Complex Analysis (including practicals)			DSE-3		
	BMATH614: Ring Theory and Linear Algebra-II			DSE-4		
L+T/P	4 + 2 = 6; 5 + 1 = 6			5 + 1 = 6; 5 + 1 = 6		24

Total Credits = 148

Legend: L: Lecture Class; T: Tutorial Class; P: Practical Class

Note: One-hour lecture per week equals 1 Credit, 2 Hours practical class per week equals 1 credit. Practical in a group of 15-20 students in Computer Lab and Tutorial in a group of 8-12 students.

List of Discipline Specific Elective (DSE) Courses:

DSE-1 (Including Practicals): Any *one* of the following

(at least *two* shall be offered by the college)

- (i) Numerical Analysis
- (ii) Mathematical Modeling and Graph Theory
- (iii) C++ Programming for Mathematics

DSE-2: Any *one* of the following

(at least *two* shall be offered by the college)

- (i) Probability Theory and Statistics
- (ii) Discrete Mathematics
- (iii) Cryptography and Network Security

DSE-3: Any *one* of the following

(at least *two* shall be offered by the college)

- (i) Mathematical Finance
- (ii) Introduction to Information Theory and Coding
- (iii) Biomathematics

DSE-4: Any *one* of the following

(at least *two* shall be offered by the college)

- (i) Number Theory
- (ii) Linear Programming and Applications
- (iii) Mechanics

Semester-I

BMATH101: Calculus

Total Marks: 150 (Theory: 75, Internal Assessment: 25 and Practical: 50)

Workload: 4 Lectures, 4 Practicals (per week) **Credits:** 6 (4+2)

Duration: 14 Weeks (56 Hrs. Theory + 56 Hrs. Practical) **Examination:** 3 Hrs.

Course Objectives: The primary objective of this course is to introduce the basic tools of calculus and geometric properties of different conic sections which are helpful in understanding their applications in planetary motion, design of telescope and to the real-world problems. Also, to carry out the hand on sessions in computer lab to have a deep conceptual understanding of the above tools to widen the horizon of students' self-experience.

Course Learning Outcomes: This course will enable the students to:

- i) Learn first and second derivative tests for relative extrema and apply the knowledge in problems in business, economics and life sciences.
- ii) Sketch curves in a plane using its mathematical properties in the different coordinate systems of reference.
- iii) Compute area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.
- iv) Understand the calculus of vector functions and its use to develop the basic principles of planetary motion.

Unit 1: Derivatives for Graphing and Applications

The first-derivative test for relative extrema, Concavity and inflection points, Second-derivative test for relative extrema, Curve sketching using first and second derivative tests; Limits to infinity and infinite limits, Graphs with asymptotes, L'Hôpital's rule; Applications in business, economics and life sciences; Higher order derivatives, Leibniz rule.

Unit 2: Sketching and Tracing of Curves

Parametric representation of curves and tracing of parametric curves (except lines in \mathbb{R}^3), Polar coordinates and tracing of curves in polar coordinates; Techniques of sketching conics, Reflection properties of conics, Rotation of axes and second degree equations, Classification into conics using the discriminant.

Unit 3: Volume and Area of Surfaces

Volumes by slicing disks and method of washers, Volumes by cylindrical shells, Arc length, Arc length of parametric curves, Area of surface of revolution; Hyperbolic functions; Reduction formulae.

Unit 4: Vector Calculus and its Applications

Introduction to vector functions and their graphs, Operations with vector functions, Limits and continuity of vector functions, Differentiation and integration of vector functions; Modeling ballistics and planetary motion, Kepler's second law; Unit tangent, Normal and binormal vectors, Curvature.

References:

1. Anton, Howard, Bivens, Irl, & Davis, Stephen (2013). *Calculus* (10th ed.). John Wiley & Sons Singapore Pte. Ltd. Indian Reprint (2016) by Wiley India Pvt. Ltd. Delhi.
2. Prasad, Gorakh (2016). *Differential Calculus* (19th ed.). Pothishala Pvt. Ltd. Allahabad.
3. Strauss, Monty J., Bradley, Gerald L., & Smith, Karl J. (2007). *Calculus* (3rd ed.). Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). Delhi. Indian Reprint 2011.

Additional Reading:

- i. Thomas, Jr. George B., Weir, Maurice D., & Hass, Joel (2014). *Thomas' Calculus* (13th ed.). Pearson Education, Delhi. Indian Reprint 2017.

Practical / Lab work to be performed in Computer Lab.

List of the practicals to be done using Mathematica /MATLAB /Maple/Scilab/Maxima etc.

1. Plotting the graphs of the following functions:

$$ax, [x](\text{greatest integer function}), \sqrt{ax+b}, |ax+b|, c \pm |ax+b|, \\ x^{\pm n}, x^{\frac{1}{n}} (n \in \mathbb{Z}), \frac{|x|}{x}, \sin\left(\frac{1}{x}\right), x\sin\left(\frac{1}{x}\right), \text{ and } e^{\pm \frac{1}{x}}, \text{ for } x \neq 0, \\ e^{ax+b}, \log(ax+b), 1/(ax+b), \sin(ax+b), \cos(ax+b), \\ |\sin(ax+b)|, |\cos(ax+b)|.$$

Observe and discuss the effect of changes in the real constants a , b and c on the graphs.

2. Plotting the graphs of polynomial of degree 4 and 5, and their first and second derivatives, and analysis of these graphs in context of the concepts covered in Unit 1.
3. Sketching parametric curves, e.g., trochoid, cycloid, epicycloid and hypocycloid.
4. Tracing of conics in Cartesian coordinates.
5. Obtaining surface of revolution of curves.
6. Graph of hyperbolic functions.
7. Computation of limit, Differentiation, Integration and sketching of vector-valued functions.
8. Complex numbers and their representations, Operations like addition, multiplication, division, modulus. Graphical representation of polar form.
9. Find numbers between two real numbers and plotting of finite and infinite subset of \mathbb{R} .
10. Matrix operations: addition, multiplication, inverse, transpose; Determinant, Rank, Eigenvectors, Eigenvalues, Characteristic equation and verification of the Cayley–Hamilton theorem, Solving the systems of linear equations.

Teaching Plan (Theory of BMATH101: Calculus):

Week 1: The first-derivative test for relative extrema, Concavity and inflection points, Second-derivative test for relative extrema, Curve sketching using first and second derivative tests.

[3] Chapter 4 (Section 4.3).

Week 2: Limits to infinity and infinite limits, Graphs with asymptotes, Vertical tangents and cusps, L'Hôpital's rule.

[3] Chapter 4 (Sections 4.4 and 4.5).

Week 3: Applications of derivatives in business, economics and life sciences. Higher order derivatives and Leibniz rule for higher order derivatives for the product of two functions.

[3] Chapter 4 (Section 4.7).

[2] Chapter 5 (Sections 5.1, 5.2 and 5.4).

Week 4: Parametric representation of curves and tracing of parametric curves (except lines in \mathbb{R}^3), Polar coordinates and the relationship between Cartesian and polar coordinates.

[3] Chapter 9 [Section 9.4 (Pages 471 to 475)].

[1] Chapter 10 (Sections 10.1, and 10.2 up to Example 2, Page 707).

Weeks 5 and 6: Tracing of curves in polar coordinates. Techniques of sketching conics: parabola, ellipse and hyperbola.

[1] Sections 10.2 (Pages 707 to 717), and 10.4 up to Example 10 Page 742)].

Week 7: Reflection properties of conics, Rotation of axes, Second degree equations and their classification into conics using the discriminant.

[1] Sections 10.4 (Pages 742 to 744) and 10.5.

Weeks 8 and 9: Volumes by slicing disks and method of washers, Volumes by cylindrical shells, Arc length, Arc length of parametric curves.

[1] Chapter 5 (Sections 5.2, 5.3 and 5.4).

Week 10: Area of surface of revolution; Hyperbolic functions.

[1] Sections 5.5 and 6.8.

Week 11: Reduction formulae, and to obtain the iterative formulae for the integrals of the form: $\int \sin^n x \, dx$, $\int \cos^n x \, dx$, $\int \tan^n x \, dx$, $\int \sec^n x \, dx$ and $\int \sin^m x \cos^n x \, dx$.

[1] Chapter 7 [Sections 7.2 and 7.3 (Pages 497 to 503)].

Week 12: Introduction to vector functions and their graphs, Operations with vector functions, Limits and continuity of vector functions, Differentiation and tangent vectors.

[3] Chapter 10 (Sections 10.1 and 10.2 up to Page 504).

Week 13: Properties of vector derivatives and integration of vector functions; Modeling ballistics and planetary motion, Kepler's second law.

[3] Chapter 10 [Sections 10.2 (Pages 505 to 511) and 10.3].

Week 14: Unit tangent, Normal and binormal vectors, Curvature.

[1] Sections 12.4 and 12.5.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn first and second derivative tests for relative extrema and apply the knowledge in problems in business, economics and life sciences.	(i) Each topic to be explained with illustrations.	<ul style="list-style-type: none"> • Presentations and class discussions. • Assignments and class tests. • Student presentations. • Mid-term examinations. • Practical and viva-voce examinations. • End-term examinations.
2.	Sketch curves in a plane using its mathematical properties in the different coordinate systems of reference.	(ii) Students to be encouraged to discover the relevant concepts.	
3.	Compute area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.	(iii) Students be given homework/assignments.	
4.	Understand the calculus of vector functions and its use to develop the basic principles of planetary motion.	(iv) Discuss and solve the theoretical and practical problems in the class.	
		(v) Students to be encouraged to apply concepts to real world problems.	

Keywords: Concavity, Extrema, Inflection point, Hyperbolic functions, Leibniz rule, L'Hôpital's rule, Polar and parametric coordinates, Vector functions.

BMATH102: Algebra

Total Marks: 100 (Theory: 75, Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: The primary objective of this course is to introduce the basic tools of theory of equations, complex numbers, number theory and matrices to understand their connection with the real-world problems. Perform matrix algebra with applications to computer graphics.

Course Learning Outcomes: This course will enable the students to:

- i) Employ De Moivre's theorem in a number of applications to solve numerical problems.
- ii) Learn about equivalent classes and cardinality of a set.
- iii) Use modular arithmetic and basic properties of congruences.
- iv) Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix.
- v) Find eigenvalues and corresponding eigenvectors for a square matrix.

Unit 1: Theory of Equations and Complex Numbers

Polynomials, The remainder and factor theorem, Synthetic division, Factored form of a polynomial, Fundamental theorem of algebra, Relations between the roots and the coefficients of polynomial equations, Theorems on imaginary, integral and rational roots; Polar representation of complex numbers, De Moivre's theorem for integer and rational indices and their applications. The n th roots of unity.

Unit 2: Equivalence Relations and Functions

Equivalence relations, Functions, Composition of functions, Invertibility and inverse of functions, One-to-one correspondence and the cardinality of a set.

Unit 3: Basic Number Theory

Well ordering principle, The division algorithm in \mathbb{Z} , Divisibility and the Euclidean algorithm, Fundamental theorem of arithmetic, Modular arithmetic and basic properties of congruences; Principle of mathematical induction.

Unit 4: Row Echelon Form of Matrices and Applications

Systems of linear equations, Row reduction and echelon forms, Vector equations, The matrix equation $A\mathbf{x} = \mathbf{b}$, Solution sets of linear systems, The inverse of a matrix; Subspaces, Linear independence, Basis and dimension, The rank of a matrix and applications; Introduction to linear transformations, The matrix of a linear transformation; Applications to computer graphics, Eigenvalues and eigenvectors, The characteristic equation and Cayley–Hamilton theorem.

References:

1. Andreescu, Titu & Andrica Dorin. (2014). *Complex Numbers from A to...Z*. (2nd ed.). Birkhäuser.

2. Dickson, Leonard Eugene (2009). *First Course in the Theory of Equations*. The Project Gutenberg EBook (<http://www.gutenberg.org/ebooks/29785>)
3. Goodaire, Edgar G., & Parmenter, Michael M. (2005). *Discrete Mathematics with Graph Theory* (3rd ed.). Pearson Education Pvt. Ltd. Indian Reprint 2015.
4. Kolman, Bernard, & Hill, David R. (2001). *Introductory Linear Algebra with Applications* (7th ed.). Pearson Education, Delhi. First Indian Reprint 2003.
5. Lay, David C., Lay, Steven R., & McDonald, Judi J. (2016). *Linear Algebra and its Applications* (5th ed.). Pearson Education.

Additional Readings:

- i. Andrilli, Stephen, & Hecker, David (2016). *Elementary Linear Algebra* (5th ed.). Academic Press, Elsevier India Private Limited.
- ii. Burton, David M. (2012). *Elementary Number Theory* (7th ed.). McGraw-Hill Education Pvt. Ltd. Indian Reprint.

Teaching Plan (BMATH102: Algebra):

Weeks 1 and 2: Polynomials, The remainder and factor theorem, Synthetic division, Factored form of a polynomial, Fundamental theorem of algebra, Relations between the roots and the coefficients of polynomial equations, Theorems on imaginary, integral and rational roots.

[2] Chapter II (Sections 12 to 16, 19 to 21, 24 and 27, Statement of the Fundamental theorem of algebra).

Weeks 3 and 4: Polar representation of complex numbers, De Moivre's theorem for integer and rational indices and their applications, The n th roots of unity.

[1] Chapter 2 [Section 2.1(2.1.1 to 2.1.3), Section 2.2 (2.2.1, 2.2.2 (up to Page 45, without propositions), 2.2.3].

Weeks 5 and 6: Equivalence relations, Functions, Composition of functions, Invertibility and inverse of functions, One-to-one correspondence and the cardinality of a set.

[3] Chapter 2 (Section 2.4 (2.4.1 to 2.4.4)), and Chapter 3.

Weeks 7 and 8: Well ordering principle, The division algorithm in \mathbb{Z} , Divisibility and the Euclidean algorithm, Modular arithmetic and basic properties of congruences, Statements of the fundamental theorem of arithmetic and principle of mathematical induction.

[3] Chapter 4 [Sections 4.1 (4.1.2, 4.1.5, 4.1.6), 4.2 (4.2.1 to 4.2.11, up to problem 11), 4.3 (4.3.7 to 4.3.9), 4.4 (4.4.1 to 4.4.8)], and Chapter 5 (Section 5.1.1).

Weeks 9 and 10: Systems of linear equations, Row reduction and echelon forms, Vector equations, The matrix equation $Ax = b$, Solution sets of linear systems, The inverse of a matrix.

[5] Chapter 1 (Sections 1.1 to 1.5) and Chapter 2 (Section 2.2).

Week 11 and 12: Subspaces, Linear independence, Basis and dimension, The rank of a matrix and applications.

[4] Chapter 6 (Sections 6.2, 6.3, 6.4, and 6.6).

Weeks 13: Introduction to linear transformations, Matrix of a linear transformation; Applications to computer graphics.

[5] Chapter 1 (Sections 1.8 and 1.9), and Chapter 2 (Section 2.7).

Week 14: Eigenvalues and eigenvectors, The characteristic equation and Cayley–Hamilton theorem.

[5] Chapter 5 (Sections 5.1 and 5.2, Supplementary Exercises 5 and 7, Page 328).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Employ De Moivre's theorem in a number of applications to solve	(i) Each topic to be explained with examples.	• Student

	numerical problems.	(ii) Students to be involved in discussions and encouraged to ask questions.	presentations.
2.	Learn about equivalent classes and cardinality of a set.		• Participation in discussions.
3.	Use modular arithmetic and basic properties of congruences.	(iii) Students to be given homework/assignments.	• Assignments and class tests.
4.	Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix. Find eigenvalues and corresponding eigenvectors for a square matrix.	(iv) Students to be encouraged to give short presentations.	• Mid-term examinations. • End-term examinations.

Keywords: Cardinality of a set, Cayley–Hamilton theorem, De Moivre’s theorem, Eigenvalues and eigenvectors, Equivalence relations, Modular arithmetic, Row echelon form, The Fundamental theorem of algebra.

Semester-II

BMATH203: Real Analysis

Total Marks: 100 (Theory: 75, Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: The course will develop a deep and rigorous understanding of real line \mathbb{R} , and of defining terms to prove the results about convergence and divergence of sequences and series of real numbers. These concepts have wide range of applications in real life scenario.

Course Learning Outcomes: This course will enable the students to:

- i) Understand many properties of the real line \mathbb{R} , including completeness and Archimedean properties.
- ii) Learn to define sequences in terms of functions from \mathbb{N} to a subset of \mathbb{R} .
- iii) Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.
- iv) Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.

Unit 1: Real Number System \mathbb{R}

Algebraic and order properties of \mathbb{R} , Absolute value of a real number; Bounded above and bounded below sets, Supremum and infimum of a nonempty subset of \mathbb{R} .

Unit 2: Properties of \mathbb{R}

The completeness property of \mathbb{R} , Archimedean property, Density of rational numbers in \mathbb{R} ; Definition and types of intervals, Nested intervals property; Neighborhood of a point in \mathbb{R} , Open and closed sets in \mathbb{R} .

Unit 3: Sequences in \mathbb{R}

Convergent sequence, Limit of a sequence, Bounded sequence, Limit theorems, Monotone sequences, Monotone convergence theorem, Subsequences, Bolzano–Weierstrass theorem for sequences, Limit superior and limit inferior for bounded sequence, Cauchy sequence, Cauchy's convergence criterion.

Unit 4: Infinite Series

Convergence and divergence of infinite series of real numbers, Necessary condition for convergence, Cauchy criterion for convergence; Tests for convergence of positive term series: Integral test, Basic comparison test, Limit comparison test, D'Alembert's ratio test, Cauchy's n th root test; Alternating series, Leibniz test, Absolute and conditional convergence.

References:

1. Bartle, Robert G., & Sherbert, Donald R. (2015). *Introduction to Real Analysis* (4th ed.). Wiley India Edition. New Delhi.
2. Bilodeau, Gerald G., Thie, Paul R., & Keough, G. E. (2010). *An Introduction to Analysis* (2nd ed.). Jones & Bartlett India Pvt. Ltd. Student Edition. Reprinted 2015.

3. Denlinger, Charles G. (2011). *Elements of Real Analysis*. Jones & Bartlett India Pvt. Ltd. Student Edition. Reprinted 2015.

Additional Readings:

- i. Ross, Kenneth A. (2013). *Elementary Analysis: The Theory of Calculus* (2nd ed.). Undergraduate Texts in Mathematics, Springer. Indian Reprint.
- ii. Thomson, Brian S., Bruckner, Andrew. M., & Bruckner, Judith B. (2001). *Elementary Real Analysis*. Prentice Hall.

Teaching Plan (BMATH203: Real Analysis):

Weeks 1 and 2: Algebraic and order properties of \mathbb{R} . Absolute value of a real number; Bounded above and bounded below sets, Supremum and infimum of a nonempty subset of \mathbb{R} .

[1] Chapter 2 [Sections 2.1, 2.2 (2.2.1 to 2.2.6) and 2.3 (2.3.1 to 2.3.5)]

Weeks 3 and 4: The completeness property of \mathbb{R} , Archimedean property, Density of rational numbers in \mathbb{R} , Definition and types of intervals, Nested intervals property; Neighborhood of a point in \mathbb{R} , Open and closed sets in \mathbb{R} .

[1] Sections 2.3 (2.3.6), 2.4 (2.4.3 to 2.4.9), and 2.5 up to Theorem 2.5.3.

[1] Chapter 11 [Section 11.1 (11.1.1 to 11.1.3)].

Weeks 5 and 6: Sequences and their limits, Bounded sequence, Limit theorems.

[1] Sections 3.1, 3.2.

Week 7: Monotone sequences, Monotone convergence theorem and applications.

[1] Section 3.3.

Week 8: Subsequences and statement of the Bolzano–Weierstrass theorem. Limit superior and limit inferior for bounded sequence of real numbers with illustrations only.

[1] Chapter 3 [Section 3.4 (3.4.1 to 3.4.12), except 3.4.4, 3.4.7, 3.4.9 and 3.4.11].

Week 9: Cauchy sequences of real numbers and Cauchy's convergence criterion.

[1] Chapter 3 [Section 3.5 (3.5.1 to 3.5.6)].

Week 10: Convergence and divergence of infinite series, Sequence of partial sums of infinite series, Necessary condition for convergence, Cauchy criterion for convergence of series.

[3] Section 8.1.

Weeks 11 and 12: Tests for convergence of positive term series: Integral test statement and convergence of p -series, Basic comparison test, Limit comparison test with applications, D'Alembert's ratio test and Cauchy's n th root test.

[3] Chapter 8 (Section 8.2 up to 8.2.19).

Weeks 13 and 14: Alternating series, Leibniz test, Absolute and conditional convergence.

[2] Chapter 6 (Section 6.2).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1. & 2.	Understand many properties of the real line \mathbb{R} including, completeness and Archimedean properties.	(i) Each topic to be explained with examples.	<ul style="list-style-type: none"> • Presentations and participation in discussions.
3.	Learn to define sequences in terms of functions from \mathbb{N} to a subset of \mathbb{R} . Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.	(ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given homework/assignments. (iv) Students to be	<ul style="list-style-type: none"> • Assignments and class tests. • Mid-term examinations. • End-term examinations.

4.	Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.	encouraged to give short presentations. (v) Illustrate the concepts through CAS.	
----	--	---	--

Keywords: Archimedean property, Absolute and conditional convergence of series, Bolzano–Weierstrass theorem, Cauchy sequence, Convergent sequence, Leibniz test, Limit of a sequence, Nested intervals property, Open and closed sets in \mathbb{R} .

BMATH204: Differential Equations

Total Marks: 150 (Theory: 75, Internal Assessment: 25 and Practical: 50)

Workload: 4 Lectures, 4 Practicals (per week) **Credits:** 6 (4+2)

Duration: 14 Weeks (56 Hrs. Theory + 56 Hrs. Practical) **Examination:** 3 Hrs.

Course Objectives: The main objective of this course is to introduce the students to the exciting world of differential equations, mathematical modeling and their applications.

Course Learning Outcomes: The course will enable the students to:

- i) Learn basics of differential equations and mathematical modeling.
- ii) Formulate differential equations for various mathematical models.
- iii) Solve first order non-linear differential equations and linear differential equations of higher order using various techniques.
- iv) Apply these techniques to solve and analyze various mathematical models.

Unit 1: Differential Equations and Mathematical Modeling

Differential equations and mathematical models, Order and degree of a differential equation, Exact differential equations and integrating factors of first order differential equations, Reducible second order differential equations, Applications of first order differential equations to acceleration-velocity model, Growth and decay model.

Unit 2: Population Growth Models

Introduction to compartmental models, Lake pollution model (with case study of Lake Burley Griffin), Drug assimilation into the blood (case of a single cold pill, case of a course of cold pills, case study of alcohol in the bloodstream), Exponential growth of population, Limited growth of population, Limited growth with harvesting.

Unit 3: Second and Higher Order Differential Equations

General solution of homogeneous equation of second order, Principle of superposition for a homogeneous equation; Wronskian, its properties and applications, Linear homogeneous and non-homogeneous equations of higher order with constant coefficients, Euler's equation, Method of undetermined coefficients, Method of variation of parameters, Applications of second order differential equations to mechanical vibrations.

Unit 4: Analysis of Mathematical Models

Interacting population models, Epidemic model of influenza and its analysis, Predator-prey model and its analysis, Equilibrium points, Interpretation of the phase plane, Battle model and its analysis.

References:

1. Barnes, Belinda & Fulford, Glenn R. (2015). *Mathematical Modelling with Case Studies, Using Maple and MATLAB* (3rd ed.). CRC Press, Taylor & Francis Group.
2. Edwards, C. Henry, Penney, David E., & Calvis, David T. (2015). *Differential Equation and Boundary Value Problems: Computing and Modeling* (5th ed.). Pearson Education.
3. Ross, Shepley L. (2004). *Differential Equations* (3rd ed.). John Wiley & Sons. India

Additional Reading:

- i. Ross, Clay C. (2004). *Differential Equations: An Introduction with Mathematica*[®] (2nd ed.). Springer.

Practical / Lab work to be performed in a Computer Lab:

Modeling of the following problems using Mathematica /MATLAB/Maple/Maxima/Scilab etc.

1. Plotting of second and third order respective solution family of differential equation.
2. Growth and decay model (exponential case only).
3. (i) Lake pollution model (with constant/seasonal flow and pollution concentration).
(ii) Case of single cold pill and a course of cold pills.
(iii) Limited growth of population (with and without harvesting).
4. (i) Predatory-prey model (basic Volterra model, with density dependence, effect of DDT, two prey one predator).
(ii) Epidemic model of influenza (basic epidemic model, contagious for life, disease with carriers).
(iii) Battle model (basic battle model, jungle warfare, long range weapons).
5. Plotting of recursive sequences, and study of the convergence.
6. Find a value $m \in \mathbb{N}$ that will make the following inequality holds for all $n > m$:
(i) $|\sqrt[n]{0.5} - 1| < 10^{-3}$, (ii) $|\sqrt[n]{n} - 1| < 10^{-3}$,
(iii) $(0.9)^n < 10^{-3}$, (iv) $\frac{2^n}{n!} < 10^{-7}$, etc.
7. Verify the Bolzano–Weierstrass theorem through plotting of sequences and hence identify convergent subsequences from the plot.
8. Study the convergence/divergence of infinite series of real numbers by plotting their sequences of partial sum.
9. Cauchy's root test by plotting n th roots.
10. D'Alembert's ratio test by plotting the ratio of n th and $(n+1)$ th term of the given series of positive terms.
11. For the following sequences $\langle a_n \rangle$, given $\varepsilon = \frac{1}{2^k}$, $p = 10^j$, $k = 0, 1, 2, \dots$; $j = 1, 2, 3, \dots$

Find $m \in \mathbb{N}$ such that

$$(i) |a_{m+p} - a_m| < \varepsilon, \quad (ii) |a_{2m+p} - a_{2m}| < \varepsilon,$$

where a_n is given as:

$$\begin{aligned} (a) \frac{n+1}{n}, & \quad (b) \frac{1}{n}, & \quad (c) 1 - \frac{1}{2} + \frac{1}{3} - \dots + \frac{(-1)^{n-1}}{n} \\ (d) \frac{(-1)^n}{n}, & \quad (e) 2^{-n}n^2, & \quad (f) 1 + \frac{1}{2!} + \dots + \frac{1}{n!}. \end{aligned}$$

12. For the following series $\sum a_n$, calculate

$$(i) \left| \frac{a_{n+1}}{a_n} \right|, \quad (ii) |a_n|^{\frac{1}{n}}, \text{ for } n = 10^j, j = 1, 2, 3, \dots,$$

and identify the convergent series, where a_n is given as:

$$\begin{aligned} (a) \left(\frac{1}{n}\right)^{1/n}, & \quad (b) \frac{1}{n}, & \quad (c) \frac{1}{n^2}, & \quad (d) \left(1 + \frac{1}{\sqrt{n}}\right)^{-n^{3/2}}, \\ (e) \frac{n!}{n^n}, & \quad (f) \frac{n^3 + 5}{3^n + 2}, & \quad (g) \frac{1}{n^2 + n}, & \quad (\square) \frac{1}{\sqrt{n+1}}, \\ (i) \cos n, & \quad (j) \frac{1}{n \log n}, & \quad (k) \frac{1}{n(\log n)^2}. \end{aligned}$$

Teaching Plan (Theory of BMATH204: Differential Equations):

Weeks 1 and 2: Differential equations and mathematical models, Order and degree of a differential equation, Exact differential equations and integrating factors of first order differential equations, Reducible second order differential equations.

[2] Chapter 1 (Sections 1.1 and 1.6).

[3] Chapter 2.

Week 3: Application of first order differential equations to acceleration-velocity model, Growth and decay model.

[2] Chapter 1 (Section 1.4, Pages 35 to 38), and Chapter 2 (Section 2.3).

[3] Chapter 3 (Section 3.3, A and B with Examples 3.8, 3.9).

Week 4: Introduction to compartmental models, Lake pollution model (with case study of Lake Burley Griffin).

[1] Chapter 2 (Sections 2.1, 2.5 and 2.6).

Week 5: Drug assimilation into the blood (case of a single cold pill, case of a course of cold pills, Case study of alcohol in the bloodstream).

[1] Chapter 2 (Sections 2.7 and 2.8).

Week 6: Exponential growth of population, Density dependent growth, Limited growth with harvesting.

[1] Chapter 3 (Sections 3.1 to 3.3).

Weeks 7 to 9: General solution of homogeneous equation of second order, Principle of superposition for a homogeneous equation; Wronskian, its properties and applications; Linear homogeneous and non-homogeneous equations of higher order with constant coefficients; Euler's equation.

[2] Chapter 3 (Sections 3.1 to 3.3).

Weeks 10 and 11: Method of undetermined coefficients, Method of variation of parameters; Applications of second order differential equations to mechanical vibrations.

[2] Chapter 3 (Sections 3.4 (Pages 172 to 177) and 3.5).

Weeks 12 to 14: Interacting population models, Epidemic model of influenza and its analysis, Predator-prey model and its analysis, Equilibrium points, Interpretation of the phase plane, Battle model and its analysis.

[1] Chapter 5 (Sections 5.1, 5.2, 5.4 and 5.9), and Chapter 6 (Sections 6.1 to 6.4).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn basics of differential equations and mathematical modeling.	(i) Each topic to be explained with examples and illustrated on computers using Mathematica /MATLAB /Maple/Maxima/Scilab. (ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given homework/assignments. (iv) Students to be encouraged to give short presentations.	<ul style="list-style-type: none">• Presentations and participation in discussions.• Assignments and class tests.• Mid-term examinations.• Practical and viva-voce examinations.• End-term examinations.
2.	Formulate differential equations for various mathematical models.		
3.	Solve first order non-linear differential equations and linear differential equations of higher order using various techniques.		
4.	Apply these techniques to solve and analyze various mathematical models.		

Keywords: Battle model, Epidemic model, Euler's equation, Exact differential equation, Integrating factor, Lake pollution model, Mechanical vibrations, Phase plane, Predator-prey model, Wronskian and its properties.

Semester-III

BMATH305: Theory of Real Functions

Total Marks: 100 (Theory: 75, Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: It is a basic course on the study of real valued functions that would develop an analytical ability to have a more matured perspective of the key concepts of calculus, namely, limits, continuity, differentiability and their applications.

Course Learning Outcomes: This course will enable the students to:

- i) Have a rigorous understanding of the concept of limit of a function.
- ii) Learn about continuity and uniform continuity of functions defined on intervals.
- iii) Understand geometrical properties of continuous functions on closed and bounded intervals.
- iv) Learn extensively about the concept of differentiability using limits, leading to a better understanding for applications.
- v) Know about applications of mean value theorems and Taylor's theorem.

Unit 1: Limits of Functions

Limits of functions (ε - δ approach), Sequential criterion for limits, Divergence criteria, Limit theorems, One-sided limits, Infinite limits and limits at infinity.

Unit 2: Continuous Functions and their Properties

Continuous functions, Sequential criterion for continuity and discontinuity, Algebra of continuous functions, Properties of continuous functions on closed and bounded intervals; Uniform continuity, Non-uniform continuity criteria, Uniform continuity theorem.

Unit 3: Derivability and its Applications

Differentiability of a function, Algebra of differentiable functions, Carathéodory's theorem, Chain rule; Relative extrema, Interior extremum theorem, Rolle's theorem, Mean-value theorem and applications, Intermediate value property of derivatives, Darboux's theorem.

Unit 4: Taylor's Theorem and its Applications

Taylor polynomial, Taylor's theorem with Lagrange form of remainder, Application of Taylor's theorem in error estimation; Relative extrema, and to establish a criterion for convexity; Taylor's series expansions of e^x , $\sin x$ and $\cos x$.

Reference:

1. Bartle, Robert G., & Sherbert, Donald R. (2015). *Introduction to Real Analysis* (4th ed.). Wiley India Edition. New Delhi.

Additional Readings:

- i. Ghorpade, Sudhir R. & Limaye, B. V. (2006). *A Course in Calculus and Real Analysis*. Undergraduate Texts in Mathematics, Springer (SIE). First Indian reprint.
- ii. Mattuck, Arthur. (1999). *Introduction to Analysis*, Prentice Hall.

- iii. Ross, Kenneth A. (2013). *Elementary Analysis: The Theory of Calculus* (2nd ed.). Undergraduate Texts in Mathematics, Springer. Indian Reprint.

Teaching Plan (BMATH305: Theory of Real Functions):

Week 1: Definition of the limit, Sequential criterion for limits, Criterion for non-existence of limit.

[1] Chapter 4 (Section 4.1).

Week 2: Algebra of limits of functions with illustrations and examples, Squeeze theorem.

[1] Chapter 4 (Section 4.2).

Week 3: Definition and illustration of the concepts of one-sided limits, Infinite limits and limits at infinity.

[1] Chapter 4 (Section 4.3).

Weeks 4 and 5: Definitions of continuity at a point and on a set, Sequential criterion for continuity, Algebra of continuous functions, Composition of continuous functions.

[1] Sections 5.1 and 5.2.

Weeks 6 and 7: Various properties of continuous functions defined on an interval, viz., Boundedness theorem, Maximum-minimum theorem, Statement of the location of roots theorem, Intermediate value theorem and the preservation of intervals theorem.

[1] Chapter 5 (Section 5.3).

Week 8: Definition of uniform continuity, Illustration of non-uniform continuity criteria, Uniform continuity theorem.

[1] Chapter 5 [Section 5.4 (5.4.1 to 5.4.3)].

Weeks 9 and 10: Differentiability of a function, Algebra of differentiable functions, Carathéodory's theorem and chain rule.

[1] Chapter 6 [Section 6.1 (6.1.1 to 6.1.7)].

Weeks 11 and 12: Relative extrema, Interior extremum theorem, Mean value theorem and its applications, Intermediate value property of derivatives - Darboux's theorem.

[1] Section 6.2.

Weeks 13 and 14: Taylor polynomial, Taylor's theorem and its applications, Taylor's series expansions of e^x , $\sin x$ and $\cos x$.

[1] Chapter 6 (Sections 6.4.1 to 6.4.6), and Chapter 9 (Example 9.4.14, Page 286).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Have a rigorous understanding of the concept of limit of a function.	(i) Each topic to be explained with examples. (ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given homework/ assignments. (iv) Students to be encouraged to give short presentations. (v) Illustrate the concepts through CAS.	<ul style="list-style-type: none"> • Presentations and participation in discussions. • Assignments and class tests. • Mid-term examinations. • End-term examinations.
2.	Learn about continuity and uniform continuity of functions defined on intervals. Understand geometrical properties of continuous functions on closed and bounded intervals.		
3.	Learn extensively about the concept of differentiability using limits, leading to a better understanding for applications.		
4.	Know about applications of mean value theorems and Taylor's theorem.		

Keywords: Continuity, Convexity, Differentiability, Limit, Relative extrema, Rolle's theorem, Taylor's theorem, Uniform continuity.

BMATH306: Group Theory-I

Total Marks: 100 (Theory: 75, Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: The objective of the course is to introduce the fundamental theory of groups and their homomorphisms. Symmetric groups and group of symmetries are also studied in detail. Fermat's Little theorem as a consequence of the Lagrange's theorem on finite groups.

Course Learning Outcomes: The course will enable the students to:

- i) Recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, etc.
- ii) Link the fundamental concepts of groups and symmetrical figures.
- iii) Analyze the subgroups of cyclic groups and classify subgroups of cyclic groups.
- iv) Explain the significance of the notion of cosets, normal subgroups and factor groups.
- v) Learn about Lagrange's theorem and Fermat's Little theorem.
- vi) Know about group homomorphisms and group isomorphisms.

Unit 1: Groups and its Elementary Properties

Symmetries of a square, Dihedral groups, Definition and examples of groups including permutation groups and quaternion groups (illustration through matrices), Elementary properties of groups.

Unit 2: Subgroups and Cyclic Groups

Subgroups and examples of subgroups, Centralizer, Normalizer, Center of a group, Product of two subgroups; Properties of cyclic groups, Classification of subgroups of cyclic groups.

Unit 3: Permutation Groups and Lagrange's Theorem

Cycle notation for permutations, Properties of permutations, Even and odd permutations, Alternating groups; Properties of cosets, Lagrange's theorem and consequences including Fermat's Little theorem; Normal subgroups, Factor groups, Cauchy's theorem for finite abelian groups.

Unit 4: Group Homomorphisms

Group homomorphisms, Properties of homomorphisms, Group isomorphisms, Cayley's theorem, Properties of isomorphisms, First, Second and Third isomorphism theorems for groups.

Reference:

1. Gallian, Joseph. A. (2013). *Contemporary Abstract Algebra* (8th ed.). Cengage Learning India Private Limited, Delhi. Fourth impression, 2015.

Additional Reading:

- i. Rotman, Joseph J. (1995). *An Introduction to The Theory of Groups* (4th ed.). Springer-Verlag, New York.

Teaching Plan (BMATH306: Group Theory-I):

Week 1: Symmetries of a square, Dihedral groups, Definition and examples of groups including permutation groups and quaternion groups (illustration through matrices).

[1] Chapter 1.

Week 2: Definition and examples of groups, Elementary properties of groups.

[1] Chapter 2.

Week 3: Subgroups and examples of subgroups, Centralizer, Normalizer, Center of a Group, Product of two subgroups.

[1] Chapter 3.

Weeks 4 and 5: Properties of cyclic groups. Classification of subgroups of cyclic groups.

[1] Chapter 4

Weeks 6 and 7: Cycle notation for permutations, Properties of permutations, Even and odd permutations, Alternating group.

[1] Chapter 5 (up to Page 110).

Weeks 8 and 9: Properties of cosets, Lagrange's theorem and consequences including Fermat's Little theorem.

[1] Chapter 7 (up to Example 6, Page 150).

Week 10: Normal subgroups, Factor groups, Cauchy's theorem for finite abelian groups.

[1] Chapters 9 (Theorem 9.1, 9.2, 9.3 and 9.5, and Examples 1 to 12).

Weeks 11 and 12: Group homomorphisms, Properties of homomorphisms, Group isomorphisms, Cayley's theorem.

[1] Chapter 10 (Theorems 10.1 and 10.2, Examples 1 to 11).

[1] Chapter 6 (Theorem 6.1, and Examples 1 to 8).

Weeks 13 and 14: Properties of isomorphisms, First, Second and Third isomorphism theorems.

[1] Chapter 6 (Theorems 6.2 and 6.3), Chapter 10 (Theorems 10.3, 10.4, Examples 12 to 14, and Exercises 41 and 42 for second and third isomorphism theorems for groups).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, etc. Link the fundamental concepts of groups and symmetrical figures.	(i) Each topic to be explained with examples. (ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given homework/assignments. (iv) Students to be encouraged to give short presentations.	<ul style="list-style-type: none"> • Presentations and participation in discussions. • Assignments and class tests. • Mid-term examinations. • End-term examinations.
2.	Analyze the subgroups of cyclic groups and classify subgroups of cyclic groups.		
3.	Explain the significance of the notion of cosets, normal subgroups and factor groups. Learn about Lagrange's theorem and Fermat's Little theorem.		
4.	Know about group homomorphisms and group isomorphisms.		

Keywords: Cauchy's theorem for finite Abelian groups, Cayley's theorem, Centralizer, Cyclic group, Dihedral group, Group homomorphism, Lagrange's theorem, Normalizer, Permutations.

BMATH307: Multivariate Calculus

Total Marks: 150 (Theory: 75, Internal Assessment: 25 and Practical: 50)

Workload: 4 Lectures, 4 Practicals (per week) **Credits:** 6 (4+2)

Duration: 14 Weeks (56 Hrs. Theory + 56 Hrs. Practical) **Examination:** 3 Hrs.

Course Objectives: To understand the extension of the studies of single variable differential and integral calculus to functions of two or more independent variables. Also, the emphasis will be on the use of Computer Algebra Systems by which these concepts may be analyzed and visualized to have a better understanding. This course will facilitate to become aware of applications of multivariable calculus tools in physics, economics, optimization, and understanding the architecture of curves and surfaces in plane and space etc.

Course Learning Outcomes: This course will enable the students to:

- i) Learn the conceptual variations when advancing in calculus from one variable to multivariable discussion.
- ii) Understand the maximization and minimization of multivariable functions subject to the given constraints on variables.
- iii) Learn about inter-relationship amongst the line integral, double and triple integral formulations.
- iv) Familiarize with Green's, Stokes' and Gauss divergence theorems.

Unit 1: Calculus of Functions of Several Variables

Functions of several variables, Level curves and surfaces, Limits and continuity, Partial differentiation, Higher order partial derivative, Tangent planes, Total differential and differentiability, Chain rule, Directional derivatives, The gradient, Maximal and normal property of the gradient, Tangent planes and normal lines.

Unit 2: Extrema of Functions of Two Variables and Properties of Vector Field

Extrema of functions of two variables, Method of Lagrange multipliers, Constrained optimization problems; Definition of vector field, Divergence and curl.

Unit 3: Double and Triple Integrals

Double integration over rectangular and nonrectangular regions, Double integrals in polar coordinates, Triple integral over a parallelepiped and solid regions, Volume by triple integrals, Triple integration in cylindrical and spherical coordinates, Change of variables in double and triple integrals.

Unit 4: Green's, Stokes' and Gauss Divergence Theorem

Line integrals, Applications of line integrals: Mass and Work, Fundamental theorem for line integrals, Conservative vector fields, Green's theorem, Area as a line integral, Surface integrals, Stokes' theorem, Gauss divergence theorem.

Reference:

1. Strauss, Monty J., Bradley, Gerald L., & Smith, Karl J. (2007). *Calculus* (3rd ed.). Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). Delhi. Indian Reprint 2011.

Additional Reading:

- i. Marsden, J. E., Tromba, A., & Weinstein, A. (2004). *Basic Multivariable Calculus*. Springer (SIE). First Indian Reprint.

Practical / Lab work to be performed in Computer Lab.

List of practicals to be done using Mathematica / MATLAB / Maple/Maxima/Scilab, etc.

1. Let $f(x)$ be any function and L be any real number. For given a and $\varepsilon > 0$ find a $\delta > 0$ such that for all x satisfying $0 < |x - a| < \delta$, the inequality $0 < |f(x) - l| < \varepsilon$ holds. For example:
 - (i) $f(x) = x + 1, L = 5, a = 4, \varepsilon = 0.01$.
 - (ii) $f(x) = \sqrt{x + 1}, L = 1, a = 4, \varepsilon = 0.1$.
 - (iii) $f(x) = x^2, L = 4, a = -2, \varepsilon = 0.5$.
 - (iv) $f(x) = \frac{1}{x}, L = -1, a = -1, \varepsilon = 0.1$.
2. Discuss the limit of the following functions when x tends to 0:

$$\pm \frac{1}{x}, \sin\left(\frac{1}{x}\right), \cos\left(\frac{1}{x}\right), x \sin\left(\frac{1}{x}\right), x \cos\left(\frac{1}{x}\right), x^2 \sin\left(\frac{1}{x}\right),$$

$$\frac{1}{x^n} \ (n \in \mathbb{N}), [x] \text{ greatest integer function, } \frac{1}{x} \sin\left(\frac{1}{x}\right).$$
3. Discuss the limit of the following functions when x tends to infinity:

$$e^{\pm \frac{1}{x}}, \sin\left(\frac{1}{x}\right), \frac{1}{x} e^{\pm x}, \frac{x}{x+1}, x^2 \sin\left(\frac{1}{x}\right), \frac{ax+b}{cx^2+dx+e} \ (a \neq 0, c \neq 0).$$
4. Discuss the continuity of the functions at $x = 0$ in the Practical 2.
5. Illustrate the geometric meaning of Rolle's theorem of the following functions on the given interval:
 - (i) $x^3 - 4x$ on $[-2, 2]$; (ii) $(x - 3)^4(x - 5)^3$ on $[3, 5]$ etc.
6. Illustrate the geometric meaning of Lagrange's mean value theorem of the following functions on the given interval:
 - (i) $\log x$ on $[1/2, 2]$; (ii) $x(x - 1)(x - 2)$ on $[0, 1/2]$; (iii) $2x^2 - 7x + 10$ on $[2, 5]$ etc.
7. Draw the following surfaces and find level curves at the given heights:
 - (i) $f(x, y) = 10 - x^2 - y^2; z = 1, z = 6, z = 9$.
 - (ii) $f(x, y) = x^2 + y^2; z = 1, z = 6, z = 9$.
 - (iii) $f(x, y) = x^3 - y; z = 1, z = 6$.
 - (iv) $f(x, y) = x^2 + \frac{y^2}{4}; z = 1, z = 5, z = 8$.
 - (v) $f(x, y) = 4x^2 + y^2; z = 0, z = 6, z = 9$.
8. Draw the following surfaces and discuss whether limit exists or not as (x, y) approaches to the given points. Find the limit, if it exists:
 - (i) $f(x, y) = \frac{x+y}{x-y}; (x, y) \rightarrow (0,0)$ and $(x, y) \rightarrow (1,3)$.
 - (ii) $f(x, y) = \frac{x-y}{\sqrt{x^2+y^2}}; (x, y) \rightarrow (0,0)$ and $(x, y) \rightarrow (2,1)$.
 - (iii) $f(x, y) = (x + y)e^{xy}; (x, y) \rightarrow (1,1)$ and $(x, y) \rightarrow (1,0)$.
 - (iv) $f(x, y) = e^{xy}; (x, y) \rightarrow (0,0)$ and $(x, y) \rightarrow (1,0)$.
 - (v) $f(x, y) = \frac{x+y^2}{x^2+y^2}; (x, y) \rightarrow (0,0)$.
 - (vi) $f(x, y) = \frac{x^2-y^2}{x^2+y^2}; (x, y) \rightarrow (0,0)$ and $(x, y) \rightarrow (2,1)$.
9. Draw the tangent plane to the following surfaces at the given point:
 - (i) $f(x, y) = \sqrt{x^2 + y^2}$ at $(3,1, \sqrt{10})$.

- (ii) $f(x, y) = 10 - x^2 - y^2$ at $(2, 2, 2)$.
 - (iii) $x^2 + y^2 + z^2 = 9$ at $(3, 0, 0)$.
 - (iii) $z = \tan^{-1}x$ at $(1, \sqrt{3}, \frac{\pi}{3})$ and $(2, 2, \frac{\pi}{4})$.
 - (iii) $z = \log|x + y^2|$ at $(-3, -2, 0)$.
10. Use an incremental approximation to estimate the following functions at the given point and compare it with calculated value:
- (i) $f(x, y) = 3x^4 + 2y^4$ at $(1.01, 2.03)$.
 - (ii) $f(x, y) = x^5 - 2y^3$ at $(0.98, 1.03)$.
 - (iii) $f(x, y) = e^{xy}$ at $(1.01, 0.98)$.
11. Find critical points and identify relative maxima, relative minima or saddle points to the following surfaces, if it exists:
- (i) $z = x^2 + y^2$; (ii) $z = 1 - x^2 - y^2$; (iii) $z = y^2 - x^2$; (iv) $z = x^2y^4$.
12. Draw the following regions D and check whether these regions are of Type I or Type II:
- (i) $D = \{(x, y): 0 \leq x \leq 2, 1 \leq y \leq e^x\}$.
 - (ii) $D = \{(x, y): \log y \leq x \leq 2, 1 \leq y \leq e^2\}$.
 - (iii) $D = \{(x, y): 0 \leq x \leq 1, x^3 \leq y \leq 1\}$.
 - (iv) The region D bounded by $y = x^2 - 2$ and the line $y = x$.
 - (v) $D = \{(x, y): 0 \leq x \leq \frac{\pi}{4}, \sin x \leq y \leq \cos x\}$.

Teaching Plan (Theory of BMATH307: Multivariate Calculus):

Week 1: Definition of functions of several variables, Graphs of functions of two variables – Level curves and surfaces, Limits and continuity of functions of two variables.

[1] Sections 11.1 and 11.2.

Week 2: Partial differentiation, and partial derivative as slope and rate, Higher order partial derivatives. Tangent planes, incremental approximation, Total differential.

[1] Chapter 11 (Sections 11.3 and 11.4).

Week 3: Differentiability, Chain rule for one parameter, Two and three independent parameters.

[1] Chapter 11 (Sections 11.4 and 11.5).

Week 4: Directional derivatives, The gradient, Maximal and normal property of the gradient, Tangent and normal lines.

[1] Chapter 11 (Section 11.6).

Week 5: First and second partial derivative tests for relative extrema of functions of two variables, and absolute extrema of continuous functions.

[1] Chapter 11 [Section 11.7 (up to page 605)].

Week 6: Lagrange multipliers method for optimization problems with one constraint, Definition of vector field, Divergence and curl.

[1] Sections 11.8 (Pages 610-614)] and 13.1.

Week 7: Double integration over rectangular and nonrectangular regions.

[1] Sections 12.1 and 12.2.

Week 8: Double integrals in polar co-ordinates, and triple integral over a parallelepiped.

[1] Chapter 12 (Sections 12.3 and 12.4).

Week 9: Triple integral over solid regions, Volume by triple integrals, and triple integration in cylindrical coordinates.

[1] Chapter 12 (Sections 12.4 and 12.5).

Week 10: Triple integration in spherical coordinates, Change of variables in double and triple integrals.

[1] Chapter 12 (Sections 12.5 and 12.6).

Week 11: Line integrals and its properties, applications of line integrals: mass and work.

[1] Chapter 13 (Section 13.2).

Week 12: Fundamental theorem for line integrals, Conservative vector fields and path independence.
[1] Chapter 13 (Section 13.3).

Week 13: Green's theorem for simply connected region, Area as a line integral, Definition of surface integrals.

[1] Chapter 13 [Sections 13.4 (Pages 712 to 716), 13.5 (Pages 723 to 726)].

Week 14: Stokes' theorem and the divergence theorem.

[1] Chapter 13 [Sections 13.6 (Pages 733 to 737), 13.7 (Pages 742 to 745)].

Note. To improve the problem solving ability, for similar kind of examples based upon the above contents, the Additional Reading (i) may be consulted.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn the conceptual variations when advancing in calculus from one variable to multivariable discussion.	(i) Each topic to be explained with illustrations. (ii) Students to be encouraged to discover the relevant concepts. (iii) Students to be given homework/assignments. (iv) Discuss and solve the theoretical and practical problems in the class. (v) Students to be encouraged to apply concepts to real world problems.	<ul style="list-style-type: none">• Presentations and class discussions.• Assignments and class tests.• Mid-term examinations.• Practical and viva-voce examinations.• End-term examinations.
2.	Understand the maximization and minimization of multivariable functions subject to the given constraints on variables.		
3.	Learn about inter-relationship amongst the line integral, double and triple integral formulations.		
4.	Familiarize with Green's, Stokes' and Gauss divergence theorems.		

Keywords: Directional derivatives, Double integral, Gauss divergence theorem, Green's theorem, Lagrange's multipliers, Level curves, Stokes' theorem, Volume integral, Vector field.

Skill Enhancement Paper

SEC-1: LaTeX and HTML

Total Marks: 100 (Theory: 38, Internal Assessment: 12, and Practical: 50)

Workload: 2 Lectures, 4 Practicals (per week) **Credits:** 4 (2+2)

Duration: 14 Weeks (28 Hrs. Theory + 56 Hrs. Practical) **Examination:** 2 Hrs.

Course Objectives: The purpose of this course is to acquaint students with the latest typesetting skills, which shall enable them to prepare high quality typesetting, beamer presentation and webpages.

Course Learning Outcomes: After studying this course the student will be able to:

- i) Create and typeset a LaTeX document.
- ii) Typeset a mathematical document using LaTeX.
- iii) Learn about pictures and graphics in LaTeX.
- iv) Create beamer presentations.
- v) Create web page using HTML.

Unit 1: Getting Started with LaTeX

Introduction to TeX and LaTeX, Typesetting a simple document, Adding basic information to a document, Environments, Footnotes, Sectioning and displayed material.

Unit 2: Mathematical Typesetting with LaTeX

Accents and symbols, Mathematical typesetting (elementary and advanced): Subscript/Superscript, Fractions, Roots, Ellipsis, Mathematical Symbols, Arrays, Delimiters, Multiline formulas, Spacing and changing style in math mode.

Unit 3: Graphics and Beamer Presentation in LaTeX

Graphics in LaTeX, Simple pictures using PSTricks, Plotting of functions, Beamer presentation.

Unit 4: HTML

HTML basics, Creating simple web pages, Images and links, Design of web pages.

References:

1. Bindner, Donald & Erickson, Martin. (2011). *A Student's Guide to the Study, Practice, and Tools of Modern Mathematics*. CRC Press, Taylor & Francis Group, LLC.
2. Lamport, Leslie (1994). *LaTeX: A Document Preparation System*, User's Guide and Reference Manual (2nd ed.). Pearson Education. Indian Reprint.

Additional Readings:

- i. Dongen, M. R. C. van (2012). *LaTeX and Friends*. Springer-Verlag.
- ii. Robbins, J. N. (2018). *Learning Web Design: A Beginner's Guide to HTML* (5th ed.). O'Reilly Media Inc.

Practical / Lab work to be performed in Computer Lab.

[1] Chapter 9 (Exercises 4 to 10), Chapter 10 (Exercises 1 to 4 and 6 to 9),
Chapter 11 (Exercises 1, 3, 4, and 5), and Chapter 15 (Exercises 5, 6 and 8 to 11).

Teaching Plan (Theory of SEC-1: LaTeX and HTML):

Weeks 1 to 3: Introduction to TeX and LaTeX, Typesetting a simple document, Adding basic information to a document, Environments, Footnotes, Sectioning and displayed material.

[1] Chapter 9 (9.1 to 9.5).

[2] Chapter 2 (2.1 to 2.5).

Weeks 4 to 6: Accents of symbols, Mathematical typesetting (elementary and advanced): Subscript/Superscript, Fractions, Roots, Ellipsis, Mathematical symbols, Arrays, Delimiters, Multiline formulas, Spacing and changing style in math mode.

[1] Chapter 9 (9.6 and 9.7).

[2] Chapter 3 (3.1 to 3.3).

Weeks 7 and 8: Graphics in LaTeX, Simple pictures using PSTricks, Plotting of functions.

[1] Chapter 9 (Section 9.8). Chapter 10 (10.1 to 10.3).

[2] Chapter 7 (7.1 and 7.2).

Weeks 9 and 10: Beamer presentation.

[1] Chapter 11 (Sections 11.1 to 11.4).

Weeks 11 and 12: HTML basics, Creating simple web pages.

[1] Chapter 15 (Sections 15.1 and 15.2).

Weeks 13 and 14: Adding images and links, Design of web pages.

[1] Chapter 15 (Sections 15.3 to 15.5).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Create and typeset a LaTeX document.	(i) Each topic to be explained with illustrations on computers. (ii) Students be given homework/ assignments. (iii) Students be encouraged to create simple webpages.	<ul style="list-style-type: none">• Presentations and class discussions.• Assignments and class tests.• Mid-term examinations.• End-term examinations.
2.	Typeset a mathematical document using LaTeX.		
3.	Learn about pictures and graphics in LaTeX. Create beamer presentations.		
4.	Create web page using HTML.		

Keywords: LaTeX, Mathematical typesetting, PSTricks, Beamer, HTML.

Semester-IV

BMATH408: Partial Differential Equations

Total Marks: 150 (Theory: 75, Internal Assessment: 25 and Practical: 50)

Workload: 4 Lectures, 4 Practicals (per week) **Credits:** 6 (4+2)

Duration: 14 Weeks (56 Hrs. Theory + 56 Hrs. Practical) **Examination:** 3 Hrs.

Course Objectives: The main objectives of this course are to teach students to form and solve partial differential equations and use them in solving some physical problems.

Course Learning Outcomes: The course will enable the students to:

- i) Formulate, classify and transform first order PDEs into canonical form.
- ii) Learn about method of characteristics and separation of variables to solve first order PDE's.
- iii) Classify and solve second order linear PDEs.
- iv) Learn about Cauchy problem for second order PDE and homogeneous and non-homogeneous wave equations.
- v) Apply the method of separation of variables for solving many well-known second order PDEs.

Unit 1: First Order PDE and Method of Characteristics

Introduction, Classification, Construction and geometrical interpretation of first order partial differential equations (PDE), Method of characteristic and general solution of first order PDE, Canonical form of first order PDE, Method of separation of variables for first order PDE.

Unit 2: Mathematical Models and Classification of Second Order Linear PDE

Gravitational potential, Conservation laws and Burger's equations, Classification of second order PDE, Reduction to canonical forms, Equations with constant coefficients, General solution.

Unit 3: The Cauchy Problem and Wave Equations

Mathematical modeling of vibrating string and vibrating membrane, Cauchy problem for second order PDE, Homogeneous wave equation, Initial boundary value problems, Non-homogeneous boundary conditions, Finite strings with fixed ends, Non-homogeneous wave equation, Goursat problem.

Unit 4: Method of Separation of Variables

Method of separation of variables for second order PDE, Vibrating string problem, Existence and uniqueness of solution of vibrating string problem, Heat conduction problem, Existence and uniqueness of solution of heat conduction problem, Non-homogeneous problem.

Reference:

1. Myint-U, Tyn & Debnath, Lokenath. (2007). *Linear Partial Differential Equation for Scientists and Engineers* (4th ed.). Springer, Third Indian Reprint, 2013.

Additional Readings:

- i. Sneddon, I. N. (2006). *Elements of Partial Differential Equations*, Dover Publications. Indian Reprint.
- ii. Stavroulakis, Ioannis P & Tersian, Stepan A. (2004). *Partial Differential Equations: An Introduction with Mathematica and MAPLE* (2nd ed.). World Scientific.

Practical / Lab work to be performed in a Computer Lab:

Modeling of the following similar problems using Mathematica/MATLAB/Maple/Maxima/Scilab etc.

1. Solution of Cauchy problem for first order PDE.
2. Plotting the characteristics for the first order PDE.
3. Plot the integral surfaces of a given first order PDE with initial data.
4. Solution of wave equation $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ for any two of the following associated conditions:
 - (i) $u(x, 0) = \phi(x)$, $u_t(x, 0) = \psi(x)$, $x \in \mathbb{R}$, $t > 0$.
 - (ii) $u(x, 0) = \phi(x)$, $u_t(x, 0) = \psi(x)$, $u(0, t) = 0$, $x > 0$, $t > 0$.
 - (iii) $u(x, 0) = \phi(x)$, $u_t(x, 0) = \psi(x)$, $u_x(0, t) = 0$, $x > 0$, $t > 0$.
 - (iv) $u(x, 0) = \phi(x)$, $u_t(x, 0) = \psi(x)$, $u(0, t) = 0$, $u(l, t) = 0$, $0 < x < l$, $t > 0$.
5. Solution of one-dimensional heat equation $u_t = k u_{xx}$, for a homogeneous rod of length l . That is - solve the IBVP:

$$\begin{aligned} u_t &= k u_{xx}, & 0 < x < l, & \quad t > 0, \\ u(0, t) &= 0, & u(l, t) &= 0, & \quad t \geq 0, \\ u(0, t) &= f(x), & 0 \leq x \leq l. \end{aligned}$$
6. Solving systems of ordinary differential equations.
7. Draw the following sequence of functions on the given interval and discuss the pointwise convergence:
 - (i) $f_n(x) = x^n$ for $x \in \mathbb{R}$,
 - (ii) $f_n(x) = \frac{x}{n}$ for $x \in \mathbb{R}$,
 - (iii) $f_n(x) = \frac{x^2 + nx}{n}$ for $x \in \mathbb{R}$,
 - (iv) $f_n(x) = \frac{\sin nx + n}{n}$ for $x \in \mathbb{R}$
 - (v) $f_n(x) = \frac{x}{x+n}$ for $x \in \mathbb{R}$, $x \geq 0$,
 - (vi) $f_n(x) = \frac{nx}{1+n^2x^2}$ for $x \in \mathbb{R}$
 - (vii) $f_n(x) = \frac{nx}{1+nx}$ for $x \in \mathbb{R}$, $x \geq 0$,
 - (viii) $f_n(x) = \frac{x^n}{1+x^n}$ for $x \in \mathbb{R}$, $x \geq 0$
8. Discuss the uniform convergence of sequence of functions (i) to (viii) given above in (7).

Teaching Plan (Theory of BMATH408: Partial Differential Equations):

Week 1: Introduction, Classification, Construction of first order partial differential equations (PDE).

[1] Chapter 2 (Sections 2.1 to 2.3).

Week 2: Method of characteristics and general solution of first order PDE.

[1] Chapter 2 (Sections 2.4 and 2.5).

Week 3: Canonical form of first order PDE, Method of separation of variables for first order PDE.

[1] Chapter 2 (Sections 2.6 and 2.7).

Week 4: The vibrating string, Vibrating membrane, Gravitational potential, Conservation laws.

[1] Chapter 3 (Sections 3.1 to 3.3, 3.5 and 3.6).

Weeks 5 and 6: Reduction to canonical forms, Equations with constant coefficients, General solution.

[1] Chapter 4 (Sections 4.1 to 4.5).

Weeks 7 and 8: The Cauchy problem for second order PDE, Homogeneous wave equation.

[1] Chapter 5 (Sections 5.1, 5.3 and 5.4).

Weeks 9 and 10: Initial boundary value problem, Non-homogeneous boundary conditions, Finite string with fixed ends, Non-homogeneous wave equation, Goursat problem.

[1] Chapter 5 (Sections 5.5 to 5. and 5.9).

Weeks 11 and 12: Method of separation of variables for second order PDE, Vibrating string problem.

[1] Chapter 7 (Sections 7.1 to 7.3).

Weeks 13 and 14: Existence (omit proof) and uniqueness of vibrating string problem. Heat conduction problem. Existence (omit proof) and uniqueness of the solution of heat conduction problem. Non-homogeneous problem.

[1] Chapter 7 (Sections 7.4 to 7.6 and 7.8).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Formulate, classify and transform first order PDEs into canonical form. Learn about method of characteristics and separation of variables to solve first order PDEs.	(i) Each topic to be explained with examples. (ii) Students to be encouraged to discover the relevant concepts.	<ul style="list-style-type: none">• Presentations and class discussions.• Assignments and class tests.• Mid-term examinations.• Practical and viva-voce examinations.• End-term examinations.
2.	Classify and solve second order linear PDEs.	(iii) Students to be given homework/ assignments.	
3.	Learn about Cauchy problem for second order PDE and homogeneous and non-homogeneous wave equations.	(iv) Discuss and solve the theoretical and practical problems in the class.	
4.	Apply the method of separation of variables for solving many well-known second order PDEs.	(v) Students to be encouraged to apply concepts to real world problems.	

Keywords: Cauchy problem, Characteristics, Conservation laws and Burger's equations, Heat equation, Vibrating membrane, Wave equation.

BMATH409: Riemann Integration & Series of Functions

Total Marks: 100 (Theory: 75 and Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: To understand the integration of bounded functions on a closed and bounded interval and its extension to the cases where either the interval of integration is infinite, or the integrand has infinite limits at a finite number of points on the interval of integration. The sequence and series of real valued functions, and an important class of series of functions (i.e., power series).

Course Learning Outcomes: The course will enable the students to:

- i) Learn about some of the classes and properties of Riemann integrable functions, and the applications of the Fundamental theorems of integration.
- ii) Know about improper integrals including, beta and gamma functions.
- iii) Learn about Cauchy criterion for uniform convergence and Weierstrass M-test for uniform convergence.
- iv) Know about the constraints for the inter-changeability of differentiability and integrability with infinite sum.
- v) Approximate transcendental functions in terms of power series as well as, differentiation and integration of power series.

Unit 1: Riemann Integration

Definition of Riemann integration, Inequalities for upper and lower Darboux sums, Necessary and sufficient conditions for the Riemann integrability, Definition of Riemann integration by Riemann sum and equivalence of the two definitions, Riemann integrability of monotone functions and continuous functions, Properties of Riemann integrable functions, Definitions of piecewise continuous and piecewise monotone functions and their Riemann integrability, intermediate value theorem for integrals, Fundamental theorems (I and II) of calculus, and the integration by parts.

Unit 2: Improper Integral

Improper integrals of Type-I, Type-II and mixed type, Convergence of beta and gamma functions, and their properties.

Unit 3: Sequence and Series of Functions

Pointwise and uniform convergence of sequence of functions, Theorem on the continuity of the limit function of a sequence of functions, Theorems on the interchange of the limit and derivative, and the interchange of the limit and integrability of a sequence of functions. Pointwise and uniform convergence of series of functions, Theorems on the continuity, derivability and integrability of the sum function of a series of functions, Cauchy criterion and the Weierstrass M-test for uniform convergence.

Unit 4: Power Series

Definition of a power series, Radius of convergence, Absolute convergence (Cauchy–Hadamard theorem), Uniform convergence, Differentiation and integration of power series, Abel's theorem.

References:

1. Bartle, Robert G., & Sherbert, Donald R. (2015). *Introduction to Real Analysis* (4th ed.). Wiley India Edition. Delhi.
2. Denlinger, Charles G. (2011). *Elements of Real Analysis*. Jones & Bartlett (Student Edition). First Indian Edition. Reprinted 2015.
3. Ghorpade, Sudhir R. & Limaye, B. V. (2006). *A Course in Calculus and Real Analysis*. Undergraduate Texts in Mathematics, Springer (SIE). First Indian reprint.
4. Ross, Kenneth A. (2013). *Elementary Analysis: The Theory of Calculus* (2nd ed.). Undergraduate Texts in Mathematics, Springer.

Additional Reading:

- i. Bilodeau, Gerald G., Thie, Paul R., & Keough, G. E. (2010). *An Introduction to Analysis* (2nd ed.). Jones & Bartlett India Pvt. Ltd. Student Edition. Reprinted 2015.

Teaching Plan (BMATH409: Riemann Integration & Series of Functions):

Week 1: Definition of Riemann integration, Inequalities for upper and lower Darboux sums.

[4] Chapter 6 [Section 32 (32.1 to 32.4)].

Week 2: Necessary and sufficient conditions for the Riemann integrability, Definition of Riemann integration by Riemann sum and equivalence of the two definitions.

[4] Chapter 6 [Section 32 (32.5 to 32.10)].

Week 3: Riemann integrability of monotone functions and continuous functions, Algebra and properties of Riemann integrable functions.

[4] Chapter 6 [Section 33 (33.1 to 33.6)].

Week 4: Definitions of piecewise continuous and piecewise monotone functions and their Riemann integrability, Intermediate value theorem for integrals.

[4] Chapter 6 [Section 33 (33.7 to 33.10)].

Week 5: First and second fundamental theorems of integral calculus, and the integration by parts.

[4] Chapter 6 [Section 34 (34.1 to 34.3)].

Week 6: Improper integrals of Type-I, Type-II and mixed type.

[2] Chapter 7 [Section 7.8 (7.8.1 to 7.8.18)].

Week 7: Convergence of beta and gamma functions, and their properties.

[3] Pages 405-408.

Week 8: Definitions and examples of pointwise and uniformly convergent sequence of functions.

[1] Chapter 8 [Section 8.1 (8.1.1 to 8.1.10)].

Week 9: Motivation for uniform convergence by giving examples, Theorem on the continuity of the limit function of a sequence of functions.

[1] Chapter 8 [Section 8.2 (8.2.1 to 8.2.2)].

Week 10: The statement of the theorem on the interchange of the limit function and derivative, and its illustration with the help of examples, The interchange of the limit function and integrability of a sequence of functions.

[1] Chapter 8 [Section 8.2 (Theorems 8.2.3 and 8.2.4)].

Week 11: Pointwise and uniform convergence of series of functions, Theorems on the continuity, derivability and integrability of the sum function of a series of functions.

[1] Chapter 9 [Section 9.4 (9.4.1 to 9.4.4)].

Week 12: Cauchy criterion for the uniform convergence of series of functions, and the Weierstrass M-test for uniform convergence.

[2] Chapter 9 [Section 9.4 (9.4.5 to 9.4.6)].

Week 13: Definition of a power series, Radius of convergence, Absolute and uniform convergence of a power series.

[4] Chapter 4 (Section 23).

Week 14: Differentiation and integration of power series, Statement of Abel's theorem and its illustration with the help of examples.

[4] Chapter 4 [Section 26 (26.1 to 26.6)].

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn about some of the classes and properties of Riemann integrable functions, and the applications of the fundamental theorems of integration.	(i) Each topic to be explained with examples. (ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given homework/assignments. (iv) Students to be encouraged to give short presentations.	<ul style="list-style-type: none">• Presentations and participation in discussions.• Assignments and class tests.• Mid-term examinations.• End-term examinations.
2.	Know about improper integrals including, beta and gamma functions.		
3.	Learn about Cauchy criterion for uniform convergence and Weierstrass M-test for uniform convergence. Know about the constraints for the inter-changeability of differentiability and integrability with infinite sum.		
4.	Approximate transcendental functions in terms of power series as well as, differentiation and integration of power series.		

Keywords: Beta function, Gamma function, Improper integral, Power series, Radius of convergence, Riemann integration, Uniform convergence, Weierstrass M-test.

BMATH410: Ring Theory & Linear Algebra-I

Total Marks: 100 (Theory: 75 and Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: The objective of this course is to introduce the fundamental theory of two objects, namely - rings and vector spaces, and their corresponding homomorphisms.

Course Learning Outcomes: The course will enable the students to:

- i) Learn about the fundamental concept of rings, integral domains and fields.
- ii) Know about ring homomorphisms and isomorphisms theorems of rings.
- iii) Learn about the concept of linear independence of vectors over a field, and the dimension of a vector space.
- iv) Basic concepts of linear transformations, dimension theorem, matrix representation of a linear transformation, and the change of coordinate matrix.

Unit 1: Introduction of Rings

Definition and examples of rings, Properties of rings, Subrings, Integral domains and fields, Characteristic of a ring, Ideals, Ideal generated by a subset of a ring, Factor rings, Operations on ideals, Prime and maximal ideals.

Unit 2: Ring Homomorphisms

Ring homomorphisms, Properties of ring homomorphisms, First, Second and Third Isomorphism theorems for rings, The Field of quotients.

Unit 3: Introduction of Vector Spaces

Vector spaces, Subspaces, Algebra of subspaces, Quotient spaces, Linear combination of vectors, Linear span, Linear independence, Basis and dimension, Dimension of subspaces.

Unit 4: Linear Transformations

Linear transformations, Null space, Range, Rank and nullity of a linear transformation, Matrix representation of a linear transformation, Algebra of linear transformations, Isomorphisms, Isomorphism theorems, Invertibility and the change of coordinate matrix.

References:

1. Gallian, Joseph. A. (2013). *Contemporary Abstract Algebra* (8th ed.). Cengage Learning India Private Limited. Delhi. Fourth impression, 2015.
2. Friedberg, Stephen H., Insel, Arnold J., & Spence, Lawrence E. (2003). *Linear Algebra* (4th ed.). Prentice-Hall of India Pvt. Ltd. New Delhi.

Additional Readings:

- i. Dummit, David S., & Foote, Richard M. (2016). *Abstract Algebra* (3rd ed.). Student Edition. Wiley India.
- ii. Herstein, I. N. (2006). *Topics in Algebra* (2nd ed.). Wiley Student Edition. India.
- iii. Hoffman, Kenneth, & Kunze, Ray Alden (1978). *Linear Algebra* (2nd ed.). Prentice-Hall of India Pvt. Limited. Delhi. Pearson Education India Reprint, 2015.

Teaching Plan (BMATH410: Ring Theory & Linear Algebra-I):

Week 1: Definition and examples of rings, Properties of rings, Subrings.

[1] Chapter 12.

Week 2: Integral domains and fields, Characteristic of a ring.

[1] Chapter 13.

Week 3 and 4: Ideals, Ideal generated by a subset of a ring, Factor rings, Operations on ideals, Prime and maximal ideals.

[1] Chapter 14.

Week 5: Ring homomorphisms, Properties of ring homomorphisms.

[1] Chapter 15 (up to Theorem 15.2).

Week 6: First, Second and Third Isomorphism theorems for rings, The field of quotients.

[1] Chapter 15 (Theorems 15.3 to 15.6, Examples 10 to 12), and Exercises 3 and 4 on Page 347.

Week 7: Vector spaces, Subspaces, Algebra of subspaces.

[2] Chapter 1 (Sections 1.2 and 1.3).

Week 8: Linear combination of vectors, Linear span, Linear independence.

[2] Chapter 1 (Sections 1.4 and 1.5).

Weeks 9 and 10: Bases and dimension. Dimension of subspaces.

[2] Chapter 1 (Section 1.6).

Week 11: Linear transformations, Null space, Range, Rank and nullity of a linear transformation.

[2] Chapter 2 (Section 2.1).

Weeks 12 and 13: Matrix representation of a linear transformation, Algebra of linear transformations.

[2] Chapter 2 (Sections 2.2 and 2.3).

Week 14: Isomorphisms, Isomorphism theorems, Invertibility and the change of coordinate matrix.

[2] Chapter 2 (Sections 2.4 and 2.5).

Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn about the fundamental concept of rings, integral domains and fields.	(i) Each topic to be explained with examples. (ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given homework/assignments. (iv) Students to be encouraged to give short presentations.	<ul style="list-style-type: none"> • Presentations and participation in discussions. • Assignments and class tests. • Mid-term examinations. • End-term examinations.
2.	Know about ring homomorphisms and isomorphisms theorems of rings.		
3.	Learn about the concept of linear independence of vectors over a field, and the dimension of a vector space.		
4.	Basic concepts of linear transformations, dimension theorem, matrix representation of a linear transformation, and the change of coordinate matrix.		

Keywords: Basis and dimension of a vector space, Characteristic of a ring, Integral domain, Isomorphism theorems for rings, Linear transformations, Prime and maximal ideals, Quotient field, Vector space.

Skill Enhancement Paper

SEC-2: Computer Algebra Systems and Related Software

Total Marks: 100 (Theory: 38, Internal Assessment: 12, and Practical: 50)

Workload: 2 Lectures, 4 Practicals (per week) **Credits:** 4 (2+2)

Duration: 14 Weeks (28 Hrs. Theory + 56 Hrs. Practical) **Examination:** 2 Hrs.

Course Objectives: This course aims at familiarizing students with the usage of computer algebra systems (/Mathematica/MATLAB/Maxima/Maple) and the statistical software **R**. The basic emphasis is on plotting and working with matrices using CAS. Data entry and summary commands will be studied in **R**. Graphical representation of data shall also be explored.

Course Learning Outcomes: This course will enable the students to:

- i) Use of computer algebra systems (Mathematica/MATLAB/Maxima/Maple etc.) as a calculator, for plotting functions and animations
- ii) Use of CAS for various applications of matrices such as solving system of equations and finding eigenvalues and eigenvectors.
- iii) Understand the use of the statistical software **R** as calculator and learn to read and get data into **R**.
- iv) Learn the use of **R** in summary calculation, pictorial representation of data and exploring relationship between data.
- v) Analyze, test, and interpret technical arguments on the basis of geometry.

Unit 1: Introduction to CAS and Applications

Computer Algebra System (CAS), Use of a CAS as a calculator, Computing and plotting functions in 2D, Plotting functions of two variables using Plot3D and ContourPlot, Plotting parametric curves surfaces, Customizing plots, Animating plots, Producing tables of values, working with piecewise defined functions, Combining graphics.

Unit 2: Working with Matrices

Simple programming in a CAS, Working with matrices, Performing Gauss elimination, operations (transpose, determinant, inverse), Minors and cofactors, Working with large matrices, Solving system of linear equations, Rank and nullity of a matrix, Eigenvalue, eigenvector and diagonalization.

Unit 3: R - The Statistical Programming Language

R as a calculator, Explore data and relationships in **R**. Reading and getting data into **R**: Combine and scan commands, Types and structure of data items with their properties, Manipulating vectors, Data frames, Matrices and lists, Viewing objects within objects, Constructing data objects and conversions.

Unit 4: Data Analysis with R

Summary commands: Summary statistics for vectors, Data frames, Matrices and lists, Summary tables, Stem and leaf plot, Histograms, Plotting in **R**: Box-whisker plots, Scatter plots, Pairs plots, Line charts, Pie charts, Cleveland dot charts and bar charts, Copy and save graphics to other applications.

References:

1. Bindner, Donald & Erickson, Martin. (2011). *A Student's Guide to the Study, Practice, and Tools of Modern Mathematics*. CRC Press, Taylor & Francis Group, LLC.
2. Torrence, Bruce F., & Torrence, Eve A. (2009). *The Student's Introduction to Mathematica®: A Handbook for Precalculus, Calculus, and Linear Algebra* (2nd ed.). Cambridge University Press.
3. Gardener, M. (2012). *Beginning R: The Statistical Programming Language*, Wiley.

Additional Reading:

- i. Verzani, John (2014). *Using R for Introductory Statistics* (2nd ed.). CRC Press, Taylor & Francis Group.

Note: Theoretical and Practical demonstration should be carried out only in **one** of the CAS: Mathematica/MATLAB/Maxima/Scilab or any other.

Practical / Lab work to be performed in Computer Lab.

[1] Chapter 12 (Exercises 1 to 4 and 8 to 12), Chapter 14 (Exercises 1 to 3)

[2] Chapter 3 [Exercises 3.2(1 and 2), 3.3(1, 2 and 4), 3.4(1 and 2), 3.5(1 to 4), 3.6(2 and 3)].

[2] Chapter 6 (Exercises 6.2 and 6.3) and Chapter 7 [Exercises 7.1(1), 7.2, 7.3(2), 7.4(1) and 7.6].

Note: Relevant exercises of [3] Chapters 2 to 5 and 7 (The practical may be done on the database to be downloaded from <http://data.gov.in/>).

Teaching Plan (Theory of SEC-1: Computer Algebra Systems and Related Software):

Weeks 1 to 3: Computer Algebra System (CAS), Use of a CAS as a calculator, Computing and plotting functions in 2D, Producing tables of values, Working with piecewise defined functions, Combining graphics. Simple programming in a CAS.

[1] Chapter 12 (Sections 12.1 to 12.5).

[2] Chapter 1, and Chapter 3 (Sections 3.1 to 3.6 and 3.8).

Weeks 4 and 5: Plotting functions of two variables using Plot3D and contour plot, Plotting parametric curves surfaces, Customizing plots, Animating plots.

[2] Chapter 6 (Sections 6.2 and 6.3).

Weeks 6 to 8: Working with matrices, Performing Gauss elimination, Operations (Transpose, Determinant, Inverse), Minors and cofactors, Working with large matrices, Solving system of linear equations, Rank and nullity of a matrix, Eigenvalue, Eigenvector and diagonalization.

[2] Chapter 7 (Sections 7.1 to 7.8).

Weeks 9 to 11: R as a calculator, Explore data and relationships in R. Reading and getting data into R: Combine and scan commands, Types and structure of data items with their properties. Manipulating vectors, Data frames, Matrices and lists. Viewing objects within objects. Constructing data objects and conversions.

[1] Chapter 14 (Sections 14.1 to 14.4).

[3] Chapter 2, and Chapter 3.

Weeks 12 to 14: Summary commands: Summary statistics for vectors, Data frames, Matrices and lists. Summary tables. Stem and leaf plot, histograms. Plotting in R: Box-whisker plots, Scatter plots, Pairs plots, Line charts, Pie charts, Cleveland dot charts and Bar charts. Copy and save graphics to other applications.

[1] Chapter 14 (Section 14.7).

[3] Chapter 5 (up to Page 157), and Chapter 7.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Use of computer algebra systems (Mathematica/MATLAB/Maxima/Maple etc.) as a calculator, for plotting functions and animations	(i) Each topic to be explained with illustrations using CAS or R . (ii) Students to be given homework/ assignments. (iii) Students to be encouraged to do look for new applications.	<ul style="list-style-type: none">• Presentations and class discussions.• Assignments and class tests.• Mid-term examinations.• End-term examinations.
2.	Use of CAS for various applications of matrices such as solving system of equations and finding eigenvalues and eigenvectors.		
3.	Understand the use of the statistical software R as calculator and learn to read and get data into R .		
4.	Learn the use of R in summary calculation, pictorial representation of data and exploring relationship between data. Analyze, test, and interpret technical arguments on the basis of geometry.		

Keywords: Plot3D, ContourPlot, Calculator, Summary commands, Histograms.

Semester-V

BMATH511: Metric Spaces

Total Marks: 100 (Theory: 75, Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: Up to this stage, students do study the concepts of analysis which evidently rely on the notion of distance. In this course, the objective is to develop the usual idea of distance into an abstract form on any set of objects, maintaining its inherent characteristics, and the resulting consequences.

Course Learning Outcomes: The course will enable the students to:

- i) Learn various natural and abstract formulations of distance on the sets of usual or unusual entities. Become aware one such formulations leading to metric spaces.
- ii) Analyse how a theory advances from a particular frame to a general frame.
- iii) Appreciate the mathematical understanding of various geometrical concepts, viz. balls or connected sets etc. in an abstract setting.
- iv) Know about Banach fixed point theorem, whose far-reaching consequences have resulted into an independent branch of study in analysis, known as fixed point theory.
- v) Learn about the two important topological properties, namely connectedness and compactness of metric spaces.

Unit 1: Basic Concepts

Metric spaces: Definition and examples, Sequences in metric spaces, Cauchy sequences, Complete metric space.

Unit 2: Topology of Metric Spaces

Open and closed ball, Neighborhood, Open set, Interior of a set, Limit point of a set, Derived set, Closed set, Closure of a set, Diameter of a set, Cantor's theorem, Subspaces, Dense set.

Unit 3: Continuity & Uniform Continuity in Metric Spaces

Continuous mappings, Sequential criterion and other characterizations of continuity, Uniform continuity, Homeomorphism, Contraction mapping, Banach fixed point theorem.

Unit 4: Connectedness and Compactness

Connectedness, Connected subsets of \mathbb{R} , Connectedness and continuous mappings, Compactness, Compactness and boundedness, Continuous functions on compact spaces.

Reference:

1. Shirali, Satish & Vasudeva, H. L. (2009). *Metric Spaces*, Springer, First Indian Print.

Additional Readings:

- i. Kumaresan, S. (2014). *Topology of Metric Spaces* (2nd ed.). Narosa Publishing House. New Delhi.
- ii. Simmons, George F. (2004). *Introduction to Topology and Modern Analysis*. McGraw-Hill Education. New Delhi.

Teaching Plan (BMATH511: Metric Spaces):

Week 1: Definition of metric space, Illustration using the usual metric on \mathbb{R} , Euclidean and max metric on \mathbb{R}^2 , Euclidean and max metric on \mathbb{R}^n , Discrete metric, Sup metric on $B(S)$ and $C[a, b]$, Integral metric on $C[a, b]$.

[1] Chapter 1 [Section 1.2 (1.2.1, 1.2.2 ((i), (ii), (iv), (v), (viii), (ix), (x)), 1.2.3 and 1.2.4 (i))]

Week 2: Sequences in metric space, Definition of limit of a sequence, Illustration through examples, Cauchy sequences.

[1] Chapter 1 [Section 1.3 (1.3.1, 1.3.2, 1.3.3 ((i), (iv)), 1.3.5) and Section 1.4 (1.4.1 to 1.4.4)]

Week 3: Definition of complete metric spaces, Illustration through examples.

[1] Chapter 1 [Section 1.4 (1.4.5 to 1.4.7, 1.4.12 to 1.4.14(ii))].

Week 4: Open and closed balls, Neighborhood, Open sets, Examples and basic results.

[1] Chapter 2 [Section 2.1 (2.1.1 to 2.1.11 (except 2.1.6(ii)))].

Week 5: Interior point, Interior of a set, Limit point, Derived set, Examples and basic results.

[1] Chapter 2 [Section 2.1 (2.1.12 to 2.1.20)].

Week 6: Closed set, Closure of a set, Examples and basic results.

[1] Chapter 2 [Section 2.1 (2.1.21 to 2.1.35)].

Week 7: Bounded set, Diameter of a set, Cantor's theorem.

[1] Chapter 2 [Section 2.1 (2.1.41 to 2.1.44)].

Week 8: Relativisation and subspaces, Dense sets.

[1] Chapter 2 [Section 2.2 (2.2.1 to 2.2.6), Section 2.3 (2.3.12 to 2.3.13(iv))].

Weeks 9 to 11: Continuous mappings, Sequential and other characterizations of continuity, Uniform continuity, Homeomorphism, Contraction mappings, Banach fixed point theorem.

[1] Chapter 3 [Section 3.1, Section 3.4 (3.4.1 to 3.4.8), Section 3.5 (3.5.1 to 3.5.7(iii)), and Section 3.7 (3.7.1 to 3.7.5)].

Weeks 12 to 14: Connectedness and compactness, Definitions and properties of connected and compact spaces.

[1] Chapter 4 [Section 4.1 (4.1.1 to 4.1.12)], and Chapter 5 [Section 5.1 (5.1.1 to 5.1.6), and Section 5.3 (5.3.1 to 5.3.10)].

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn various natural and abstract formulations of distance on the sets of usual or unusual entities. Become aware one such formulations leading to metric spaces. Analyse how a theory advances from a particular frame to a general frame.	(i) Each topic to be explained with examples.	<ul style="list-style-type: none"> • Student presentations • Participation in discussions. • Assignments and class tests. • Mid-term examinations. • End-term examinations.
2.	Appreciate the mathematical understanding of various geometrical concepts, viz. balls or connected sets etc. in an abstract setting.	(ii) Students to be involved in discussions and encouraged to ask questions.	
3.	Know about Banach fixed point theorem, whose far-reaching consequences resulted into an independent branch of study in analysis, known as fixed point theory.	(iii) Students to be given homework/assignment.	
4.	Learn about the two important topological properties, namely connectedness and compactness of metric spaces.	(iv) Students to be encouraged to give short presentations. (v) Illustrate the concepts through CAS.	

Keywords: Banach fixed point theorem, Cantor's theorem, Closure, Compactness, Connectedness, Contraction mapping, Interior, Open set.

BMATH512: Group Theory-II

Total Marks: 100 (Theory: 75, Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: The course will develop an in-depth understanding of one of the most important branch of the abstract algebra with applications to practical real-world problems. Classification of all finite abelian groups (up to isomorphism) can be done.

Course Learning Outcomes: The course shall enable students to:

- i) Learn about automorphisms for constructing new groups from the given group.
- ii) Learn about the fact that external direct product applies to data security and electric circuits.
- iii) Understand fundamental theorem of finite abelian groups.
- iv) Be familiar with group actions and conjugacy in S_n .
- v) Understand Sylow theorems and their applications in checking nonsimplicity.

Unit 1: Automorphisms and Properties

Automorphism, inner automorphism, Automorphism groups, Automorphism groups of finite and infinite cyclic groups, Characteristic subgroups, Commutator subgroup and its properties; Applications of factor groups to automorphism groups.

Unit 2: External and Internal Direct Products of Groups

External direct products of groups and its properties, The group of units modulo n as an external direct product, Applications to data security and electric circuits; Internal direct products, Classification of groups of order p^2 , where p is a prime; Fundamental theorem of finite abelian groups and its isomorphism classes.

Unit 3: Group Action

Group actions and permutation representations; Stabilizers and kernels of group actions; Groups acting on themselves by left multiplication and consequences; Conjugacy in S_n .

Unit 4: Sylow Theorems and Applications

Conjugacy classes, Class equation, p -groups, Sylow theorems and consequences, Applications of Sylow theorems; Finite simple groups, Nonsimplicity tests; Generalized Cayley's theorem, Index theorem, Embedding theorem and applications. Simplicity of A_5 .

References:

1. Dummit, David S., & Foote, Richard M. (2016). *Abstract Algebra* (3rd ed.). Student Edition. Wiley India.
2. Gallian, Joseph. A. (2013). *Contemporary Abstract Algebra* (8th ed.). Cengage Learning India Private Limited. Delhi. Fourth impression, 2015.

Additional Reading:

- i. Rotman, Joseph J. (1995). *An Introduction to The Theory of Groups* (4th ed.). Springer-Verlag, New York.

Teaching Plan (BMATH512: Group Theory-II):

Week 1: Automorphism, Inner automorphism, Automorphism groups, Automorphism groups of finite and infinite cyclic groups.

[2] Chapter 6 (Pages 135 to 138).

Week 2: Characteristic subgroups, Commutator subgroup and its properties; Applications of factor groups to automorphism groups.

[2] Exercises 1 to 4 on Page 181, and Exercises 62, 68 on Page 204.

[2] Chapter 9 (Theorem 9.4 and Example 17).

Week 3: External direct products of groups and its properties, The group of units modulo n as an external direct product, Applications to data security and electric circuits.

[2] Chapter 8.

Week 4: Internal direct products, Classification of groups of order p^2 , where p is a prime.

[2] Chapter 9 (Section on internal direct products, Pages 195 to 200).

Week 5: Statement of the Fundamental theorem of finite abelian groups, The isomorphism classes of Abelian groups.

[2] Chapter 11.

Weeks 6 and 7: Group actions and permutation representations; Stabilizers and kernels of group actions.

[1] Chapter 1 (Section 1.7), Chapter 2 (Section 2.2) and Chapter 4 (Section 4.1, except cycle decompositions).

Weeks 8 and 9: Groups acting on themselves by left multiplication and consequences; Conjugacy in S_n .

[1] Chapter 4 [Section 4.2 and Section 4.3 (Pages 125-126)].

Week 10: Conjugacy classes, Class equation, p -groups.

[2] Chapter 24 (Pages 409 to 411).

Weeks 11 and 12: State three Sylow theorems and give their applications.

[2] Chapter 24 (Pages 412 to 421).

Weeks 13 and 14: Finite simple groups, Nonsimplicity tests; Generalized Cayley's theorem, Index theorem, Embedding theorem and applications; Simplicity of A_5 .

[2] Chapter 25.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn about automorphisms for constructing new groups from the given group. Learn about the fact that external direct product applies to data security and electric circuits.	(i) Each topic to be explained with examples. (ii) Students to be involved in discussions and encouraged to ask questions.	<ul style="list-style-type: none"> • Presentations and participation in discussions. • Assignments and class tests. • Mid-term examinations. • End-term examinations.
2.	Understand fundamental theorem of finite abelian groups.	(iii) Students to be given homework/assignments.	
3.	Be familiar with group actions and conjugacy in S_n .	(iv) Students to be encouraged to give short presentations.	
4.	Understand Sylow theorems and their applications in checking nonsimplicity.		

Keywords: Automorphism, External direct products, Isomorphism classes, Group action, Class equation, Sylow theorems.

Discipline Specific Elective (DSE) Course -1 (including practicals)

Any *one* of the following (at least *two* shall be offered by the college):

DSE-1 (i): Numerical Analysis

DSE-1 (ii): Mathematical Modeling and Graph Theory

DSE-1 (iii): C++ Programming for Mathematics

DSE-1 (i): Numerical Analysis

Total Marks: 150 (Theory: 75 + Internal Assessment: 25 + Practical: 50)

Workload: 4 Lectures, 4 Periods practical (per week) **Credits:** 6 (4+2)

Duration: 14 Weeks (56 Hrs. Theory + 56 Hrs. practical) **Examination:** 3 Hrs.

Course Objectives: To comprehend various computational techniques to find approximate value for possible root(s) of non-algebraic equations, to find the approximate solutions of system of linear equations and ordinary differential equations. Also, the use of Computer Algebra System (CAS) by which the numerical problems can be solved both numerically and analytically, and to enhance the problem solving skills.

Course Learning Outcomes: The course will enable the students to:

- i) Learn some numerical methods to find the zeroes of nonlinear functions of a single variable and solution of a system of linear equations, up to a certain given level of precision.
- ii) Know about methods to solve system of linear equations, such as Gauss–Jacobi, Gauss–Seidel and SOR methods.
- iii) Interpolation techniques to compute the values for a tabulated function at points not in the table.
- iv) Applications of numerical differentiation and integration to convert differential equations into difference equations for numerical solutions.

Unit 1: Methods for Solving Algebraic and Transcendental Equations

Algorithms, Convergence, Bisection method, False position method, Fixed point iteration method, Newton's method and Secant method.

Unit 2: Techniques to Solve Linear Systems

Partial and scaled partial pivoting, LU decomposition and its applications, Iterative methods: Gauss–Jacobi, Gauss–Seidel and SOR methods.

Unit 3: Interpolation

Lagrange and Newton interpolation, Piecewise linear interpolation.

Unit 4: Numerical Differentiation and Integration

First and higher order approximation for first derivative, Approximation for second derivative, Richardson extrapolation method; Numerical integration by closed Newton–Cotes formulae: Trapezoidal rule, Simpson's rule and its error analysis; Euler's method to solve ODE's, Second order Runge–Kutta Methods: Modified Euler's method, Heun's method and optimal RK2 method.

Note: Emphasis is to be laid on the algorithms of the above numerical methods. Non programmable scientific calculator may be allowed in the University examination.

Reference:

1. Bradie, Brian. (2006). *A Friendly Introduction to Numerical Analysis*. Pearson Education, India. Dorling Kindersley (India) Pvt. Ltd. Third impression 2011.

Additional Readings:

- i. Jain, M. K., Iyengar, S. R. K., & Jain, R. K. (2012). *Numerical Methods for Scientific and Engineering Computation*. (6th ed.). New Age International Publisher, India, 2016.
- ii. Gerald, C. F., & Wheatley, P. O. (2008). *Applied Numerical Analysis* (7th ed.). Pearson Education. India.

Practical / Lab work to be performed in Computer Lab:

Use of computer algebra software (CAS), for example Mathematica/MATLAB/Maple/Maxima/Scilab etc., for developing the following numerical programs:

1. Bisection method
2. Newton–Raphson method
3. Secant method
4. Regula–Falsi method
5. LU decomposition method
6. Gauss–Jacobi method
7. SOR method
8. Gauss–Seidel method
9. Lagrange interpolation
10. Newton interpolation
11. Trapezoidal rule
12. Simpson's rule
13. Euler's method
14. Second order Runge–Kutta methods.

Note: For any of the CAS: Mathematica /MATLAB/ Maple/Maxima/Scilab etc., data types-simple data types, floating data types, character data types, arithmetic operators and operator precedence, variables and constant declarations, expressions, input/output, relational operators, logical operators and logical expressions, control statements and loop statements, Arrays should be introduced to the students.

Teaching Plan (Theory of DSE-I (i): Numerical Analysis):

Week 1: Algorithms, Convergence, Order of convergence and examples.

[1] Chapter 1 (Sections 1.1 and 1.2).

Week 2: Bisection method, False position method and their convergence analysis, Stopping condition and algorithms.

[1] Chapter 2 (Sections 2.1 and 2.2).

Week 3: Fixed point iteration method, its order of convergence and stopping condition.

[1] Chapter 2 (Section 2.3).

Week 4: Newton's method, Secant method, their order of convergence and convergence analysis.

[1] Chapter 2 (Sections 2.4 and 2.5).

Week 5: Examples to understand partial and scaled partial pivoting. LU decomposition.

[1] Chapter 3 (Sections 3.2, and 3.5 up to Example 3.15).

Weeks 6 and 7: Application of LU decomposition to solve system of linear equations. Gauss–Jacobi method, Gauss–Seidel and SOR iterative methods to solve system of linear equations.

[1] Chapter 3 (Sections 3.5 and 3.8).

Week 8: Lagrange interpolation: Linear and higher order interpolation, and error in it.

[1] Chapter 5 (Section 5.1).

Weeks 9 and 10: Divided difference and Newton interpolation, Piecewise linear interpolation.

[1] Chapter 5 (Sections 5.3 and 5.5).

Weeks 11 and 12: First and higher order approximation for first derivative and error in the approximation. Second order forward, Backward and central difference approximations for second derivative, Richardson extrapolation method

[1] Chapter 6 (Sections 6.2 and 6.3).

Week 13: Numerical integration: Trapezoidal rule, Simpson's rule and its error analysis.

[1] Chapter 6 (Section 6.4).

Week 14: Euler's method to solve ODE's, Second order Runge–Kutta methods: Modified Euler's method, Heun's method and optimal RK2 method.

[1] Chapter 7 (Section 7.2 up to Page 562 and Section 7.4, Pages 582-585).

Facilitating the achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn some numerical methods to find the zeroes of nonlinear functions of a single variable and solution of a system of linear equations, up to a certain given level of precision.	(i) Each topic to be explained with illustrations. (ii) Students be encouraged to discover the relevant concepts.	• Presentations and class discussions. • Assignments and class tests.
2.	Know about methods to solve system of linear equations, such as Gauss–Jacobi, Gauss–Seidel and SOR methods.	(iii) Students to be given homework/assignments. (iv) Discuss and solve the theoretical and practical problems in the class.	• Student presentations. • Mid-term examinations.
3.	Interpolation techniques to compute the values for a tabulated function at points not in the table.	(v) Students to be encouraged to apply concepts to real world problems.	• Practical and viva-voce examinations. • End-term examinations.
4.	Applications of numerical differentiation and integration to convert differential equations into difference equations for numerical solutions.		

Keywords: Algorithm, Euler's method, Interpolation, Iterative methods, LU decomposition, Newton–Cotes formulae, Order of convergence, Order of a method, Partial pivoting.

DSE-1 (ii): Mathematical Modeling and Graph Theory

Total Marks: 150 (Theory: 75 + Internal Assessment: 25 + Practical: 50)

Workload: 4 Lectures, 4 Periods practical (per week) **Credits:** 6 (4+2)

Duration: 14 Weeks (56 Hrs. Theory + 56 Hrs. practical) **Examination:** 3 Hrs.

Course Objectives: The main objective of this course is to teach students how to model physical problems using differential equations and solve them. Also, the use of Computer Algebra Systems (CAS) by which the listed problems can be solved both numerically and analytically.

Course Learning Outcomes: The course will enable the students to:

- i) Know about power series solution of a differential equation and learn about Legendre's and Bessel's equations.
- ii) Use of Laplace transform and inverse transform for solving initial value problems.
- iii) Learn about various models such as Monte Carlo simulation models, queuing models, and linear programming models.
- iv) Understand the basics of graph theory and learn about social networks, Eulerian and Hamiltonian graphs, diagram tracing puzzles and knight's tour problem.

Unit 1: Power Series Solutions

Power series solution of a differential equation about an ordinary point, Solution about a regular singular point, The method of Frobenius, Legendre's and Bessel's equations.

Unit 2: Laplace Transforms

Laplace transform and inverse transform, Application to initial value problem up to second order.

Unit 3: Monte Carlo Simulation

Monte Carlo simulation modeling: Simulating deterministic behavior (area under a curve, volume under a surface); Generating random numbers: Middle square method, Linear congruence; Queuing models: Harbor system, Morning rush hour; Overview of optimization modeling; Linear programming model: Geometric solution, Algebraic solution, Simplex method, Sensitivity analysis.

Unit 4: Graph Theory

Graphs, Diagraphs, Networks and subgraphs, Vertex degree, Paths and cycles, Regular and bipartite graphs, Four cube problem, Social networks, Exploring and traveling, Eulerian and Hamiltonian graphs, Applications to dominoes, Diagram tracing puzzles, Knight's tour problem, Gray codes.

References:

1. Aldous, Joan M., & Wilson, Robin J. (2007). *Graphs and Applications: An Introductory Approach*. Springer. Indian Reprint.
2. Edwards, C. Henry, Penney, David E., & Calvis, David T. (2015). *Differential Equations and Boundary Value Problems: Computing and Modeling* (5th ed.). Pearson.
3. Giordano, Frank R., Fox, William P., & Horton, Steven B. (2014). *A First Course in Mathematical Modeling* (5th ed.). Brooks/Cole, Cengage Learning.

Practical / Lab work to be performed in Computer Lab:

Modeling of the following problems using Mathematica/MATLAB/Maple/Maxima/Scilab etc.

1. Plotting of Legendre polynomial for $n = 1$ to 5 in the interval $[0, 1]$. Verifying graphically that all the roots of $P_n(x)$ lie in the interval $[0, 1]$.
2. Automatic computation of coefficients in the series solution near ordinary points.
3. Plotting of the Bessel's function of first kind of order 0 to 3.
4. Automating the Frobenius series method.
5. (i) Random number generation and then use it for one of the following:
 - (a) Simulate area under a curve,
 - (b) Simulate volume under a surface.
- (ii) Programming of either one of the queuing model:
 - (a) Single server queue (e.g. Harbor system),
 - (b) Multiple server queue (e.g. Rush hour).
- (iii) Programming of the Simplex method for 2 / 3 variables.

Teaching Plan (Theory of DSE-I (ii): Mathematical Modeling and Graph Theory):

Weeks 1 and 3: Power series solution of a differential equation about an ordinary point, Solution about a regular singular point. Legendre's equation. The method of Frobenius.

[2] Chapter 8 (Sections 8.1 to 8.3).

Week 4: Bessel's equation. Bessel's function of first kind.

[2] Chapter 8 [Section 8.5 up to Equation (19), Page 551].

Weeks 5 and 6: Laplace transform and inverse transform, Application to initial value problem up to second order.

[2] Chapter 7 (Sections 7.1 to 7.3).

Weeks 7 and 8: Monte Carlo simulation modeling: Simulating deterministic behavior (area under a curve, volume under a surface), Generating random numbers: Middle square method, Linear congruence. Queuing models: Harbor system, Morning rush hour.

[3] Chapter 5 (Sections 5.1 to 5.2, and 5.5).

Weeks 9 and 10: Overview of optimization modeling, Linear programming model: Geometric solution, Algebraic solution, Simplex method, Sensitivity analysis.

[3] Chapter 7.

Weeks 11 and 12: Graphs, Diagraphs, Networks and subgraphs, Vertex degree, Paths and cycles, Regular and bipartite graphs, Four cube problem, Social networks.

[1] Chapter 1 (Section 1.1), and Chapter 2.

Weeks 13 and 14: Overview of optimization modeling, Linear Programming Model: Geometric solution, Algebraic solution, Simplex method, Sensitivity analysis.

[1] Chapter 3.

Note: [1] Chapter 1 (Section 1.1), Chapter 2 (Sections 2.1 to 2.4), Chapter 3 (Sections 3.1 to 3.3) are to be reviewed only. This is in order to understand the models on Graph Theory.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Know about power series solution of a differential equation and learn about Legendre's and Bessel's equations.	(i) Each topic to be explained with illustrations. (ii) Students to be encouraged to discover the relevant	<ul style="list-style-type: none"> • Presentations and class discussions. • Assignments and

2.	Use of Laplace transform and inverse transform for solving initial value problems.	concepts. (iii) Students to be given homework/assignments.	class tests. <ul style="list-style-type: none">• Student presentations.
3.	Learn about various models such as Monte Carlo simulation models, queuing models, and linear programming models.	(iv) Discuss and solve the theoretical and practical problems in the class.	<ul style="list-style-type: none">• Mid-term examinations.
4.	Understand the basics of graph theory and learn about social networks, Eulerian and Hamiltonian graphs, diagram tracing puzzles and knight's tour problem.	(v) Students to be encouraged to apply concepts to real world problems.	<ul style="list-style-type: none">• Practical and viva-voce examinations.• End-term examinations.

Keywords: Legendre's and Bessel's equations, Laplace transform Monte Carlo simulation, Hamiltonian graphs.

DSE-1 (iii): C++ Programming for Mathematics

Total Marks: 150 (Theory: 75 + Internal Assessment: 25 + Practical: 50)

Workload: 4 Lectures, 4 Periods practical (per week) **Credits:** 6 (4+2)

Duration: 14 Weeks (56 Hrs. Theory + 56 Hrs. practical) **Examination:** 3 Hrs.

Course Objectives: This course introduces C++ programming in the idiom and context of mathematics and imparts a starting orientation using available mathematical libraries, and their applications.

Course Learning Outcomes: After completion of this paper, student will be able to:

- i) Understand and apply the programming concepts of C++ which is important to mathematical investigation and problem solving.
- ii) Learn about structured data-types in C++ and learn about applications in factorization of an integer and understanding Cartesian geometry and Pythagorean triples.
- iii) Use of containers and templates in various applications in algebra.
- iv) Use mathematical libraries for computational objectives.
- v) Represent the outputs of programs visually in terms of well formatted text and plots.

Unit 1: C++ Essentials

Fundamentals of programming, Organization of logic flow in stored program model of computation, C++ as a general purpose programming language, Structure of a C++ program, Common compilers and IDE's, Basic data-types, Variables and literals in C++, Operators, Expressions, Evaluation precedence, and Type compatibility. Outline of program development in C++, Debugging and testing; Applications: Greatest common divisor, and Random number generation.

Unit 2: Working with Structured Data

Structured data-types in C++, Arrays and manipulating data in arrays with applications in factorization of an integer and finding Euler's totient; Objects and classes: Information hiding, Modularity, Constructors and Destructors, Methods and Polymorphism; Applications: Cartesian geometry using points (2 & 3-dimensional), and Pythagorean triples.

Unit 3: Working with Containers and Templates

Containers and Template Libraries: Sets, Iterators, Multisets, Vectors, Maps, Lists, Stacks and Queues; Applications: Basic set algebra, Modulo arithmetic, Permutations, and Polynomials.

Unit 4: Using Mathematical Libraries and Packages

Arbitrary precision arithmetic using the GMP package; Linear algebra: Two-dimensional arrays in C++ with applications in finding eigenvalues, eigenvectors, rank, nullity, and solving system of linear equations in matrices; Features of C++ for input/output and visualization: strings, streams, formatting method; Processing files in a batch, Command-line arguments, Visualization packages and their use in plots.

Reference:

1. Scheinerman, Edward (2006). *C++ for Mathematicians: An Introduction for Students and Professionals*. Chapman & Hall/CRC. Taylor & Francis Group, LLC.

Additional Readings:

- i. Dale, Nell & Weems, Chip (2013). *Programming and Problem Solving with C++* (6th ed.). Comprehensive Edition. Jones & Bartlett Learning.
- ii. Gottschling, Peter (2016). *Discovering Modern C++: An Intensive Course for Scientists, Engineers, and Programmers*. Addison-Wesley. Pearson Education, Inc.
- iii. Josuttis, Nicolai M. (2012). *The C++ Standard Library: A Tutorial and Reference* (2nd ed.). Addison-Wesley. Pearson Education, Inc.
- iv. Lippman, Stanley B. (2000). *Essential C++*. Addison-Wesley.
- v. Stroustrup, Bjarne (2013). *The C++ Programming Language* (4th ed.). Addison-Wesley.

Practical / Lab work to be performed in Computer Lab:

A: Preparatory (Practical Sessions: 8 Hrs.)

1. Setting up of C++ programming environment on Linux/Windows/Mac-OS; gcc/g++/mingw/cc, Program-development methodology and use IDE's or other tools.
2. Demonstration of sample programs for
 - (i) "Hello World"
 - (ii) Sum of an arithmetic progression.
 - (iii) Value of $\sin x$ using series expansion.
3. Finding/demonstrating:
 - (i) Machine epsilon.
 - (ii) Integer and float overflow/underflow.
 - (iii) Iteration and selection based logic.

(provide a list of 8-10 problems suitable to learners needs)

B: Evaluative:

Set-I: (Practical Sessions: 8 Hrs.)

1. Greatest common divisor (including Euclid's Method).
2. Random number generation (including a Monte Carlo Program).

Set-II: (Practical Sessions: 12 Hrs.)

1. Factorization of an integer, and Euler's totient.
2. Cartesian geometry using points (2 & 3-dimensional).
3. Pythagorean triples.

Set-III: (Practical Sessions: 16 Hrs.)

1. Basic set algebra.
2. Modulo arithmetic.
3. Permutations.
4. Polynomials.

Set-IV: (Practical Sessions: 12 Hrs.)

1. Arbitrary precision arithmetic using the GMP package.
2. Finding eigenvalues, eigenvectors, rank, nullity, and solving system of linear equations in matrices.
3. Plots (using the GNU plotutils package).

Note. Exception handling in lab-exercises (SET-I to IV), Comments/Documentation using Doxygen may be emphasized.

Teaching Plan (Theory of DSE-1 (iii) C++ Programming for Mathematics):

Week 1: Fundamentals of programming, Organization of logic flow in stored program model of computation, C++ as a general purpose programming language, Structure of a C++ program, Common compilers and IDE's, Basic data-types.

[1] Chapter 1, and Chapter 2 (Sections 2.1 to 2.3).

Week 2: Variables and literals in C++, Operators, Expressions, Evaluation precedence, and Type compatibility. Outline of program development in C++, Debugging and testing.

[1] Chapter 2 (Sections 2.4 to 2.9).

Weeks 3 and 4: Applications: Greatest common divisor, and Random number generation.

[1] Chapters 3 and 4.

Week 5: Structured data-types in C++, Arrays and manipulating data in arrays. Applications: Factorization of an integer, and Euler's totient.

[1] Chapter 5 (Sections 5.1 to 5.4).

Weeks 6 and 7: Objects and classes: Information hiding, Modularity, Constructors and destructors, Methods and polymorphism; Applications: Cartesian geometry using points (two and three dimensional), and Pythagorean triples.

[1] Chapters 6 and 7.

Weeks 8 and 9: Containers and template libraries: sets, iterators, multisets, vectors, maps, lists, stacks and queues with applications in basic set algebra.

[1] Sections 8.1 to 8.7 (8.7.1-8.7.3).

Weeks 10 and 11: Applications: modulo arithmetic, permutations, and polynomials.

[1] Chapter 9, Chapter 11 (Sections 11.1, and 11.2) and Chapter 12 (Sections 12.1 to 12.3).

Week 12: Arbitrary precision arithmetic using the GMP package; Linear algebra: Two-dimensional arrays in C++ with applications in finding eigenvalues, eigenvectors, rank, nullity, and solving system of linear equations in matrices.

[1] Chapter 13 [Sections 13.1, and 13.2 (13.2.1, 13.2.2)].

Weeks 13 and 14: Features of C++ for input/output & visualization: strings, streams, formatting methods, processing files in a batch, command-line arguments, visualization packages and plots.

[1] Chapter 14 [Sections 14.1 to 14.6, and 14.8 (14.8.1-14.8.3)].

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understand and apply the programming concepts of C++ which is important to mathematical investigation and problem solving.	(i) Each topic to be explained with illustrations.	• Presentations and class discussions.
2.	Learn about structured data-types in C++ and learn about applications in factorization of an integer and understanding Cartesian geometry and Pythagorean triples.	(ii) Students to be encouraged to discover the relevant concepts.	• Assignments and class tests.
3.	Use of containers and templates in various applications in algebra.	(iii) Students to be given homework/assignments.	• Mid-term examinations.
4.	Use mathematical libraries for computational objectives. Represent the outputs of programs visually in terms of well formatted text and plots.	(iv) Discuss and solve the theoretical and practical problems in the class.	• Viva-voce examinations.
		(v) Students to be encouraged to apply concepts to real world problems.	• End-term examinations.

Keywords: Array, Class, Command-line Argument, Constructor, Containers, Data-type, Debugging, Destructor, Multiset, Map, Object, Polymorphism, Queue, Vector.

Discipline Specific Elective (DSE) Course - 2

Any *one* of the following (at least *two* shall be offered by the college):

DSE-2 (i): Probability Theory and Statistics

DSE-2 (ii): Discrete Mathematics

DSE-2 (iii): Cryptography and Network Security

DSE-2 (i): Probability Theory and Statistics

Total Marks: 100 (Theory: 75 + Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: To make the students familiar with the basic statistical concepts and tools which are needed to study situations involving uncertainty or randomness. The course intends to render the students to several examples and exercises that blend their everyday experiences with their scientific interests.

Course Learning Outcomes: This course will enable the students to:

- i) Learn about probability density and moment generating functions.
- ii) Know about various univariate distributions such as Bernoulli, Binomial, Poisson, gamma and exponential distributions.
- iii) Learn about distributions to study the joint behavior of two random variables.
- iv) Measure the scale of association between two variables, and to establish a formulation helping to predict one variable in terms of the other, i.e., correlation and linear regression.
- v) Understand central limit theorem, which helps to understand the remarkable fact that: the empirical frequencies of so many natural populations, exhibit a bell-shaped curve, i.e., a normal distribution.

Unit 1: Probability Functions and Moment Generating Function

Sample space, Probability set function, Real random variables - Discrete and continuous, Cumulative distribution function, Probability mass/density functions, Transformations, Mathematical expectation, Moments, Moment generating function, Characteristic function.

Unit 2: Univariate Discrete and Continuous Distributions

Discrete distributions: Uniform, Bernoulli, Binomial, Negative binomial, Geometric and Poisson; Continuous distributions: Uniform, Gamma, Exponential, Chi-square, Beta and normal; Normal approximation to the binomial distribution.

Unit 3: Bivariate Distribution

Joint cumulative distribution function and its properties, Joint probability density function, Marginal distributions, Expectation of function of two random variables, Joint moment generating function, Conditional distributions and expectations.

Unit 4: Correlation, Regression and Central Limit Theorem

The Correlation coefficient, Covariance, Calculation of covariance from joint moment generating function, Independent random variables, Linear regression for two variables, Method of least squares, Bivariate normal distribution, Chebyshev's theorem, Strong law of large numbers, Central limit theorem and weak law of large numbers.

References:

1. Hogg, Robert V., McKean, Joseph W., & Craig, Allen T. (2013). *Introduction to Mathematical Statistics* (7th ed.). Pearson Education, Inc.
2. Miller, Irwin & Miller, Marylees. (2014). John E. Freund's *Mathematical Statistics with Applications* (8th ed.). Pearson. Dorling Kindersley (India).
3. Ross, Sheldon M. (2014). *Introduction to Probability Models* (11th ed.). Elsevier Inc.

Additional Reading:

- i. Mood, A. M., Graybill, F. A. & Boes, D. C. (1974). *Introduction to the Theory of Statistics* (3rd ed.). McGraw-Hill Education Pvt. Ltd. Indian Edition (2017).

Teaching Plan (DSE-2 (i): Probability Theory and Statistics):

Weeks 1 and 2: Sample space, Probability set function and examples, Random variable, Probability mass/density function, Cumulative distribution function and its properties.

[1] Chapter 1 (Sections 1.1, 1.3 and 1.5).

Week 3 and 4: Discrete and continuous random variables, and Transformations. Expectation of random variables, and some special expectations: Mean, Variance, Standard deviation, Moments and moment generating function, Characteristic function.

[1] Chapter 1 (Sections 1.6 to 1.9).

Week 5: The discrete distributions - Uniform, Bernoulli and binomial.

[2] Chapter 5 (Sections 5.2 to 5.4).

Week 6: The discrete distributions - negative Binomial, Geometric and Poisson.

[2] Chapter 5 (Sections 5.5 and 5.7).

Week 7: The continuous distributions - Uniform, Gamma, Exponential, Chi-square and Beta.

[2] Chapter 6 (Sections 6.2 to 6.4).

Week 8: Normal distribution, and normal approximation to the binomial distribution.

[2] Chapter 6 (Sections 6.5 and 6.6).

Weeks 9 and 10: Random vector: Discrete and continuous, Joint cumulative distribution function and its properties, Joint probability mass/density function, Marginal probability mass function, and expectation of two random variables, Joint moment generating function, Conditional distributions and expectations.

[1] Chapter 2 (Sections 2.1 and 2.3).

Week 11: Correlation coefficient, Covariance, Calculation of covariance from joint moment generating function, Independent random variables.

[1] Chapter 2 (Sections 2.4 and 2.5).

Week 12: Linear regression for two variables, and the method of least squares.

[2] Chapter 14 (Sections 14.1 to 14.3).

Week 13: Bivariate normal distribution; Chebyshev's theorem.

[2] Chapter 6 (Section 6.7), and Chapter 4 (Section 4.4).

Week 14: Statement and interpretation of the strong law of large numbers, Central limit theorem and the weak law of large numbers.

[3] Chapter 2 (Section 2.8, and Exercise 76, Page 89).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn about probability density and moment generating functions.	(i) Each topic to be explained with examples. (ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given homework/ assignments. (iv) Students to be encouraged to give short presentations.	<ul style="list-style-type: none">• Presentations and participation in discussions.• Assignments and class tests.• Mid-term examinations.• End-term examinations.
2.	Know about various univariate distributions such as Bernoulli, Binomial, Poisson, gamma and exponential distributions.		
3.	Learn about distributions to study the joint behavior of two random variables.		
4.	Measure the scale of association between two variables, and to establish a formulation helping to predict one variable in terms of the other, i.e., correlation and linear regression. Understand central limit theorem, which helps to understand the remarkable fact that: the empirical frequencies of so many natural populations, exhibit a bell-shaped curve, i.e., a normal distribution.		

Keywords: Chebyshev's theorem, Correlation, Distributions, Distribution functions, Expectation, moments, Random variable, Regression.

DSE-2 (ii): Discrete Mathematics

Total Marks: 100 (Theory: 75 + Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: The course aims at introducing the concepts of ordered sets, lattices, sublattices and homomorphisms between lattices. It also includes introduction to modular and distributive lattices along with complemented lattices and Boolean algebra. Then some important applications of Boolean algebra are discussed in switching circuits. The second part of this course deals with introduction to graph theory, paths and circuits, Eulerian circuits, Hamiltonian graphs and finally some applications of graphs to shortest path algorithms.

Course Learning outcomes: After the course, the student will be able to:

- i) Understand the notion of ordered sets and maps between ordered sets.
- ii) Learn about lattices, modular and distributive lattices, sublattices and homomorphisms between lattices.
- iii) Become familiar with Boolean algebra, Boolean homomorphism, Karnaugh diagrams, switching circuits and their applications.
- iv) Learn about basics of graph theory, including Eulerian graphs, Hamiltonian graphs.
- v) Learn about the applications of graph theory in the study of shortest path algorithms.

Unit 1: Ordered Sets

Definitions, Examples and basic properties of ordered sets, Order isomorphism, Hasse diagrams, Dual of an ordered set, Duality principle, Maximal and minimal elements, Building new ordered sets, Maps between ordered sets.

Unit 2: Lattices

Lattices as ordered sets, Lattices as algebraic structures, Sublattices, Products and homomorphisms; Definitions, Examples and properties of modular and distributive lattices, The $M_3 - N_5$ theorem with applications, Complemented lattice, Relatively complemented lattice, Sectionally complemented lattice.

Unit 3: Boolean Algebras and Switching Circuits

Boolean algebras, De Morgan's laws, Boolean homomorphism, Representation theorem; Boolean polynomials, Boolean polynomial functions, Disjunctive normal form and conjunctive normal form, Minimal forms of Boolean polynomial, Quine–McCluskey method, Karnaugh diagrams, Switching circuits and applications of switching circuits.

Unit 4: Graph Theory

Introduction to graphs, Königsberg bridge problem, Instant insanity game; Definition, examples and basic properties of graphs, Subgraphs, Pseudographs, Complete graphs, Bipartite graphs, Isomorphism of graphs, Paths and circuits, Eulerian circuits, Hamiltonian cycles, Adjacency matrix, Weighted graph, Travelling salesman problem, Shortest path, Dijkstra's algorithm.

References:

1. Davey, B. A., & Priestley, H. A. (2002). *Introduction to Lattices and Order* (2nd ed.). Cambridge University press, Cambridge.
2. Goodaire, Edgar G., & Parmenter, Michael M. (2011). *Discrete Mathematics with Graph Theory* (3rd ed.). Pearson Education (Singapore) Pvt. Ltd. Indian Reprint.
3. Lidl, Rudolf & Pilz, Gunter. (2004). *Applied Abstract Algebra* (2nd ed.), Undergraduate Texts in Mathematics. Springer (SIE). Indian Reprint.

Additional Reading:

- i. Rosen, Kenneth H. (2012). *Discrete Mathematics and its Applications, with Combinatorics and Graph Theory*. (7th ed.). McGraw-Hill Education. Indian Reprint.

Teaching Plan (DSE-2 (ii): Discrete Mathematics):

Weeks 1 and 2: Definitions, Examples and basic properties of ordered sets, Order isomorphism, Hasse diagrams, dual of an ordered set, Duality principle, Maximal and minimal elements, Building new ordered sets, Maps between ordered sets.

[1] Chapter 1 (Sections 1.1 to 1.5, Sections 1.14 to 1.26, and Sections 1.34 to 1.36).

[3] Chapter 1 [Section 1 (1.1 to 1.3)].

Weeks 3 and 4: Lattices as ordered sets, Lattices as algebraic structures, Sublattices, Products and homomorphisms.

[1] Chapter 2 (Sections 2.1 to 2.19).

[3] Chapter 1 [Section 1 (1.5 to 1.20)].

Week 5: Definitions, Examples and properties of Modular and distributive lattices.

[1] Chapter 4 (Sections 4.1 to 4.9).

[3] Chapter 1 [Section 2 (2.1 to 2.6)].

Week 6: $M_3 - N_5$ theorem with applications, Complemented lattice, Relatively complemented lattice, Sectionally complemented lattice.

[1] Chapter 4 (Sections 4.10 and 4.11).

[3] Chapter 1 [Section 2 (2.7 to 2.14)].

Weeks 7 and 8: Boolean algebras, De Morgan's laws, Boolean homomorphism, representation theorem, Boolean polynomials, Boolean polynomial functions, Disjunctive normal form and conjunctive normal form.

[3] Chapter 1 (Sections 3 and 4).

Week 9: Minimal forms of Boolean polynomial, Quine–McCluskey method, Karnaugh diagrams.

[3] Chapter 1 (Section 6).

Week 10: Switching circuits and applications of switching circuits.

[3] Chapter 2 (Sections 7 and 8).

Weeks 11 and 12: Introduction to graphs, Königsberg bridge problem, Instant insanity game. Definition, Examples and basic properties of graphs, Subgraphs, Pseudographs, Complete graphs, Bipartite graphs, Isomorphism of graphs.

[2] Chapter 9 [Sections 9.1, 9.2 (9.2.1, 9.2.7) and 9.3].

Weeks 13 and 14: Paths and circuits, Eulerian circuits, Hamiltonian cycles, Adjacency matrix, Weighted graph, Travelling salesman problem, shortest path, Dijkstra's algorithm.

[2] Chapter 10 [Sections 10.1 to 10.4 (10.4.1 to 10.4.3)].

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understand the notion of ordered sets and maps between ordered sets.	(i) Each topic to be explained with examples. (ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given homework/assignments. (iv) Students to be encouraged to give short presentations.	<ul style="list-style-type: none">• Presentations and participation in discussions.• Assignments and class tests.• Mid-term examinations.• End-term examinations.
2.	Learn about lattices, modular and distributive lattices, sublattices and homomorphisms between lattices.		
3.	Become familiar with Boolean algebra, Boolean homomorphism, Karnaugh diagrams, switching circuits and their applications.		
4.	Learn about basics of graph theory, including Eulerian graphs, Hamiltonian graphs. Learn about the applications of graph theory in the study of shortest path algorithms.		

Keywords: Boolean algebra, Lattices, Graphs, Modularity, Ordered sets, Paths and circuits, Shortest path algorithms, Switching circuits.

DSE-2 (iii): Cryptography and Network Security

Total Marks: 100 (Theory: 75 + Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: This course helps the students to develop skills and knowledge of standard concepts in cryptography and demonstrates how cryptography plays an important role in the present digital world by knowing encryption and decryption techniques and secure data in transit across data networks.

Course Learning Outcomes: After the course, the student will be able to:

- i) Understand the fundamentals of cryptography and computer security attacks.
- ii) Learn about various ciphers and data encryption standard.
- iii) Review basic concepts of number theory and finite fields.
- iv) Learn about advanced encryption standard.
- v) Understand the fundamentals of RSA and elliptic curve cryptography.
- vi) Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.

Unit 1: Cryptography and Data Encryption Standard (DES)

Overview of Cryptography, Computer security concepts, Security attacks, Symmetric cipher model, Cryptanalysis and brute-force attack, Substitution techniques, Caesar cipher, Monoalphabetic ciphers, Playfair cipher, Hill cipher, Polyalphabetic ciphers, One-time pad, Transposition techniques, Binary and ASCII, Pseudo-random bit generation, Stream ciphers and Block ciphers, Feistel cipher, Data encryption standard (DES), DES example.

Unit 2: Algorithms and Advanced Encryption Standard (AES)

Review of basic concepts in Number theory and Finite Fields: divisibility, polynomial and modular arithmetic, Fermat's and Euler's theorems, Chinese remainder theorem, Discrete logarithm, Finite fields of the form $GF(p)$ and $GF(2^n)$; Advanced encryption standard (AES), AES transformation functions, AES key expansion, AES example.

Unit 3: Public-key Cryptography

Principles of public-key cryptosystems, RSA algorithm and security of RSA, Elliptic curve arithmetic, Elliptic curve cryptography, Cryptographic Hash functions, Secure Hash algorithm.

Unit 4: Digital Signatures and Network Security

Digital signatures, Elgamal and Schnorr digital signature schemes, Digital signature algorithm. Wireless network and mobile device security, Email architecture, formats, threats and security, Secure/Multipurpose Internet Mail Extension, Pretty Good Privacy.

References:

1. Stallings, William (2017). *Cryptography and Network Security, Principles and Practice* (7th ed.). Pearson Education Limited. England.
2. Trappe, Wade & Washington, Lawrence C. (2006). *Introduction to Cryptography with Coding Theory* (2nd ed.). Pearson Education International.

Additional Reading:

- i. Stinson, Douglas R. (2005). *Cryptography Theory and Practice* (3rd ed.). CRC Press.

Teaching Plan (DSE-2 (iii): Cryptography and Network Security):

Weeks 1 and 2: Overview of Cryptography, Computer security concepts, Security attacks, Symmetric cipher model, Cryptanalysis and brute-force attack, Substitution techniques, Caesar cipher, Monoalphabetic ciphers, Playfair cipher, Hill cipher, Polyalphabetic ciphers, One-time pad.

[2] Chapter 1.

[1] Chapter 1 (Sections 1.1 and 1.3) and Chapter 3 (Sections 3.1 and 3.2).

Weeks 3 and 4: Transposition techniques, Binary and ASCII, Pseudo-random bit generation, Stream ciphers and Block ciphers, Feistel cipher, Data Encryption Standard (DES), DES example.

[1] Chapter 3 (Section 3.3) and Chapter 4 (Sections 4.1 to 4.3).

[2] Chapter 2 (Sections 2.8 and 2.10).

Weeks 5 and 6: Review of basic concepts in Number theory and Finite Fields: divisibility, polynomial and modular arithmetic, Statements of Fermat's and Euler's theorems, Chinese remainder theorem, Discrete logarithm, Finite fields of the form $GF(p)$ and $GF(2^n)$.

[1] Chapter 1 (Sections 2.1 to 2.3, 2.5, 2.7, and 2.8) and Chapter 5 (Sections 5.4 to 5.6).

Weeks 7 and 8: Advanced encryption standard (AES), AES transformation functions, AES key expansion, AES example.

[1] Chapter 6 [Sections 6.1 to 6.5 (up to Page 195)].

Weeks 9 and 10: Principles of public-key cryptosystems, RSA algorithm and security of RSA, Elliptic curve arithmetic, Elliptic curve cryptography.

[1] Chapter 9 (Sections 9.1 and 9.2), and Chapter 10 (Sections 10.3 and 10.4).

Week 11: Cryptographic Hash functions, Secure Hash algorithm.

[1] Sections 11.1 and 11.5.

Weeks 12 and 13: Digital signatures, Elgamal and Schnorr digital signature schemes, Digital signature algorithm, Wireless network and mobile device security.

[1] Chapter 13 (Sections 13.1 to 13.4) and Chapter 18 (Sections 18.1 and 18.2).

Week 14: Email architecture, threats and security, Secure/Multipurpose Internet Mail Extension (S/MIME) and Pretty Good Privacy (PGP).

[1] Chapter 19 [Sections 19.1 to 19.5 (Confidentiality excluded)].

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Understand the fundamentals of cryptography and computer security attacks. Learn about various ciphers and data encryption standard.	(i) Each topic to be explained with examples.	<ul style="list-style-type: none"> • Student presentations. • Participation in discussions. • Assignments and class tests. • Mid-term examinations. • End-term examinations.
2.	Review basic concepts of number theory and finite fields. Learn about advanced encryption standard.	(ii) Students to be involved in discussions and encouraged to ask questions.	
3.	Understand the fundamentals of RSA and elliptic curve cryptography.	(iii) Students to be given homework/ assignments.	
4.	Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.	(iv) Students to be encouraged to give short presentations.	

Keywords: Cipher, Encryption, Hash function. Privacy, Public-key, Security.

Semester-VI

BMATH613: Complex Analysis

Total Marks: 150 (Theory: 75, Internal Assessment: 25 and Practical: 50)

Workload: 4 Lectures, 4 Practicals (per week), **Credits:** 6 (4+2)

Duration: 14 Weeks (56 Hrs. Theory + 56 Hrs. Practical) **Examination:** 3 Hrs.

Course Objectives: This course aims to introduce the basic ideas of analysis for complex functions in complex variables with visualization through relevant practicals. Emphasis has been laid on Cauchy's theorems, series expansions and calculation of residues.

Course Learning Outcomes: The completion of the course will enable the students to:

- i) Learn the significance of differentiability of complex functions leading to the understanding of Cauchy–Riemann equations.
- ii) Learn some elementary functions and evaluate the contour integrals.
- iii) Understand the role of Cauchy–Goursat theorem and the Cauchy integral formula.
- iv) Expand some simple functions as their Taylor and Laurent series, classify the nature of singularities, find residues and apply Cauchy Residue theorem to evaluate integrals.

Unit 1: Analytic Functions and Cauchy–Riemann Equations

Functions of complex variable, Mappings; Mappings by the exponential function, Limits, Theorems on limits, Limits involving the point at infinity, Continuity, Derivatives, Differentiation formulae, Cauchy–Riemann equations, Sufficient conditions for differentiability; Analytic functions and their examples.

Unit 2: Elementary Functions and Integrals

Exponential function, Logarithmic function, Branches and derivatives of logarithms, Trigonometric function, Derivatives of functions, Definite integrals of functions, Contours, Contour integrals and its examples, Upper bounds for moduli of contour integrals,

Unit 3: Cauchy's Theorems and Fundamental Theorem of Algebra

Antiderivatives, Proof of antiderivative theorem, Cauchy–Goursat theorem, Cauchy integral formula; An extension of Cauchy integral formula, Consequences of Cauchy integral formula, Liouville's theorem and the fundamental theorem of algebra.

Unit 4: Series and Residues

Convergence of sequences and series, Taylor series and its examples; Laurent series and its examples, Absolute and uniform convergence of power series, Uniqueness of series representations of power series, Isolated singular points, Residues, Cauchy's residue theorem, residue at infinity; Types of isolated singular points, Residues at poles and its examples.

Reference:

1. Brown, James Ward, & Churchill, Ruel V. (2014). *Complex Variables and Applications* (9th ed.). McGraw-Hill Education. New York.

Additional Readings:

- i. Bak, Joseph & Newman, Donald J. (2010). *Complex Analysis* (3rd ed.). Undergraduate Texts in Mathematics, Springer. New York.
- ii. Zills, Dennis G., & Shanahan, Patrick D. (2003). *A First Course in Complex Analysis with Applications*. Jones & Bartlett Publishers, Inc.
- iii. Mathews, John H., & Howell, Russell W. (2012). *Complex Analysis for Mathematics and Engineering* (6th ed.). Jones & Bartlett Learning. Narosa, Delhi. Indian Edition.

Practical / Lab work to be performed in Computer Lab:

Modeling of the following similar problems using Mathematica/Maple/MATLAB/Maxima/Scilab etc.

1. Make a geometric plot to show that the n^{th} roots of unity are equally spaced points that lie on the unit circle $C_1(0) = \{z : |z| = 1\}$ and form the vertices of a regular polygon with n sides, for $n = 4, 5, 6, 7, 8$.
2. Find all the solutions of the equation $z^3 = 8i$ and represent these geometrically.
3. Write parametric equations and make a parametric plot for an ellipse centered at the origin with horizontal major axis of 4 units and vertical minor axis of 2 units. Show the effect of rotation of this ellipse by an angle of $\frac{\pi}{6}$ radians and shifting of the centre from (0,0) to (2,1), by making a parametric plot.
4. Show that the image of the open disk $D_1(-1 - i) = \{z : |z + 1 + i| < 1\}$ under the linear transformation $w = f(z) = (3 - 4i)z + 6 + 2i$ is the open disk:
 $D_5(-1 + 3i) = \{w : |w + 1 - 3i| < 5\}$.
5. Show that the image of the right half plane $\text{Re } z = x > 1$ under the linear transformation $w = (-1 + i)z - 2 + 3i$ is the half plane $v > u + 7$, where $u = \text{Re}(w)$, etc. Plot the map.
6. Show that the image of the right half plane $A = \{z : \text{Re } z \geq \frac{1}{2}\}$ under the mapping $w = f(z) = \frac{1}{z}$ is the closed disk $\overline{D_1(1)} = \{w : |w - 1| \leq 1\}$ in the w -plane.
7. Make a plot of the vertical lines $x = a$, for $a = -1, -\frac{1}{2}, \frac{1}{2}, 1$ and the horizontal lines $y = b$, for $b = -1, -\frac{1}{2}, \frac{1}{2}, 1$. Find the plot of this grid under the mapping $w = f(z) = \frac{1}{z}$.
8. Find a parametrization of the polygonal path $C = C_1 + C_2 + C_3$ from $-1 + i$ to $3 - i$, where C_1 is the line from: $-1 + i$ to -1 , C_2 is the line from: -1 to $1 + i$ and C_3 is the line from $1 + i$ to $3 - i$. Make a plot of this path.
9. Plot the line segment 'L' joining the point $A = 0$ to $B = 2 + \frac{\pi}{4}i$ and give an exact calculation of $\int_L e^z dz$.
10. Plot the semicircle 'C' with radius 1 centered at $z = 2$ and evaluate the contour integral $\int_C \frac{1}{z-2} dz$.
11. Show that $\int_{C_1} z dz = \int_{C_2} z dz = 4 + 2i$ where C_1 is the line segment from $-1 - i$ to $3 + i$ and C_2 is the portion of the parabola $x = y^2 + 2y$ joining $-1 - i$ to $3 + i$. Make plots of two contours C_1 and C_2 joining $-1 - i$ to $3 + i$.

12. Use ML inequality to show that $\left| \int_C \frac{1}{z^2+1} dz \right| \leq \frac{1}{2\sqrt{5}}$, where C is the straight line segment from 2 to $2+i$. While solving, represent the distance from the point z to the points i and $-i$, respectively, i.e. $|z-i|$ and $|z+i|$ on the complex plane \mathbb{C} .
13. Show that $\int_C \frac{dz}{2z^{1/2}}$, where $z^{1/2}$ is the principal branch of the square root function and C is the line segment joining 4 to $8+6i$. Also plot the path of integration.
14. Find and plot three different Laurent series representations for the function $f(z) = \frac{3}{2+z-z^2}$, involving powers of z .
15. Locate the poles of $f(z) = \frac{1}{5z^4+26z^2+5}$ and specify their order.
16. Locate the zeros and poles of $g(z) = \frac{\pi \cot(\pi z)}{z^2}$ and determine their order. Also justify that $\text{Res}(g, 0) = -\pi^2/3$.
17. Evaluate $\int_{C_1^+(0)} \exp\left(\frac{2}{z}\right) dz$, where $C_1^+(0)$ denotes the circle $\{z : |z| = 1\}$ with positive orientation. Similarly evaluate $\int_{C_1^+(0)} \frac{1}{z^4+z^3-2z^2} dz$.

Note: For practicals: Sample materials of files in the form Mathematica/Maple 2011.zip, www.jblearning.com/catalog/9781449604455/.

Teaching Plan (Theory of BMATH613: Complex Analysis):

Week 1: Functions of complex variable, Mappings, Mappings by the exponential function.

[1] Chapter 2 (Sections 12 to 14).

Week 2: Limits, Theorems on limits, Limits involving the point at infinity, Continuity.

[1] Chapter 2 (Sections 15 to 18).

Week 3: Derivatives, Differentiation formulae, Cauchy-Riemann equations, Sufficient conditions for differentiability.

[1] Chapter 2 (Sections 19 to 22).

Week 4: Analytic functions, Examples of analytic functions, Exponential function.

[1] Chapter 2 (Sections 24 and 25) and Chapter 3 (Section 29).

Week 5: Logarithmic function, Branches and Derivatives of Logarithms, Trigonometric functions.

[1] Chapter 3 (Sections 30, 31 and 34).

Week 6: Derivatives of functions, Definite integrals of functions, Contours.

[1] Chapter 4 (Sections 37 to 39).

Week 7: Contour integrals and its examples, upper bounds for moduli of contour integrals.

[1] Chapter 4 (Sections 40, 41 and 43).

Week 8: Antiderivatives, proof of antiderivative theorem.

[1] Chapter 4 (Sections 44 and 45).

Week 9: State Cauchy–Goursat theorem, Cauchy integral formula.

[1] Chapter 4 (Sections 46 and 50).

Week 10: An extension of Cauchy integral formula, Consequences of Cauchy integral formula, Liouville's theorem and the fundamental theorem of algebra.

[1] Chapter 4 (Sections 51 to 53).

Week 11: Convergence of sequences, Convergence of series, Taylor series, proof of Taylor's theorem, Examples.

[1] Chapter 5 (Sections 55 to 59).

Week 12: Laurent series and its examples, Absolute and uniform convergence of power series, uniqueness of series representations of power series.

[1] Chapter 5 (Sections 60, 62, 63 and 66).

Week 13: Isolated singular points, Residues, Cauchy's residue theorem, Residue at infinity.

[1]: Chapter 6 (Sections 68 to 71).

Week 14: Types of isolated singular points, Residues at poles and its examples.

[1] Chapter 6 (Sections 72 to 74).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn the significance of differentiability of complex functions leading to the understanding of Cauchy–Riemann equations.	(i) Each topic to be explained with illustrations. (ii) Students to be encouraged to discover the relevant concepts. (iii) Students to be given homework/assignments. (iv) Discuss and solve the theoretical and practical problems in the class. (v) Students be encouraged to apply concepts to real world problems.	<ul style="list-style-type: none">• Presentations and class discussions.• Assignments and class tests.• Student presentations.• Mid-term examinations.• Practical and viva-voce examinations.• End-term examinations.
2.	Learn some elementary functions and evaluate the contour integrals.		
3.	Understand the role of Cauchy–Goursat theorem and the Cauchy integral formula.		
4.	Expand some simple functions as their Taylor and Laurent series, classify the nature of singularities, find residues and apply Cauchy Residue theorem to evaluate integrals.		

Keywords: Analytic functions, Antiderivatives, Cauchy–Riemann equations, Cauchy–Goursat theorem, Cauchy integral formula, Cauchy's inequality, Cauchy's residue theorem, Closed contour, Contour integrals, Fundamental theorem of algebra, Liouville's theorem, Morera's theorem, Poles, Regions in complex plane, Residue, Singular points, Taylor's and Laurent's series.

BMATH614: Ring Theory and Linear Algebra-II

Total Marks: 100 (Theory: 75, Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: This course introduces the basic concepts of ring of polynomials and irreducibility tests for polynomials over ring of integers, used in finite fields with applications in cryptography. This course emphasizes the application of techniques using the adjoint of a linear operator and their properties to least squares approximation and minimal solutions to systems of linear equations.

Courses Learning Outcomes: On completion of this course, the student will be able to:

- i) Appreciate the significance of unique factorization in rings and integral domains.
- ii) Compute the characteristic polynomial, eigenvalues, eigenvectors, and eigenspaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result.
- iii) Compute inner products and determine orthogonality on vector spaces, including Gram–Schmidt orthogonalization to obtain orthonormal basis.
- iv) Find the adjoint, normal, unitary and orthogonal operators.

Unit 1: Polynomial Rings and Unique Factorization Domain (UFD)

Polynomial rings over commutative rings, Division algorithm and consequences, Principal ideal domains, Factorization of polynomials, Reducibility tests, Irreducibility tests, Eisenstein's criterion, Unique factorization in $\mathbb{Z}[x]$; Divisibility in integral domains, Irreducibles, Primes, Unique factorization domains, Euclidean domains.

Unit 2: Dual Spaces and Diagonalizable Operators

Dual spaces, Double dual, Dual basis, Transpose of a linear transformation and its matrix in the dual basis, Annihilators; Eigenvalues, Eigenvectors, Eigenspaces and characteristic polynomial of a linear operator; Diagonalizability, Invariant subspaces and Cayley–Hamilton theorem; Minimal polynomial for a linear operator.

Unit 3: Inner Product Spaces

Inner product spaces and norms, Orthonormal basis, Gram–Schmidt orthogonalization process, Orthogonal complements, Bessel's inequality.

Unit 4: Adjoint Operators and Their Properties

Adjoint of a linear operator, Least squares approximation, Minimal solutions to systems of linear equations, Normal, self-adjoint, unitary and orthogonal operators and their properties.

References:

1. Friedberg, Stephen H., Insel, Arnold J., & Spence, Lawrence E. (2003). *Linear Algebra* (4th ed.). Prentice-Hall of India Pvt. Ltd. New Delhi.
2. Gallian, Joseph. A. (2013). *Contemporary Abstract Algebra* (8th ed.). Cengage Learning India Private Limited. Delhi. Fourth impression, 2015.

Additional Readings:

- i. Herstein, I. N. (2006). *Topics in Algebra* (2nd ed.). Wiley Student Edition. India.
- ii. Hoffman, Kenneth, & Kunze, Ray Alden (1978). *Linear Algebra* (2nd ed.). Prentice-Hall of India Pvt. Limited. Delhi. Pearson Education India Reprint, 2015.

- iii. Lang, Serge (1987). *Linear Algebra* (3rd ed.). Springer.

Teaching Plan (BMATH614: Ring Theory and Linear Algebra-II):

Week 1: Polynomial rings over commutative rings, Division algorithm and consequences, Principal ideal domains.

[2] Chapter 16.

Weeks 2 and 3: Factorization of polynomials, Reducibility tests, Irreducibility tests, Eisenstein's criterion, Unique factorization in $\mathbb{Z}[x]$.

[2] Chapter 17.

Weeks 4 and 5: Divisibility in integral domains, Irreducibles, Primes, Unique factorization domains, Euclidean domains.

[2] Chapter 18.

Week 6: Dual spaces, Double dual, Dual basis, Transpose of a linear transformation and its matrix in dual basis, Annihilators.

[1] Chapter 2 (Section 2.6).

Weeks 7 and 8: Eigenvalues, Eigenvectors, Eigenspaces and characteristic polynomial of a linear operator; Diagonalizability, Invariant subspaces and Cayley–Hamilton theorem; Minimal polynomial for a linear operator.

[1] Chapter 5 (Sections 5.1, 5.2 and 5.4), Chapter 7 (Section 7.3, Statement of Theorem 7.16)

Week 9: Inner product spaces and norms.

[1] Chapter 6 (Section 6.1).

Weeks 10 and 11: Orthonormal basis, Gram–Schmidt orthogonalization process, Orthogonal complements, Bessel's inequality.

[1] Chapter 6 (Section 6.2).

Week 12: Adjoint of a linear operator and its properties, Least squares approximation, Minimal solutions to systems of linear equations.

[1] Chapter 6 (Section 6.3, Statement of Theorem 6.13 with applications).

Weeks 13 and 14: Normal, self-adjoint, unitary and orthogonal operators and their properties.

[1] Chapter 6 (Sections 6.4, and 6.5, up to Theorem 6.21, Page 385).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Appreciate the significance of unique factorization in rings and integral domains.	(i) Each topic to be explained with examples. (ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given homework/assignment. (iv) Students to be encouraged to give short presentations.	<ul style="list-style-type: none"> • Student presentations. • Participation in discussions. • Assignments and class tests. • Mid-term examinations. • End-term examinations.
2.	Compute the characteristic polynomial, eigenvalues, eigenvectors, eigenspaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result.		
3.	Compute inner products and determine orthogonality on vector spaces, including Gram–Schmidt orthogonalization to obtain orthonormal basis.		
4.	Find the adjoint, normal, unitary and orthogonal operators.		

Keywords: Bessel's inequality, Cayley–Hamilton theorem, Eigenvalues and eigenvectors, Eisenstein's criterion, Euclidean domains, Inner product spaces, Orthonormal basis, Principal ideal domains, Unique factorization domains, Normal, self-adjoint and unitary operators.

Discipline Specific Elective (DSE) Course - 3

Any *one* of the following (at least *two* shall be offered by the college):

DSE-3 (i): Mathematical Finance

DSE-3 (ii): Introduction to Information Theory and Coding

DSE-3 (iii): Biomathematics

DSE-3 (i): Mathematical Finance

Total Marks: 100 (Theory: 75 + Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: This course is an introduction to the application of mathematics in financial world, that enables the student to understand some computational and quantitative techniques required for working in the financial markets and actuarial mathematics.

Course Learning outcomes: On completion of this course, the student will be able to:

- i) Know the basics of financial markets and derivatives including options and futures.
- ii) Learn about pricing and hedging of options, as well as interest rate swaps.
- iii) Learn about no-arbitrage pricing concept and types of options.
- iv) Learn stochastic analysis (Ito formula, Ito integration) and the Black–Scholes model.
- v) Understand the concepts of trading strategies and valuation of currency swaps.

Unit 1: Interest Rates

Interest rates, Types of rates, Measuring interest rates, Zero rates, Bond pricing, Forward rate, Duration, Convexity, Exchange traded markets and OTC markets, Derivatives--forward contracts, Futures contract, Options, Types of traders, Hedging, Speculation, Arbitrage.

Unit 2: Mechanics and Properties of Options

No Arbitrage principle, Short selling, Forward price for an investment asset, Types of options, Option positions, Underlying assets, Factors affecting option prices, Bounds on option prices, Put-call parity, Early exercise, Effect of dividends.

Unit 3: Stochastic Analysis of Stock Prices and Black-Scholes Model

Binomial option pricing model, Risk neutral valuation (for European and American options on assets following binomial tree model), Lognormal property of stock prices, Distribution of rate of return, expected return, Volatility, estimating volatility from historical data, Extension of risk neutral valuation to assets following GBM, Black–Scholes formula for European options.

Unit 4: Hedging Parameters, Trading Strategies and Swaps

Hedging parameters (the Greeks: Delta, Gamma, Theta, Rho and Vega), Trading strategies involving options, Swaps, Mechanics of interest rate swaps, Comparative advantage argument, Valuation of interest rate swaps, Currency swaps, Valuation of currency swaps.

Reference:

1. Hull, J. C., & Basu, S. (2010). *Options, Futures and Other Derivatives* (7th ed.). Pearson Education. New Delhi.

Additional Readings:

- i. Luenberger, David G. (1998). *Investment Science*, Oxford University Press. Delhi.
- ii. Ross, Sheldon M. (2011). *An elementary Introduction to Mathematical Finance* (3rd ed.). Cambridge University Press. USA.

Teaching Plan (DSE-3 (i): Mathematical Finance):

Weeks 1 and 2: Interest rates, Types of rates, Measuring interest rates, Zero rates, Bond pricing, Forward rate, Duration, Convexity.

[1] Chapter 4 (Section 4.1 to 4.4, 4.6, 4.8 and 4.9).

Weeks 3 and 4: Exchange traded markets and OTC markets, Derivatives- forward contracts, Futures contract, Options, Types of traders, Hedging, Speculation, Arbitrage.

[1] Chapter 1 (Sections 1.1 to 1.9).

Week 5: No Arbitrage principle, Short selling, Forward price for an investment asset.

[1] Chapter 5 (Sections 5.2 to 5.4).

Week 6: Types of options, Option positions, Underlying assets, Factors affecting option prices.

[1] Chapter 8 (Sections 8.1 to 8.3), and Chapter 9 (Section 9.1).

Week 7: Bounds on option prices, Put-call parity, Early exercise, Effect of dividends.

[1] Chapter 9 (Sections 9.2 to 9.7).

Week 8: Binomial option pricing model, Risk neutral valuation (for European and American options on assets following binomial tree model).

[1] Chapter 11 (Sections 11.1 to 11.5).

Weeks 9 to 11: Lognormal property of stock prices, Distribution of rate of return, expected return, Volatility, estimating volatility from historical data. Extension of risk neutral valuation to assets following GBM (without proof), Black–Scholes formula for European options.

[1] Chapter 13 (Sections 13.1 to 13.4, 13.7 and 13.8).

Week 12: Hedging parameters (the Greeks: Delta, Gamma, Theta, Rho and Vega).

[1] Chapter 17 (Sections 17.1 to 17.9).

Week 13: Trading strategies Involving options.

[1] Chapter 10 (except box spreads, calendar spreads and diagonal spreads).

Week 14: Swaps, Mechanics of interest rate swaps, Comparative advantage argument, Valuation of interest rate swaps, Currency swaps, Valuation of currency swaps

[1] Chapter 7 (Sections 7.1 to 7.4 and 7.7 to 7.9).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Know the basics of financial markets and derivatives including options and futures. Learn about pricing and hedging of options, as well as interest rate swaps.	(i) Each topic to be explained with examples. (ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given homework/assignments. (iv) Students to be encouraged to give short presentations.	<ul style="list-style-type: none"> • Student presentations. • Participation in discussions. • Assignments and class tests. • Mid-term examinations. • End-term examinations.
2.	Learn about no-arbitrage pricing concept and types of options.		
3.	Learn stochastic analysis (Ito formula and Ito integration) and the Black–Scholes model.		
4.	Find the adjoint, normal, unitary and orthogonal operators.		

Keywords: Black–Scholes model, Forward contracts, Futures contract, Options, Hedging, Speculation, Arbitrage, Put-call parity, Short sellings, Swaps.

DSE-3 (ii): Introduction to Information Theory and Coding

Total Marks: 100 (Theory: 75, Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: This course aims to introduce the basic aspects of Information Theory and Coding to the students. Shannon's work form the underlying theme for the present course. Construction of finite fields and bounds on the parameters of a linear code discussed.

Course Learning Outcomes: This course will enable the students to:

- i) Learn about the basic concepts of information theory.
- ii) Know about basic relationship among different entropies and interpretation of Shannon's fundamental inequalities.
- iii) Learn about the detection and correction of errors while transmission.
- iv) Representation of a linear code by matrices.
- v) Learn about encoding and decoding of linear codes.

Unit 1: Concepts of Information Theory

Communication processes, A model of communication system, A quantitative measure of information, Binary unit of information, A measure of uncertainty, H function as a measure of uncertainty, Sources and binary sources, Measure of information for two-dimensional discrete finite probability schemes.

Unit 2: Entropy Function

A sketch of communication network, Entropy, Basic relationship among different entropies, A measure of mutual information, Interpretation of Shannon's fundamental inequalities; Redundancy, Efficiency and channel capacity, Binary symmetric channel, Binary erasure channel, Uniqueness of the entropy function, Joint entropy and conditional entropy, Relative entropy and mutual information, Chain rules for entropy, Conditional relative entropy and conditional mutual information, Jensen's inequality and its characterizations, The log sum inequality and its applications.

Unit 3: Concepts of Coding

Block codes, Hamming distance, Maximum likelihood decoding, Levels of error handling, Error correction, Error detection, Erasure correction, Construction of finite fields, Linear codes, Matrix representation of linear codes.

Unit 4: Bounds of Codes

Orthogonality relation, Encoding of linear codes, Decoding of linear codes, Singleton bound and maximum distance separable codes, Sphere-packing bound and perfect codes, Gilbert–Varshamov bound, MacWilliams' identities.

References:

1. Cover, Thomas M., & Thomas, Joy A. (2006). *Elements of Information Theory* (2nd ed.). Wiley India. Indian Reprint 2014.
2. Gallian, Joseph. A. (2013). *Contemporary Abstract Algebra* (8th ed.). Cengage Learning India Private Limited. Delhi. Fourth impression, 2015.

3. Reza, Fazlollah M. (1961). *An Introduction to Information Theory*. Dover Publications Inc, New York. Reprint 1994.
4. Roth, Ron M. (2007). *Introduction to Coding Theory*. Cambridge University Press.

Additional Readings:

- i. Ash, Robert B. (1965). *Information Theory*. Dover Publications, Inc. New York. Reprint in 1990.
- ii. Goldman, Stanford (1968). *Information Theory*, Dover Publications, Inc. New York. Reprint in 1990.
- iii. Ling, San & Xing, Chaoping (2004). *Coding Theory: A First Course*. Cambridge University Press.

Teaching Plan (DSE-3 (ii): Introduction to Information Theory and Coding):

Weeks 1 and 2: Communication processes, A model of communication system, A quantitative measure of information, Binary unit of information.

[3] Chapter 1 (Sections 1.1 to 1.7).

Weeks 3 and 4: A measure of uncertainty, H function as a measure of uncertainty, Sources and binary sources, Measure of information for two-dimensional discrete finite probability schemes.

[3] Chapter 3 (Sections 3.1 to 3.7).

Weeks 5 and 6: A sketch of communication network, Entropy, Basic relationship among different entropies, A measure of mutual information, Interpretation of Shannon's fundamental inequalities; redundancy, efficiency and channel capacity, Binary symmetric channel, Binary erasure channel, Uniqueness of the entropy function.

[3] Chapter 3 (Sections 3.9, 3.11 to 3.16 and 3.19).

[1] Chapter 2 (Section 2.1).

Weeks 7 and 8: Joint entropy and conditional entropy, Relative entropy and mutual information, Chain rules for entropy, Conditional relative entropy and conditional mutual information, Jensen's inequality and its characterizations, The log sum inequality and its applications.

[1] Chapter 2 (Sections 2.2 to 2.7).

Weeks 9 and 10: Block codes, Hamming distance, Maximum likelihood decoding, Levels of error handling, Error correction, Error detection, Erasure correction, Construction of finite fields.

[4] Chapter 1 (Sections 1.2 to 1.5, excluding 1.5.3), and Chapter 3 (Sections 3.1 to 3.4).

Weeks 11 and 12: Linear codes, Matrix representation of linear codes, Orthogonality relation, Encoding of linear codes, Decoding of linear codes.

[4] Chapter 2 (Sections 2.1 to 2.4).

[2] Chapter 31 (Lemma and Theorem 31.3 on Page 538).

Weeks 13 and 14: Singleton bound and maximum distance separable codes, Sphere-packing bound and perfect codes, Gilbert–Varshamov bound, MacWilliams' identities.

[4] Chapter 4 (Sections 4.1 to 4.4) and Chapter 11 (Section 11.1).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn about the basic concepts of information theory.	(i) Each topic to be explained with examples.	<ul style="list-style-type: none"> • Student presentations. • Participation in discussions. • Assignments
2.	Know about basic relationship among different entropies and interpretation of Shannon's fundamental inequalities.	(ii) Students to be involved in discussions and encouraged to ask questions. (iii) Students to be given	

3.	Learn about the detection and correction of errors while transmission.	homework/assignments. (iv) Students to be encouraged to give short presentations.	and class tests. <ul style="list-style-type: none">• Mid-term examinations.• End-term examinations.
4.	Representation of a linear code by matrices. Learn about encoding and decoding of linear codes.		

Keywords: Measure of uncertainty, Entropy, Shannon's fundamental inequalities, Channel capacity, Linear codes, Gilbert–Varshamov bound.

DSE-3 (iii): Biomathematics

Total Marks: 100 (Theory: 75 + Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: The focus of the course is on scientific study of normal functions in living systems. The emphasis is on exposure to nonlinear differential equations with examples such as heartbeat, chemical reactions and nerve impulse transmission. The basic concepts of the probability to understand molecular evolution and genetics have also been applied.

Course Learning outcomes: Apropos conclusion of the course will empower the student to:

- i) Learn the development, analysis and interpretation of bio mathematical models such as population growth, cell division, and predator-prey models.
- ii) Learn about the mathematics behind heartbeat model and nerve impulse transmission model.
- iii) Appreciate the theory of bifurcation and chaos.
- iv) Learn to apply the basic concepts of probability to molecular evolution and genetics.

Unit 1: Modeling Biological Phenomenon

Population growth, Administration of drugs, Cell division, Systems of linear ordinary differential equations, Heartbeat, Nerve impulse transmission, Chemical reactions, Predator-prey models.

Unit 2: Mathematics of Heart Physiology and Nerve Impulse Transmission

Stability and oscillations: Epidemics, Phase plane and Jacobian matrix, Local stability, Stability, Limit cycles, Forced oscillations; Mathematics of heart physiology: local model, threshold effect, phase plane analysis and heartbeat model, A model of the cardiac pacemaker; Mathematics of nerve impulse transmission: excitability and repetitive firing, travelling waves.

Unit 3: Bifurcation and Chaos

Bifurcation, Bifurcation of a limit cycle, Discrete bifurcation and period-doubling, Chaos, Stability of limit cycles, Poincaré plane.

Unit 4: Modeling Molecular Evolution and Genetics

Modelling Molecular Evolution: Matrix models of base substitutions for DNA sequences, Jukes–Cantor model, Kimura models, Phylogenetic distances; Constructing Phylogenetic Trees: Phylogenetic trees, Unweighted pair-group method with arithmetic means (UPGMA), Neighbor joining method; Genetics: Mendelian genetics, Probability distributions in genetics.

References:

1. Allman, Elizabeth S., & Rhodes, John A. (2004). *Mathematical Models in Biology: An Introduction*. Cambridge University Press.
2. Jones, D. S., Plank, M. J., & Sleeman, B. D. (2009). *Differential Equations and Mathematical Biology* (2nd ed.). CRC Press, Taylor & Francis Group, LLC.

Additional Readings:

- i. Murray, J. D. (2002). *An Introduction to Mathematical Biology* (3rd ed.). Springer.
- ii. Myint-U, Tyn (1977). *Ordinary Differential Equations*. Elsevier North-Holland, Inc.
- iii. Simmons, George F., & Krantz, Steven G. (2015). *Differential Equations*. McGraw-Hill Education. Indian Reprint.
- iv. Strogatz, Steven H. (2009). *Nonlinear Dynamics and Chaos* (2nd ed.). Perseus Book Publishing. LLC. Sarat Publication, Kolkata, India.

Teaching Plan (DSE-3 (iii): Biomathematics):

Week 1: Population growth, Administration of drugs, Cell division, Systems of linear ordinary differential equations.

[2] Chapter 1 (Sections 1.1 to 1.3) and Chapter 3 (An overview of the methods in Sections 3.1 to 3.6).

Week 2: Heartbeat, Nerve impulse transmission.

[2] Chapter 4 (Sections 4.2, and 4.3).

Week 3: Chemical reactions, Predator-prey models, Epidemics (mathematical model).

[2] Chapter 4 (Sections 4.4 and 4.5) and Chapter 5 (Section 5.2)

Week 4: The phase plane and Jacobian matrix, Local stability.

[2] Chapter 5 (Sections 5.3 and 5.4).

Week 5: Stability, Limit cycles.

[2] Chapter 5 [Sections 5.5, and 5.6 (up to Page number 137)].

Week 6: Limit cycle criterion and Poincaré–Bendixson Theorem (interpretation only, with Example 5.6.1), Forced oscillations.

[2] Chapter 5 [Section 5.6 (Page number 137 to 138) and Section 5.7).

Week 7: Mathematics of heart physiology: local model, threshold effect, phase plane analysis and heartbeat model.

[2] Chapter 6 (Sections 6.1 to 6.3).

Week 8: A model of the cardiac pacemaker, Excitability and repetitive firing.

[2] Chapter 6 (Section 6.5) and Chapter 7 (Section 7.1).

Week 9: Travelling waves, Bifurcation, Bifurcation of a limit cycle.

[2] Chapter 7 (Section 7.2), and Chapter 13 (Sections 13.1 and 13.2).

Weeks 10 and 11: Discrete bifurcation and period-doubling, Chaos, Stability of limit cycles, Poincaré plane.

[2] Chapter 13 (Sections 13.3 to 13.6).

Week 12: Matrix models of base substitutions for DNA sequences, Jukes–Cantor model, Kimura models, Phylogenetic distances.

[1] Chapter 4 (Sections 4.4 and 4.5).

Week 13: Constructing phylogenetic trees: phylogenetic trees, unweighted pair-group method with arithmetic means (UPGMA), Neighbor joining method.

[1] Chapter 5 (Sections 5.1 to 5.3).

Week 14: Genetics: Mendelian genetics, probability distributions in genetics.

[1] Chapter 6 [Sections 6.1 and 6.2 (up to Equation 6.2 only)].

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn the development, analysis and interpretation of bio mathematical models such as	(i) Each topic to be explained with examples. (ii) Students to be involved in	• Student presentations.

	population growth, cell division, and predator-prey models.	discussions and encouraged to ask questions.	<ul style="list-style-type: none">• Participation in discussions.• Assignments and class tests.• Mid-term examinations.• End-term examinations.
2.	Learn about the mathematics behind heartbeat model and nerve impulse transmission model.	(iii) Students to be given homework/assignments.	
3.	Appreciate the theory of bifurcation and chaos.	(iv) Students to be encouraged to give short presentations.	
4.	Learn to apply the basic concepts of probability to molecular evolution and genetics.		

Keywords: Bifurcation and chaos, Forced oscillations, Jukes–Cantor model, Kimura model, Limit cycles, Phase plane, Phylogenetic distances, Stability, UPGMA.

Discipline Specific Elective (DSE) Course - 4

Any *one* of the following (at least *two* shall be offered by the college):

DSE-4 (i): Number Theory

DSE-4 (ii): Linear Programming and Applications

DSE-4 (iii): Mechanics

DSE-4 (i): Number Theory

Total Marks: 100 (Theory: 75 and Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: In number theory there are challenging open problems which are comprehensible at undergraduate level, this course is intended to build a micro aptitude of understanding aesthetic aspect of mathematical instructions and gear young minds to ponder upon such problems. Also, another objective is to make the students familiar with simple number theoretic techniques, to be used in data security.

Course Learning Outcomes: This course will enable the students to:

- i) Learn about some fascinating discoveries related to the properties of prime numbers, and some of the open problems in number theory, viz., Goldbach conjecture etc.
- ii) Know about number theoretic functions and modular arithmetic.
- iii) Solve linear, quadratic and system of linear congruence equations.
- iv) Learn about public key crypto systems, in particular, RSA.

Unit 1: Distribution of Primes and Theory of Congruencies

Linear Diophantine equation, Prime counting function, Prime number theorem, Goldbach conjecture, Fermat and Mersenne primes, Congruence relation and its properties, Linear congruence and Chinese remainder theorem, Fermat's little theorem, Wilson's theorem.

Unit 2: Number Theoretic Functions

Number theoretic functions for sum and number of divisors, Multiplicative function, Möbius inversion formula, Greatest integer function. Euler's phi-function and properties, Euler's theorem.

Unit 3: Primitive Roots

The order of an integer modulo n , Primitive roots for primes, Composite numbers having primitive roots; Definition of quadratic residue of an odd prime, and Euler's criterion.

Unit 4: Quadratic Reciprocity Law and Public Key Encryption

The Legendre symbol and its properties, Quadratic reciprocity, Quadratic congruencies with composite moduli; Public key encryption, RSA encryption and decryption.

References:

1. Burton, David M. (2012). *Elementary Number Theory* (7th ed.). Mc-Graw Hill Education Pvt. Ltd. Indian Reprint.

2. Jones, G. A., & Jones, J. Mary. (2005). *Elementary Number Theory*. Undergraduate Mathematics Series (SUMS). First Indian Print.

Additional Reading:

- i. Neville Robinns. (2007). *Beginning Number Theory* (2nd ed.). Narosa Publishing House Pvt. Limited, Delhi.

Teaching Plan (DSE-4 (i): Number Theory):

Week 1: Linear Diophantine equation and its solutions, Distribution of primes, Prime counting function, Statement of the prime number theorem, Goldbach conjecture.

[1] Chapter 2 (Section 2.5).

[2] Chapter 2 (Section 2.2).

Week 2: Fermat and Mersenne primes, Congruence relation and its basic properties, Linear congruence equation and its solutions.

[2] Chapter 2 (Section 2.3).

[1] Chapter 4 (Sections 4.2 and 4.4).

Week 3: Chinese remainder theorem, to solve system of linear congruence for two variables, Fermat's little theorem, Wilson's theorem.

[1] Chapter 4 (Section 4.4), Chapter 5 (Section 5.2 up to before pseudo-prime at Page 90, Section 5.3).

Weeks 4 and 5: Number theoretic functions for sum and number of divisors, Multiplicative function, and the Möbius inversion formula. The greatest integer function, Euler's phi-function.

[1] Chapter 6 (Sections 6.1 to 6.2) and Chapter 7 (Section 7.2).

Week 6: Euler's theorem, Properties of Euler's phi-function.

[1] Chapter 7 (Sections 7.3 and 7.4).

Weeks 7 and 8: The order of an integer modulo n . Primitive roots for primes.

[1] Chapter 8 (Sections 8.1 and 8.2).

Week 9: Composite numbers having primitive roots.

[1] Chapter 8 (Section 8.3).

Week 10: Definition of quadratic residue of an odd prime, and Euler's criterion.

[1] Chapter 9 (Section 9.1).

Weeks 11 and 12: The Legendre symbol and its properties. Quadratic reciprocity law.

[1] Chapter 9 (Section 9.2 up to Page 181 and Section 9.3).

Week 13: Quadratic congruencies with composite moduli.

[1] Chapter 9 (Section 9.4).

Week 14: Public key encryption, RSA encryption and decryption scheme.

[1] Section 10.1.

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn about some fascinating discoveries related to the properties of prime numbers, and some of the open problems in number theory, viz., Goldbach conjecture etc.	(i) Each topic to be explained with examples.	<ul style="list-style-type: none"> • Student presentations. • Participation in discussions. • Assignments and class tests. • Mid-term examinations.
2.	Know about number theoretic functions and modular arithmetic.	(ii) Students to be involved in discussions and encouraged to ask questions.	
3.	Solve linear, quadratic and system of linear congruence equations.	(iii) Students to be given homework/assignments.	

4.	Learn about public key crypto systems, in particular, RSA.	(iv) Students to be encouraged to give short presentations.	• End-term examinations.
----	--	---	--------------------------

Keywords: Congruence, Decryption & Encryption, Legendre symbol, Multiplicative function, Prime numbers, Primitive roots, Reciprocity, Quadratic residue.

DSE-4 (ii): Linear Programming and Applications

Total Marks: 100 (Theory: 75 and Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: This course develops the ideas underlying the Simplex Method for Linear Programming Problem, as an important branch of Operations Research. The course covers Linear programming with applications to transportation, assignment and game problem. Such problems arise in manufacturing resource planning and financial sectors.

Course Learning Outcomes: This course will enable the students to:

- i) Learn about the graphical solution of linear programming problem with two variables.
- ii) Learn about the relation between basic feasible solutions and extreme points.
- iii) Understand the theory of the simplex method used to solve linear programming problems.
- iv) Learn about two-phase and big-M methods to deal with problems involving artificial variables.
- v) Learn about the relationships between the primal and dual problems.
- vi) Solve transportation and assignment problems.
- vii) Apply linear programming method to solve two-person zero-sum game problems.

Unit 1: Introduction to Linear Programming

Linear programming problem: Standard, Canonical and matrix forms, Graphical solution; Convex and polyhedral sets, Hyperplanes, Extreme points; Basic solutions, Basic feasible solutions, Reduction of feasible solution to a basic feasible solution, Correspondence between basic feasible solutions and extreme points.

Unit 2: Methods of Solving Linear Programming Problem

Simplex method: Optimal solution, Termination criteria for optimal solution of the linear programming problem, Unique and alternate optimal solutions, Unboundedness; Simplex algorithm and its tableau format; Artificial variables, Two-phase method, Big-M method.

Unit 3: Duality Theory of Linear Programming

Motivation and formulation of dual problem; Primal-Dual relationships; Fundamental theorem of duality; Complimentary slackness.

Unit 4: Applications

Transportation Problem: Definition and formulation; Methods of finding initial basic feasible solutions; Northwest-corner rule. Least-cost method; Vogel's approximation method; Algorithm for solving transportation problem.

Assignment Problem: Mathematical formulation and Hungarian method of solving.

Game Theory: Basic concept, Formulation and solution of two-person zero-sum games, Games with mixed strategies, Linear programming method of solving a game.

References:

1. Bazaraa, Mokhtar S., Jarvis, John J., & Sherali, Hanif D. (2010). *Linear Programming and Network Flows* (4th ed.). John Wiley and Sons.

2. Hadley, G. (1997). *Linear Programming*. Narosa Publishing House. New Delhi.
3. Taha, Hamdy A. (2010). *Operations Research: An Introduction* (9th ed.). Pearson.

Additional Readings:

- i. Hillier, Frederick S. & Lieberman, Gerald J. (2015). *Introduction to Operations Research* (10th ed.). McGraw-Hill Education (India) Pvt. Ltd.
- ii. Thie, Paul R., & Keough, G. E. (2014). *An Introduction to Linear Programming and Game Theory*. (3rd ed.). Wiley India Pvt. Ltd.

Teaching Plan (DSE-4 (ii): Linear Programming and Applications):

Week 1: Linear programming problem: Standard, Canonical and matrix forms, Graphical solution.

[1] Chapter 1 (Section 1.1).

[2] Chapter 1 (Sections 1.1 to 1.4 and 1.6).

Weeks 2 and 3: Convex and polyhedral sets, Hyperplanes, Extreme points; Basic solutions, Basic feasible solutions; Reduction of any feasible solution to a basic feasible solution; Correspondence between basic feasible solutions and extreme points.

[2] Chapter 2 (Sections 2.16, 2.19 and 2.20), and Chapter 3 (Sections 3.4 and 3.10).

[1] Chapter 3 (Section 3.2).

Week 4: Simplex Method: Optimal solution, Termination criteria for optimal solution of the linear programming problem, Unique and alternate optimal solutions, Unboundedness.

[1] Chapter 3 (Sections 3.3 and 3.6).

Weeks 5 and 6: Simplex algorithm and its tableau format.

[1] Chapter 3 (Sections 3.7 and 3.8).

Weeks 7 and 8: Artificial variables, Two-phase method, Big-M method.

[1] Chapter 4 (Sections 4.1 to 4.3).

Weeks 9 and 10: Motivation and formulation of dual problem; Primal-dual relationships.

[1] Chapter 6 (Section 6.1 and 6.2, up to Example 6.4).

Week 11: Statements of the fundamental theorem of duality and complimentary slackness theorem with examples.

[1] Chapter 6 (Section 6.2).

Weeks 12 and 13: Transportation problem, Assignment problem.

[3] Chapter 5 (Sections 5.1, 5.3 and 5.4).

Week 14: Game Theory: Basic concept, Formulation and solution of two-person zero-sum games, Games with mixed strategies, Linear programming method of solving a game.

[2] Chapter 11 (Sections 11.12 and 11.13).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn about the graphical solution of linear programming problem with two variables. Learn about the relation between basic feasible solutions and extreme points.	(i) Each topic to be explained with examples. (ii) Students to be involved in discussions and encouraged to ask questions.	• Student presentations. • Participation in discussions. • Assignments and class tests.
2.	Understand the theory of the simplex method used to solve linear programming problems. Learn about two-phase and big-M methods to deal with problems involving artificial variables.	(iii) Students to be given homework/assignments. (iv) Students to be encouraged to give short	• Mid-term examinations. • End-term examinations.

3.	Learn about the relationships between the primal and dual problems.	presentations.	
4.	Solve transportation and assignment problems. Apply linear programming method to solve two-person zero-sum game problems.		

Keywords: Artificial variables, Big-M method, Duality, Extreme points and basic feasible solutions, Simplex method, Two-phase method, Vogel's approximation method.

DSE-4 (iii): Mechanics

Total Marks: 100 (Theory: 75, Internal Assessment: 25)

Workload: 5 Lectures, 1 Tutorial (per week) **Credits:** 6 (5+1)

Duration: 14 Weeks (70 Hrs.) **Examination:** 3 Hrs.

Course Objectives: The course aims at understanding the various concepts of physical quantities and the related effects on different bodies using mathematical techniques. It emphasizes knowledge building for applying mathematics in physical world.

Course Learning Outcomes: The course will enable the students to:

- i) Know about the concepts in statics such as moments, couples, equilibrium in both two and three dimensions.
- ii) Understand the theory behind friction and center of gravity.
- iii) Calculate moments of inertia of areas and rigid bodies.
- iv) Know about conservation of mechanical energy and work-energy equations.
- v) Learn about translational and rotational motion of rigid bodies.

Unit 1: Forces in Equilibrium

Coplanar force systems; Three-dimensional force systems; Moment of a force about a point and an axis, Principle of moments, Couple and couple moment, Moment of a couple about a line, Resultant of a force system, Distributed force system, Rigid-body equilibrium, Equilibrium of forces in two and three dimensions, Free-body diagrams, General equations of equilibrium, Constraints and statical determinacy.

Unit 2: Friction, Center of Gravity and Moments of Inertia

Equations of equilibrium and friction, Frictional forces on screws and flat belts; Center of gravity, Center of mass and Centroid of a body and composite bodies; Theorems of Pappus and Guldinus; Moments and products of inertia for areas, Composite areas and rigid body, Parallel-axis theorem, Moment of inertia of a rigid body about an arbitrary axis, Principal moments and principal axes of inertia.

Unit 3: Conservation of Energy and Applications

Conservative force fields, Conservation of mechanical energy, Work-energy equations, Kinetic energy and work-kinetic energy expressions based on center of mass, Moment of momentum equation for a single particle and a system of particles.

Unit 4: Rigid Body Motion

Translation and rotation of rigid bodies, Chasles' theorem, General relationship between time derivatives of a vector for different references, Relationship between velocities of a particle for different references, Acceleration of particle for different references.

References:

1. Hibbeler, R. C. (2016). *Engineering Mechanics: Statics & Dynamics* (14th ed.). Pearson Prentice Hall (Pearson Education), New Jersey.
2. Shames, Irving H., & Rao, G. Krishna Mohan (2009). *Engineering Mechanics: Statics and Dynamics* (4th ed.). Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). Delhi.

Additional Reading:

- i. Nelson, E. W., Best, Charles L. & McLean, W. G. (1998). *Theory and Problems of Engineering Mechanics: Statics and Dynamics* (5th ed.). McGraw-Hill, Schaum's Outline Series.

Teaching Plan (DSE-4 (iii): Mechanics):

Weeks 1 and 2: Coplanar force systems; Three-dimensional force systems. Moment of a force about a point and an axis, Principle of moments, Couple and couple moment, Moment of a couple about a line, Resultant of a force system, Distributed force system.

[1] Chapters 3 and 4.

Weeks 3 and 4: Rigid-body equilibrium, Equilibrium of forces in two and three dimensions, Free-body diagrams, General equations of equilibrium, Constraints and statical determinacy.

[1] Chapter 5.

Weeks 5 and 6: Equations of equilibrium and friction, Frictional forces on screws and flat belts; Center of gravity, Center of mass and Centroid of a body and composite bodies; Theorems of Pappus and Guldinus.

[1] Chapters 8 and 9.

Weeks 7 and 8: Moments and products of inertia for areas, Composite areas and rigid body, Parallel-axis theorem, Moment of inertia of a rigid body about an arbitrary axis, Principal moments and principal axes of inertia.

[1] Chapter 10 (Sections 10.1 to 10.5) and Chapter 21 (Section 21.1).

Weeks 9 to 11: Conservative force fields, Conservation of mechanical energy, Work-energy equations, Kinetic energy and work-kinetic energy expressions based on center of mass, Moment of momentum equation for a single particle and a system of particles.

[2] Chapter 11 and Chapter 12 (Sections 12.5 and 12.6).

Weeks 12 to 14: Translation and rotation of rigid bodies, Chasles' theorem, General relationship between time derivatives of a vector for different references, Relationship between velocities of a particle for different references, Acceleration of particle for different references.

[2] Chapter 13 (Sections 13.1 to 13.3, and 13.6 to 13.8).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Know about the concepts in statics such as moments, couples, equilibrium in both two and three dimensions.	(i) Each topic to be explained with examples.	<ul style="list-style-type: none">• Student presentations.• Participation in discussions.• Assignments and class tests.• Mid-term examinations.• End-term examinations.
2.	Understand the theory behind friction and center of gravity. Calculate moments of inertia of areas and rigid bodies.	(ii) Students to be involved in discussions and encouraged to ask questions.	
3.	Know about conservation of mechanical energy and work-energy equations.	(iii) Students to be given homework/assignments.	
4.	Learn about translational and rotational motion of rigid bodies.	(iv) Students to be encouraged to give short presentations.	

Keywords: Center of gravity, Conservation of energy and its applications, Forces in equilibrium, Friction, Moments of inertia, Rigid body motion.

Acknowledgments

The following members were actively involved in drafting the LOCF syllabus of B.Sc. (Hons.) Mathematics, University of Delhi.

Head

- C.S. Lalitha, Department of Mathematics

Coordinator

- Hemant Kumar Singh, Department of Mathematics

Committee Members

- Satish Verma (SGTB Khalsa College)
- Preeti Dharmraha (Hansraj College)
- Monika Singh (LSR College for Women)
- Arun Pal Singh (Dyal Singh College)
- Raj Kumar (Kirori Mal College)
- Anita Bakshi (Vivekananda College)
- Shobha Rani (Vivekananda College)
- Manjari Srivastava (Miranda House)
- Swarn Singh (Sri Venkateswara College)
- Anju Nagpal (Vivekananda College)
- R.D. Sarma (Rajdhani College)
- Sanjay Mehra (Zakir Husain Delhi College)
- Vandana Rajpal (Shivaji College)
- Dhiraj Kumar Singh (Zakir Husain College)
- Arvind (Hansraj College)
- P.D. Sharma (SGTB Khalsa College)
- Aparna Jain (Shivaji College)
- Kriti Wadhwa (Hansraj College)
- Umesh (Rajdhani College)
- Vinay Trehan (Vivekananda College)
- Pankaj Garg (Rajdhani College)
- Virendrer Dalal (Ramjas College)
- Charanpreet Kaur (SGTB Khalsa College)

दिल्ली विश्वविद्यालय UNIVERSITY OF DELHI

Bachelor of Arts (Hons) Philosophy

(Effective from Academic Year 2019-20)



Revised Syllabus as approved by

Academic Council

Date:

No:

Executive Council

Date:

No:

**Applicable for students registered with Regular Colleges, Non Collegiate
Women's Education Board and School of Open Learning**

List of Contents

Page No.


Preamble	3
1. Introduction to Programme	4
2. Learning Outcome-based Curriculum Framework in Programme B.A. (Hons) Philosophy	
2.1. Nature and Extent of the Programme in B.A. (Hons) Philosophy	4
2.2. Aims of Bachelor Degree Programme in B.A. (Hons) Philosophy	5
3. Graduate Attributes in B.A. (Hons) Philosophy	6
4. Qualification Descriptors for Graduates B.A. (Hons) Philosophy	7
5. Programme Learning Outcomes for in B.A. (Hons) Philosophy	7
6. Structure of in B.A. (Hons) Philosophy	
6.1. Credit Distribution for B.A. (Hons) Philosophy	8
6.2. Semester-wise Distribution of Courses.	9
7. Courses for Programme B.A. (Hons) Philosophy	11-121
7.1. Course Learning Objective	
7.2. Course Learning Outcomes	
7.3. Course Teaching-Learning Process	
7.4. Assessment Methods	
8. Keywords	

Preamble

The objective of any programme at Higher Education Institute is to prepare their students for the society at large. The University of Delhi envisions all its programmes in the best interest of their students and in this endeavour it offers a new vision to all its Under-Graduate courses. It imbibes a Learning Outcome-based Curriculum Framework (LOCF) for all its Under Graduate programmes.

The LOCF approach is envisioned to provide a focused, outcome-based syllabus at the undergraduate level with an agenda to structure the teaching-learning experiences in a more student-centric manner. The LOCF approach has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice. The Under-Graduate Programmes will prepare the students for both, academia and employability.

Each programme vividly elaborates its nature and promises the outcomes that are to be accomplished by studying the courses. The programmes also state the attributes that it offers to inculcate at the graduation level. The graduate attributes encompass values related to well-being, emotional stability, critical thinking, social justice and also skills for employability. In short, each programme prepares students for sustainability and life-long learning.

The new curriculum of B.A. (Hons)  Philosophy offers an updated syllabus which will bring students to the forefront of philosophical debates in various areas of philosophy, viz., metaphysics, epistemology, ethics, logic, aesthetics. The syllabus is a combination of traditional aspects of philosophy along with modern trends.

The University of Delhi hopes the LOCF approach of the programme B.A. (Hons) Philosophy will help students in making an informed decision regarding the goals that they wish to pursue in further education and life, at large.

1. Introduction to Programme

The BA (Hons) Philosophy programme in Delhi University is an attempt to both introduce and, at the same time, provide an in depth look into one of the most challenging subjects that one can study. It will introduce students to the great philosophers and their ideas and also how one thinks about contemporary problems through the lens of their theories. It will give a comprehensive sweep of Indian and Western philosophy. It will also make the students aware of the main currents of thought in Ethics. Students can also explore Philosophy of Science, Logic, Feminism and Bio-ethics amongst many other core and optional papers. The core idea of the Honours course is to make the student aware of the foundational issues related to the world around us, whether it be in our life, or regarding mind and matter, or existence, or belief, or religion or science. Philosophy is vast in scope and intense in analysis and the Honours course tries to provide a taste of the extent of philosophy and the intensity of the argumentation and analysis at the same time.

2. Learning Outcomes based approach to Curriculum Planning

The learning outcomes-based curriculum framework for B.A (Hons.) Philosophy is based on the graduate attributes that a graduate in philosophy is expected to attain along coupled with the expected learning outcomes of each course and the combined course. The curriculum for B.A (Hons) Philosophy is prepared keeping in mind the needs, expectations and aspirations of students in philosophy as well as the modernizing trends and methodological perspectives of philosophy as a subject. The course learning outcomes and the programme learning outcomes specify the knowledge, understanding, skills, attitudes, values that a student completing this degree is expected to inculcate and know.

2.1 Nature and extent of the B. A (Hons.) Philosophy

Philosophy is taken to be an abstract study about the fundamental structure of the world. It works towards foundations of each and every subject that is investigating the nature of the world but it does not only deal with foundations of science but with foundations of humanities as well, including that of social structures. The scope of philosophy is therefore vast. Philosophy inculcates the habits of logical reasoning, avoiding fallacious reasoning, thinking more carefully about the place of each and every aspect of nature vis à vis the whole

of nature. A philosophy student emerges as a critical thinker who accepts nothing at face value. The philosophy student will contribute to society through positive reflection about its various facets.

In pursuing these aims, B.A (Hons.) Philosophy Programme aims at developing the ability to think critically, logically and analytically and hence use philosophical reasoning in practical situations. Pursuing a degree in philosophy will make students pursue interesting careers in media, education, law, politics, government etc.

The B A (Hons.) Philosophy programme covers the full range of philosophy, from classical Indian Philosophy and Greek Philosophy to Modern Logic, Ethical theories of Mill and Kant and contemporary reflections on current debates in applied ethics and bio ethics, analytic philosophy and continental philosophy, philosophy of science and law, and core courses in Indian and western philosophy texts. Current issues in feminist theory are also dealt with. There are many choices students have regarding which options they can take which makes the Honours syllabus a rich and diverse experience for students.

2.2 Aims of Bachelor's degree programme in Philosophy

The overall aims of B A.(Hons) Philosophy Programme are to:

- A) Inculcate strong curiosity about philosophy
- B) Develop understanding of definitions, key concepts, and principles of various theories of philosophers and develop comparing and contrasting techniques regarding the various theories
- C) enable learners/students to apply the knowledge and skills acquired by them to solve specific theoretical and applied problems in philosophy, especially ethical and bio ethical fields
- D) Develop in students the ability to apply critical thinking tools developed in philosophical theorising to handle issues and problems in ethics, social sciences and problems that arise out of the technological effects of natural sciences

E) Provide students with sufficient skills to think about foundational issues

F) Enable students to think logically and critically and analytically

3. Graduate Attributes in Philosophy

Some of the graduate attributes in philosophy are listed below:

A) Disciplinary knowledge: Students must have good knowledge of the history of the subject, the relevant historical line of development in Indian and western philosophy and should show good command of logic, ethics, philosophy of science, metaphysics, epistemology and aesthetics.

B) Communications skills: Ability to communicate various concepts of philosophy in writing and orally and ability to present complex philosophical ideas with clarity and present philosophical concepts logically

C) Critical thinking and analytical reasoning: Ability to identify relevant assumptions, hypothesis, implications or conclusions; formulate logically correct arguments and to know the pros and cons of the various arguments given by philosophers regarding mind, existence, necessity, evidence, belief, substance, justice, equality, fairness, beauty and truth.

D) Research-related skills: Capability to ask NEW questions that will take the subject forward

E) Self-directed learning: Ability to work independently, ability to search relevant resources and e-content for self-learning and enhancing knowledge in philosophy

F) Moral and ethical awareness/reasoning: To understand how serious the effects of plagiarism are and to inculcate a lifelong habit of never indulging in plagiarism. An equally important moral awareness should exist of avoiding narrow-minded thinking.

G) Lifelong learning: Ability to acquire a habit of reading and thinking about philosophy for life and to appreciate modern developments in the subject with the critical spirit that they will inculcate in the program.

4. Qualification descriptors for B.A (Hons.) Philosophy

Students who choose B.A (Hons) Philosophy Programme, develop the ability to think critically, logically and analytically and hence use philosophical reasoning to develop sophisticated theories and also in everyday life.

BA (Hons) Philosophy consists of Core Courses and Electives and also Discipline Specific Courses. A student qualifying in the subject will have broad knowledge of Indian philosophy and western philosophy; the student will know specific details of the theories of analytic and continental philosophy; the student will develop highly specific skills in logic, ethics, metaphysics, epistemology and will be well informed about current trends in feminism and social issues related to applied ethics and bio ethics.

Descriptors for B.A (Hons.) Philosophy may include the following:

- i. demonstrate fundamental/systematic and coherent knowledge of the academic field of philosophy with comprehensive understanding of ontology, metaphysics and epistemology and to think in an interdisciplinary manner
- ii Demonstrate the habit of reading leading journals of philosophy like Mind, Journal of Philosophy, Analysis, Philosophy and Phenomenological Research, Nous, Synthese, etc
- iii. Demonstrate skills to identify presuppositions and entailments of theories
- iv. Apply the acquired knowledge in philosophy and transferable skills to new/unfamiliar contexts and real-life problems.
- v. Demonstrate the ability to think about the foundations of sciences and the arts and to see the fruits of inquiry, whether in literature, the arts, or the sciences, as a culmination of a unified enterprise.

5. Programme Learning Outcomes in B A (Hons.) Philosophy

The completion of the B A. (Hons.) Philosophy Programme will enable a student to:

- i) Understand the broad ideas that are enshrined in the basic thinking of various centres of philosophy
- ii) Develop the idea of creating new theories of metaphysics and epistemology and ethics and logic and aesthetics
- iii) Critically analyse the hypothesis, theories, techniques and definitions offered by philosophers
- iv) Utilize philosophy to understand social realities and problems and to come up with ideal solutions to them
- v) Identify how deeply philosophy is connected to other disciplines like economics and natural sciences and literature
- vi) Understand and appreciate the foundational nature of philosophy

6. Structure of B.A. (Hons) Philosophy

6.1 Credit Distribution for B.A. (Hons) Philosophy

Course Credits

Type of Course	Theory/Practical	Theory/Tutorial
Core Course (14 Papers)	14X4= 56	14X5= 70
Core Course Practical / Tutorial* (14 Papers)	14X2=28	14X1=14
Elective Course (8 Papers)		
A.1. Discipline Specific Elective (4 Papers)	4X4=16	4X5= 20
A.2. Discipline Specific Elective Practical/ Tutorial* (4 Papers)	4X2= 8	4X1= 4
B.1. Generic Elective/ Interdisciplinary (4 Papers)	4X4= 16	4X5= 20
B.2. Generic Elective Practical/ Tutorial* (4 Papers)	4X2= 8	4X1= 4

• Optional Dissertation or project work in place of one Discipline Specific Elective paper (6 credits) in 6th Semester		
III. Ability Enhancement Courses	2X2= 4	2X2= 4
1. Ability Enhancement Compulsory (2 Papers of 2 credit each)		
2. Ability Enhancement Elective (Skill Based) (Minimum 2) (2 Papers of 2 credit each)	2X2= 4	2X2= 4
Total Credits	140	140

Institute should evolve a system/policy about ECA/ General Interest/ Hobby/ Sports/ NCC/ NSS related courses on its own.

*** wherever there is a practical there will be no tutorial and vice-versa**

6.2 Semester-wise Distribution of Courses.

CHOICE BASED CREDIT SYSTEM IN B.A. (HONS.) PHILOSOPHY

Sem.	Core Course CC 1- 14	Ability enhancement Compulsory Course (AECC)	Skill Enhancement Course (SEC) SEC (1)-(2)	Discipline Specific Elective (DSE) DSE (1)-(10)	General Elective (GE) GE (1)-(6)
I	Indian Philosophy (C 1)				Ethics in the Public Domain (GE I)
	Logic (C 2)				
II	Greek Philosophy (C 3)				Formal Logic (GE II)

	Ethics (C 4)				
III	Western Philosophy: Descartes to Kant (C 5)		Critical thinking & Decision Making (SEC 1)		Feminism (GE III)
	Social and Political Philosophy (C 6)				Critical thinking (GE IV)
	Applied Ethics (C 7)				
IV	Text of Indian Philosophy (C 8)		Art & Film Appreciation (SEC 2)		Bioethics (GE V)
	Text of Western Philosophy (C 9)				Symbolic Logic (GE VI)
	Truth Functional Logic (C 10)				
V	Analytic Philosophy (C 11)			Philosophy of Mind (DSE I)	
	Continental Philosophy (C 12)			Philosophy of Science (DSE II)	
				Philosophy of Law (DSE III)	
				Indian Materialism (DSE IV)	
				Bioethics (DSE V)	
VI	Philosophy of Religion (Indian & Western) (C 13)			Feminism (DSE VI)	
	Philosophy of Language (Indian & Western) (C 14)			Indian Theories of Consciousness (DSE VII)	
				Aesthetics (DSE VIII)	

				Knowledge and Skepticism (DSE IX)	
				Philosophy of Logic (DSE X)	

7.0 Courses for Programme B.A. (Hons) Philosophy.

SEMESTER 1

Indian Philosophy (CC (1)) Core Course - (CC) Credit:6

Course Objectives

•The objective of this course is to make students familiar with Indian Intellectual traditions. This course will be an Introduction to the major schools of Indian philosophy. Focus will be on interactive learning where students will engage themselves into rigorous and an analytical examination of key concepts in a manner that enables them for contemporary engagement and reflection . The course will help the students in understanding the significance of Indian philosophical studies in their daily life, how to overcome the stress, how to manage their life and take challenges in life; hence there will be a focus on the dialectical and analytical method to understand Indian philosophy.

• The aim is to make students familiar with and develop a clear understanding of the major concepts such as the Shruti and Smriti, Karma, Jnana and Bhakti in different systems, Idealism and Materialism, and Preyas, Shreyas and Nihshreyas in Kathopanishads etc within Indian Philosophical studies.

• Debate amongst the schools regarding the nature of the self will enhance various perspectives and further increase students understanding of Indian Philosophical systems and their philosophy.

•Improved critical reading of the texts, their rational and logical understanding, and writing abilities.

•Exposure to various Indian Philosophical texts.

• Finally it will give a holistic development of their personality

Course Learning Outcomes

- Students of the B.A. (Honors) Indian Philosophy will understand the richness of Indian Intellectual Traditions through basic concepts such as Shruti (agama) and Smriti (Nigama), Karma, Jnana and Bhakti, Indian Idealism vs. Indian Materialism, Preyas, Shreyas and Nihisreyas etc
- Students will appreciate the Indian Metaphysics of various ancient Indian schools such as Charvaka, Buddhism, Jainism, Samkhya, Mimamsa and Vedanta. They will become aware of the Metaphysics of various schools which will help them to understand the society at large.

In the unit III, students will gain familiarity with the epistemology of Jaina and Nyaya - Vaisheshika system. Unit II and Unit III are interrelated in the sense that epistemology of a particular school can be understood through its metaphysics and vice-versa.

- In Unit IV Students will learn to develop scientific, logical and rational inquiry for understanding the systems. Students will be able to do a comparative analysis of all systems which will further enhance their debating skills. Students will develop the ability to think critically and to read and analyze scientific literature.
- Students will develop strong oral and written communication skills through the effective presentation of Projects, Quiz as well as through Seminars.

UNIT I: Introducing Basic Concepts and Outlines of Indian Philosophy

(a) Basic Concepts

1. Distinction between *Shruti* (agama) and *Smriti* (nigama)
2. Emphasis on *Karma* (Action), *Jnana* (Knowledge) and *Bhakti* (devotion): An Understanding of different Indian Philosophical Schools
3. Distinction between *Indian Idealism* vs. *Indian Materialism*
4. *Preyas*, *Sreyas* and *Nihisreyas* with reference to Kathopanishadas

(b) General Characteristics of Indian Philosophy

Recommended Readings:

- Chatterjee, S and D.M.Datta. 1984. *An Introduction to Indian Philosophy*, 8th ed. Calcutta: University of Calcutta.

- Chattopadhyaya, Debiprasad. 2008. *Lokayata: A Study in Ancient Indian Materialism*, 7thed. Delhi: People's Publishing House.
 - Cowell, E. B. and A.E. Gough. 1882. *The Sarva-Darshana-Samgraha or Review of the Different Systems of Hindu Philosophy*, by Madhavacharya, London: Trubner's & Co. Ludgate Hill.
 - Dasgupta, S.N. 2004. *A History of Indian Philosophy*, vol.1. Delhi: Motilal Banarasidass.
 - Mohanty, J.N. 1992. *Reason and Tradition in Indian Thought*. Oxford (U.K.): Clarendon Press.
 - Paul S. and Anthony J. Tribe. 2000. *Buddhist Thought: A Complete Introduction to the Indian Tradition*. London: Routledge.
 - Radhakrishnan, S. and C. A. Moore. 1967. *A Source book in Indian Philosophy*. Princeton: Princeton University Press.
 - Radhakrishnan, S. 1967. *The Principal Upanishads*. United States : Princeton University Press .
 - Raju, P.T. 1985. *Structural Depths of Indian Thought*. Albany (New York): State University of New York Press.
-

UNIT II: Indian Metaphysics (*Tattva Vicara*)

- (a) Indian Materialism: Carvaka
- (b) Four Noble Truths (*catvariaryasatyani*) and Doctrine of Dependent Origination (*Pratityasamutpada*) and Doctrine of Momentariness (*Kshanabhangavada*) in Buddhism
- (c) Jaina *Anekantavada* (Relativistic pluralism)
- (d) Samkhya Dualism: Prakriti and Purusha
- (e) *Purva Mimamsha* theory of Karma (*Apurva*)

Recommended Readings:

- Bhattacharya, Ramkrishna. “[Materialism in India: A Synoptic View](http://www.carvaka4india.com/2011/08/materialism-in-india-synoptic-view.html).” Retrieved 27 July 2012. <http://www.carvaka4india.com/2011/08/materialism-in-india-synoptic-view.html>
- Chakravarti, P. 1975. *Origin and Development of the Samkhya System of Thought*. Delhi: Munshiram Manoharlal Publishers.
- Dasgupta, S.N. 2004. *A History of Indian Philosophy*, vol.1. Delhi: Motilal Banarasidass.

- Jha, Ganganath. 1978. Prabhakara School of Purva Mimamsa. Delhi: Motilal Banarsidass.
 - Kewal Krishna.1974. *Materialism in Indian Thought*. Delhi: Munshiram Manoharlal Publishers.
 - Mohanty, J.N. 1993. *Essays on Indian Philosophy*, Ed. Purusottama Bilimoria. Oxford (U.K.): University Press.
 - Paul S. and Anthony J. Tribe.2000. *Buddhist Thought: A Complete Introduction to the Indian Tradition*. London: Routledge.
 - Radhakrishnan, S. 1929. Indian Philosophy, Vol.1, Muirhead library of philosophy 2nd ed. London: George Allen and Unwin Ltd.
 - Sharma, C.D. 2000. *A Critical Survey of Indian Philosophy*. Delhi: Motilal Banarasidass
 - Stevenson, S.1951. The Heart of Jainism. London: Oxford University Press.
-

UNIT III: Indian Epistemology (*Pramana Vicara*)

- (a) *Syadvada* of Jainism
- (b) *Prama* and *Pramana* Distinction with reference to Nyaya theory of Perception (*Pratyaksha*) and Inference (*Anumana*)

Recommended Readings:

- Bijalwan, C.D. 1977. *Indian Theory of Knowledge based upon Jayanta's Nyaya Manjari*. New Delhi: Heritage Publishers.
 - Chatterjee, Satishchandra. 2015. The Nyaya theory of Knowledge. Delhi: Rupa publishers.
 - Datta, D.M. 1972. *The Six Ways of Knowing*. Calcutta: University of Calcutta Press.
 - Sharma, C.D. 2000. *A Critical Survey of Indian Philosophy*. Delhi: Motilal Banarasidass.
 - Stevenson, S.1951. The Heart of Jainism. London: Oxford University Press.
-

UNIT IV: Indian Philosophical Debates

- (a) Carvaka, Buddha and Samkaracharya on Doctrine of Self

(b) *Satkaryavada* of Samkhya System and *Asatkaryavada* of Nyaya-Vaishesika System

(c) Samkaracharya and Ramanuja on *Maya*

Recommended Readings:

- Bhattacharya, Ramkrishna. “[Materialism in India: A Synoptic View](http://www.carvaka4india.com/2011/08/materialism-in-india-synoptic-view.html).” Retrieved 27 July 2012. <http://www.carvaka4india.com/2011/08/materialism-in-india-synoptic-view.html>
- Murthi, Satchidananda K. 1959. *Revelation and Reason in Advaita Vedanta*. Waltair: Andhra University Press.
- Organ, Troy Wilson. 1964. *The Self in Indian Philosophy*. London: Mouton & Co.
- Pandey, Sangam Lal. 1983. *Pre-Samkara Advaita Philosophy*, 2nd ed. Allahabad: Darsan Peeth.
- Paul S. and Anthony J. Tribe. 2000. *Buddhist Thought: A Complete Introduction to the Indian Tradition*. London: Routledge.
- Srinivasachari, P.N. 1943. *The Philosophy of Visistadvaita*. Madras: Adyar library.
- Stcherbatsky, Theodore. 1970. *The Soul Theory of Buddhists*, 1st ed. Varanasi: Bharatiya Vidya Prakasana.

Additional Resources:

Suggested Readings:

- [Chatalian](#), George. 1983. Early Indian Buddhism and the nature of philosophy: A philosophical investigation. *Journal of Indian Philosophy* 11(2): 167-222.
- Gokhle, Padeep P. 1991. The Logical Structure of Syadvada, *The Journal of Indian Council of Philosophical Research* 8 (3): PP.1-10.
- Koller, John M. 1977. [Skepticism in Early Indian Thought](#). *Philosophy East and West* 27(2): 155-164
- Murty, T. R. V. 1955. *Central Philosophy of Buddhism*. London: George Allen & Unwin .
- Mehta, Sonia. 2017. *The Buddhist Theory of Meaning*. Delhi: Krishi Sanskriti Publications.
- [Prevos](#), Peter. “*The Self in Indian Philosophy: Hindu, Buddhist and Carvaka views*.” Retrieved, April 2002. <https://prevos.net/humanities/philosophy/self/> uddhist Theory of Meaning, Delhi, 2017

Teaching-Learning Process:

Teaching learning is a continuous process which is surrounded by students attitude to learn share the knowledge, academic curiosity, reading & practicing, creativity, thinking ability and extending your knowledge levels. This course demands interaction among the students and their ability to think independently. The B.A (Honours) Indian Philosophy aims to make the student proficient in understanding their Philosophy, Culture and Society through the transfer of knowledge in the classroom as well as in life. In the classroom this will be done through blackboard and chalk lectures, charts, powerpoint presentations, and the use of audio-visual resources that are available on the internet such as virtual lab. An interactive mode of teaching will be used. The student will be encouraged to participate in discussions, group discussions and deliver seminars on some topics. A problem-solving approach will be adopted wherever suitable.

Assessment methods

The student will be assessed over the duration of the programme by many different methods. These include short objectives-type quizzes, assignments, written and oral examinations, group discussions and presentations, problem-solving exercises, seminars, preparation of reports. Students will strictly follow the course policies.

Grade will be determined on the basis of graded assignments as specified below:

Evaluation:

- Four Assignments/ Projects: 10% each
 - Three in-class quizzes/oral tests: 5% each
 - Paper Presentations: 5%
 - Final exam: 10%
 - Attendance and participation 5%
-

Keywords

Keywords

Shruti and Smriti, Idealism, Materialism, Realism, Pluralism, Self, Brahman, Maya, Dualism, Preyas, Shreyas and Nihshreyas, Anekantavada, Syadvada, Karma, Jnana, Bhakti, Pratityasamutpada, Nirguna and Saguna Brahman, Jiva, Apurva, etc

Logic
(CC (2))
Core Course - (CC) Credit:6

Course Objectives

Logic is fundamental to the way human beings communicate. Though our public debate and private reasoning are shaped by logical principles, we are not able to spell them out without a basic training in logic. This Logic course helps the students to develop an understanding of the basic concepts of logic and language as well as familiarity with precise models of deductive reasoning. It includes theoretical as well as the applied aspects. Uses of language manage to differentiate the various applications of language effectively. Informal fallacies enables the students to understand the flaws in the arguments which we use in our day to day life. Identifying informal fallacies is very important nowadays to preserve one's intellectual sanctity in an increasingly media saturated world.

UNIT I: Basic Logical Concepts

1. Sentence and Proposition
2. Argument: Deduction and Induction
3. Truth, Validity and Soundness.
4. Argument and Explanation

Chapter 1 of Irving Copi, *Introduction to Logic*, (Delhi: Pearson, 2014,2017), 14th ed, 2-33.

UNIT II: Logic and Language:

1. Definition of a term, Extensional and Intentional meaning of a term and their relationship.
2. Uses of Language: Three Basic functions of Language.
3. Kinds of Definitions

Chapter 3 of Irving Copi, *Introduction to Logic*, (Delhi: Pearson, 2014,2017), 14th ed, 64-93.

Chapter 4 of Irving Copi, *Introduction to Logic*, (Delhi: Pearson, 2014,2017), 14th ed., 105-162.

UNIT III: Aristotelian Logic:

(A)

1. Categorical Propositions

2. Distribution of Terms
3. Square of Opposition
4. Further Immediate Inferences: Conversion, Obversion and Contraposition
5. Problem of Existential Import
6. Translating Categorical Propositions into Standard form
7. Disjunctive and Hypothetical Syllogisms

(B)

8. Mediate Inference: Categorical Syllogism: Mood, Figure
9. Validating / Invalidating Categorical Syllogisms through syllogistic rules & fallacies.
10. Special rules for each figure
11. Venn Diagram technique for testing Syllogism.

Chapter 5, 6 and 7 of Irving Copi, *Introduction to Logic*, (Delhi: Pearson, 2014,2017), 14th ed,163-286.

UNIT – IV : Informal Fallacies

(As given in Copi's 14th Edition)

Chapter 4 of Irving Copi, *Introduction to Logic*, (Delhi: Pearson, 2014,2017), 14th ed., 105-162

Additional Resources:

1. Cohen, Morris and Ernst Nagel. *An Introduction to Logic and Scientific Method*, Delhi: Allied Publishers, 1968.
2. Hurley, Patrick, *Introduction to Logic*, Wadsworth: Delhi, 2007.
3. Sen, Madhucchanda, *LOGIC*, Delhi: Pearson, 2008.
4. Chakraborti, Chhanda, *Logic: Informal, Symbolic and Inductive*, Delhi:Prentice-Hall of India Private Limited, 2006.

Teaching Learning Process

Lectures and Tutorials

Assessment Methods

Assignments, Presentation and Examination

Keywords

Logic, Argument, Deduction, Truth, Validity, Syllogism, Rules, Fallacies.

Ethics in the Public Domain (GE (1)) Generic Elective - (GE) Credit:6

Course Objectives

The course aims to develop an ethical perspective on socio-political and even economic issues where the public discourses and debates are often bereft of ethical/moral considerations and are often plagued with objectivism and materialism.

Through theoretical understanding of ethics and its practical application in daily life, it generates ethical awareness/sensitivity necessary for overall wellbeing and inspires the readers to contribute voluntarily to the society as a responsible member.

Course Learning Outcomes

1. To equip the students with tools and techniques for handling socio political issues that affect them on individual / collective basis.
 2. Larger awareness of public issues and empathy with marginalised issues in society.
 3. Inculcate a sense of ethical responsibility and a vision to challenge the existing norms in need of change.
-

Unit I: Introduction to Ethics

1.Morality

*Rachel, James. "What is Morality?" In *The Elements of Moral Philosophy*. 1-14. McGraw-Hill, 2012.

2.Cultural Relativism

*Rachel, James. "The Challenge of Cultural Relativism." In *The Elements of Moral Philosophy*. 15-34. McGraw- Hill, 2012.

Unit II: Morality and Relationship

1.The Married Women

*Beauvoir, Simone de. "The Married Woman." In *Second Sex*, vol.II, part two, chapter 5. USA: Vintage, 2011.

2. Morality: Parents and Children

*Rachel, James. "Morality, Parents and Children." In *Ethics in Practice: An Anthology* edited by Hugh LaFollette, 167-177. USA;UK;Australia: Blackwell, 2004

Unit III: Structures of Inequality

1.Caste

*Ambedkar, B. R. "Castes in India: Their Mechanism, Genesis and Development." Paper presented at an Anthology Seminar, Columbia University, 1916.

Available online:

http://www.columbia.edu/itc/mealc/pritchett/00ambedkar/txt_ambedkar_castes.html

2.Affluence and Poverty

*Sen, Amartya. "Freedom, Agency and Wellbeing." In *Inequality Reexamined*, 56-72.USA: First Harvard University Press, 1992.

*Singer, Peter. "Famine, Affluence and Morality." *Philosophy and Public Affairs*, 1,no.3 (Spring, 1972): 229-243

Unit IV: Media Ethics

1. Privacy

*Archard, David. "Privacy, the public interest and a prurient public. In *Media Ethics* edited Matthew Kieran, 82-96. USA;Canada: Routledge. 2014

2. Pornography

*Gary, Ann. "Sex Lies and Pornography." In *Ethics in Practice: An Anthology* edited by Hugh LaFollette, 344-355. USA;UK;Australia: Blackwell, 2004.

Unit IV: Animal Ethics

*Singer, Peter. "All Animals Are Equal." In *Ethics in Practice: An Anthology* edited by Hugh LaFollette, 107-115. USA;UK;Australia: Blackwell, 2004.

References

Unit I: Introduction to Ethics

1.Morality

*Rachel, James. "What is Morality?" In *The Elements of Moral Philosophy*. 1-14. McGraw-Hill, 2012.

2.Cultural Relativism

*Rachel, James. "The Challenge of Cultural Relativism." In *The Elements of Moral Philosophy*. 15-34. McGraw- Hill, 2012.

Unit II: Morality and Relationships

1.The Married Women

*Beauvoir, Simone de. "The Married Woman." In *Second Sex*, vol.II, part two, chapter 5. USA: Vintage, 2011.

2. Morality: Parents and Children

*Rachel, James. "Morality, Parents and Children." In *Ethics in Practice: An Anthology* edited by Hugh LaFollette, 167-177. USA;UK;Australia: Blackwell, 2004.

Unit III: Structures of Inequality

1.Caste

*Ambedkar, B. R. "Castes in India: Their Mechanism, Genesis and Development." Paper presented at an Anthology Seminar, Columbia University, 1916.

Available online:

http://www.columbia.edu/itc/mealac/pritchett/00ambedkar/txt_ambedkar_castes.html

2.Affluence and Poverty

*Sen, Amartya. "Freedom, Agency and Wellbeing." In *Inequality Reexamined*, 56-72.USA: First Harvard University Press, 1992.

*Singer, Peter. "Famine, Affluence and Morality." *Philosophy and Public Affairs*, 1,no.3 (Spring, 1972): 229-243.

Unit IV: Media Ethics

1. Privacy

*Archard, David. "Privacy, the public interest and a prurient public. In *Media Ethics* edited Matthew Kieran, 82-96. USA;Canada: Routledge. 2014

2. Pornography

*Gary, Ann. "Sex Lies and Pornography." In *Ethics in Practice: An Anthology* edited by Hugh LaFollette, 344-355. USA;UK;Australia: Blackwell, 2004.

Unit IV: Animal Ethics

*Singer, Peter. "All Animals Are Equal." In *Ethics in Practice: An Anthology* edited by Hugh LaFollette, 107-115. USA;UK;Australia: Blackwell, 2004.

Additional Resources:

*LaFollette, Gary. *Ethics in Practice: An Anthology*. USA;UK;Australia: Blackwell, 2004.

*Rachel, James. *The Elements of Moral Philosophy*. McGraw- Hill, 2012.

Teaching Learning Process

Lectures, tutorials and film screenings.

Assessment Methods

As per the rules of University of Delhi.

Keywords: Morality, relativism, inequality, privacy, public interest.

Semester II

Greek philosophy (CC (3)) Core Course - (CC) Credit:6

Course Objectives

This course traces the origins of philosophy in the Western tradition in the thinkers of Ancient Greece. It begins with the Pre-Socratic natural philosophers like Thales and Anaximander. Then it moves on to Heraclitus and Parmenides of Elea. Then, it discusses the counter position of Sophists and Socrates. Finally, there is discussion on Plato's theory of virtue and Forms.

Course Learning Outcomes

This course facilitates a comprehension of early Greek tradition. A comprehensive understanding of it is like a foundation course in the Classics. The two great classical traditions, viz., Greek and Indian have left a rich legacy of philosophic knowledge that can be pragmatically and scholastically contextualized in the present day times. Students of Delhi University read Indian Philosophy, this course in Greek Philosophy complements it fairly well for understanding of the classics.

Unit-1: Naturalism (Cosmos and Arche)

Thales and Anaximander

Recommended Reading:

J. Barnes. Early Greek Philosophy. Harmondsworth: Penguin Books, 1981. p.xi-xxv.

Curd, Patricia. A Presocratic Reader: Selected Fragments and Testimonia Second Edition Edited, with Introduction. Translations by Richard D Mckirahan and Patricia Curd (Hackett Publishing Company, Inc, 2011) ,p.13-19

Warren, James & Frisbee Sheffield (eds.). The Routledge Companion to Ancient Philosophy. Routledge: London and New York, 2014. Part-1., 94-124

Kirk, G.S and Raven, J.E, The Presocratic Philosophers: A Critical History with Selection of Texts (Cambridge; At The University Press, 1957) pp74-99

Unit 2: Change, Being and Becoming

1. Heraclitus: Doctrine of Flux.
2. Parmenides of Elea: Doctrine of Being and not-being.

Recommended Reading:

Curd, Patricia. A Presocratic Reader: Selected Fragments and Testimonia Second Edition Edited, with Introduction. Translations by Richard D. McKirahan and Patricia Curd (Hackett Publishing Company, Inc, 2011), p.39-65,
G.S Kirk and J.E. Raven, The Presocratic Philosophers, Chapters vi and x

Online Source:

Adobe PDF ebook ISBN: [978-1-60384-598-4/2010019297](https://www.adobe.com/india/creativecloud/ebooks/978-1-60384-598-4/2010019297)

Unit 3: Sophists and Socrates

1. Sophists (Protagoras): Relativism and Scepticism

2. Socrates: Critical Enquiry and Virtue is Knowledge

Recommended Reading: Gill, M. L. A Companion to Ancient Philosophy edited. Pierre Pellegrin: Blackwell Companion Series, 2006. Relevant chapters.

Warren, James & Frisbee Sheffield (eds.),

The Routledge Companion to Ancient Philosophy. Routledge: London and New York, 2014. Part-1., 94-124

Unit 4: Plato

Justice as Virtue and Theory of Forms Recommended Readings

Lee, Desmond (translated), Plato: The Republic, edited by Betty Radice, (Penguin Classics, 1974), p.196-224 and 300-333. (books 4.5 and 7.6-7.7)

Warren, James & Sheffield Frisbee. (eds). The Routledge Companion to Ancient Philosophy. Routledge: London and New York, 2014. Part-II, chapters 13-16.

Vlastos, G. "Justice and psychic harmony in the Republic" in Journal of Philosophy. 1969. Vol.66. (16): pp 505-521)

Recommended Readings

Barnes, Jonathan. Early Greek Philosophy. Harmondsworth: Penguin Books, 1987.

Gill, M. L & Pellegrin, Pierre. Blackwell Companion to Philosophy: A Companion to Ancient Philosophy. Blackwell Series, 2006. Warren, James & Sheffield Frisbee. (eds). The Routledge Companion to Ancient Philosophy. Routledge: London and New York, 2014.

Cohen, M.S. Curd, P. & Reeve, C.D.C. (ed). Readings in Ancient Greek Philosophy. Hackett: Indianapolis, 1995.

Lee, Desmond(translated), Plato: The Republic,edited by Betty Radice, (Penguin Classics,1974)

Curd, Patricia. A Presocratic Reader: Selected Fragments and Testimonia Second Edition Edited, with Introduction. Translations by RichardbD Mckirahan and Patricia Curd (Hackett Publishing Company, Inc,2011) ,

Wareen, James & Sheffield Frisbee. (eds). The Routledge Companion to Ancient Philosophy (Routledge: London and New York,2014).

Kirk, G.S. Raven & Schofield , Pre Socratic Philosophy. CUP,1957.

Tankha, V. Ancient Greek Philosophy: Thales to Socrates. India: Pearson, 2012.

Vlastos, G. “Justice and psychic harmony in the Republic” in Journal of Philosophy.1969. Vol.66. (16)

Additional Resources:

Guthrie,WKC. A History of Greek Philosophy, Vol-. The Earlier Presocratic Tradition and the Pythagoreans. Cambridge,1962. ----A History of Greek Philosophy, Vol-2. The Presocratic Tradition from Parmenides to Democritus. Cambridge,1965. ——A History of Greek Philosophy, Vol-3, The fifth Century Enlightenment. Cambridge,1969. ——A History of Greek Philosophy, Vol-4, Plato, the Man and his Dialogues: Earlier Period Cambridge,1975.

Kirk,G.S and Raven, J.E, The Presocratic Philosophers: A Critical History with Selection of Texts(Cambridge; At The University Press,1957)

Teaching Learning Process

Since this is a course on Classical tradition, a comparison with Greek Mythologies in the class room discussions will certainly be enriching for the students to comprehend ancient tradition of cosmology and classics Besides this, the standard process of assignments, tests and exam needs to be followed.

Assessment Methods

To follow the university mandate of 75% end of semester university exam and to add to this 25% of the Internal Assessment which comprises of an assessment based upon class tests, projects, home assignments and attendance.

Keywords: Pre-Socratic, Thales, Anaximander, Heraclitus , Protagoras, Parmenides , Socrates, Plato

Ethics
(CC (4))
Core Course - (CC) Credit:6

Course Objective

The objective is to introduce students to basic ethical theories which enhance their decision making capabilities.

To help them achieve clarity and creative approach in a given situation.

Course Learning Outcomes

The students after having run through basic ethical theories gain a better orientation from the ethical perspective.

This course helps to understand and interpret events with a more rational basis.

Unit 1 Morality and Relativism

1. Conventional and Reflective Morality

2. Relativism

Essential Readings:

Lillie William, An Introduction To Ethics, Allied Publishers Pvt. Ltd. 1st edition, 1967, New Delhi

Rachel, J. , The Elements of Moral Philosophy, McGraw- Hill, 2003

Unit 2 Ethical Theories

1. Aristotle: Virtue Ethics

2. Kant: The Categorical Imperative

3. Mill: Utilitarianism

Essential Readings:

Aristotle, Nichomachean Ethics, Harvard University Press, 1926

Kant, Immanuel, Groundwork of the Metaphysics of Morals, Trans. H.J Paton, as The Moral Law, London: Hutchinson, 1953

Warnock Mary, J.S Mill Utilitarianism, Glasgow: Collins, 1962

Unit 3 Meta Ethics

1. Emotivism

2. Prescriptivism

Essential Readings:

Stevenson, C.L., Facts and Values, Yale University Press, 1963

Hare, R.M. ,Language of Morals, Oxford University Press, 1973.

Unit 4 Indian Ethics

1. Bhagvadgītā: Niṣkāmakarma

2. Four Puruṣārthas: Dharma , Artha, Kāma, Mokṣa

3. Gandhi's conception of Ahimsā and satya

Essential Readings

Bilimoria, Purushottama ed., Indian Ethics: Classical Traditions and Contemporary Challenges, New Delhi: Oxford University Press, 2007

Sharma, I.C., Ethical Philosophies of India, New York, U.S.A. Johnson Publishing Company, 1967

Iyer, Raghavan.N., The Moral And Political Thought Of Mahatma Gandhi, Oxford University Press, 2000

References

Lillie William, An Introduction To Ethics, Allied Publishers Pvt. Ltd. 1st edition, 1967, New Delhi

Aristotle, Nichomachean Ethics, Harvard University Press. 1926

Bilimoria, Purushottam, Indian Ethics: Classical Traditions and Contemporary Challenges, New Delhi: Oxford University Press, 2007

Kant, Immanuel, Groundwork of the Metaphysics of Morals, Trans. H.J Paton, as The Moral Law, London: Hutchinson, 1953

Stevenson, C.L., Facts and Values, Yale University Press, 1963

Hare, R.M. ,Language of Morals, Oxford University Press, 1973.

Rachel, J, The Elements of Moral Philosophy, McGraw- Hill,2003

Sharma, I.C., Ethical Philosophies of India, New York, U.S.A. Johnson Publishing Company, 1962

Warnock Mary, J.S Mill Utilitarianism, Glasgow: Collins, 1962

Additional Resources:

Hudson, W.D., Modern Moral Philosophy, Macmillan Education, 1983

Urmson, J.O., The Emotive Theory of Ethics, Hutchinson, London, 1968

Teaching Learning Process

Lectures

Group Discussions

Power Point Presentation

Assessment Methods

Internal assessment

Project

University Examination

Keywords

Aristotle, Kant, J.S. Mill, Stevenson, Hare, M. K.Gandhi, Bhagvadagita

Formal Logic
(GE (2))
Generic Elective - (GE) Credit:6

Course Objective(2-3)

This course is designed as an introductory course in logic which will bring out the standard forms of Formal and Informal reasoning. It introduces the basic logical concepts and provides a clear understanding of the structure of arguments and the nature of inferential reasoning. It provides ground for application of logical skills and techniques for formal testing of syllogistic arguments.

Course Learning Outcomes

Formal logic enhances the reasoning skills and develops ground for rejecting the wrong arguments on the basis of sound inferences. It creates ground for eliminating superstitious beliefs and creates ways for strong arguments. This paper helps in good score that provides better rank in form of results. It trains the student to construct good arguments and also provides valid ground to reject the wrong ones.

Unit 1

UNIT I: BASIC LOGICAL CONCEPTS

1. Sentence and Proposition
2. Argument, Explanation and Inference.
3. Truth, Validity and Soundness

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016. Ch 1-2.
-

Unit 2

UNIT II: - LOGIC AND LANGUAGE

1. Term and Distribution of Term.
2. Basic Functions of Language.
3. Agreement and Disagreement in Belief and Attitude

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016. Ch 3.

Unit 3

UNIT III: ARISTOTELIAN LOGIC (A)

1. Classification of Categorical Propositions
2. Traditional Square of Opposition and Existential Import
3. Translating ordinary sentences into Standard form

ARISTOTELIAN LOGIC (B)

1. Immediate Inference (Conversion, Obversion and Contraposition)
2. Mediate Inference: Categorical Syllogism.
3. Testing Validity/Invalidity of Syllogism by Syllogistic Rules & Venn Diagram

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016. Ch 5-7.

Unit 4

UNIT IV: PROPOSITIONAL LOGIC

1. Importance of Symbolic logic
2. Logical constants, Variables and basic truth functions (Negation, Conjunction, Disjunction (Alternation), Conditional (Material Implication), Bi-conditional (Material Equivalence) and Stroke Function
3. Symbolization of statements
4. Proving Validity/Invalidity: Truth Table Method & Reductio ad absurdum

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016. Ch8.

Unit 5

UNIT V :- INFORMAL FALLACIES

1. Fallacies of Relevance
2. Fallacies of Defective induction
3. Fallacies of Presumption
4. Fallacies of Ambiguity

Recommended Readings:

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016. Ch 4.

References

PRESCRIBED TEXT

1. Copi, Irving M., Carl Cohen, and Kenneth McMahon. *Introduction to Logic*. 14th ed. Delhi: Pearson, 2016.
2. Cavendish, A. P., and D. J. Connor. *Introduction to symbolic logic*. London: University Tutorial Press, 1959.

Additional Resources:

Jain, Krishna. *A Textbook of Logic*. New Delhi: D.K. Printworld, 2018.

Teaching Learning Process

Lectures & tutorials as per University Norm

Assessment Methods

As per University norm 75% for final exam and 25% for internal assessment should be there. More objective and less subjective questions should be encouraged. Reasoning skill based questions should be given priority

Keywords

Basic logical concepts: argument & inference Truth/validity/soundness Syllogism Square of opposition Informal fallacy

Semester III

Western Philosophy: Descartes to Kant
(CC (5))
Core Course - (CC) Credit:6

Course Objective

Philosophy is both fascinating and frustrating. It deals with the most difficult questions of life which have always bewildered us. Philosophers have been relentlessly working to quench this thirst of the mankind by expounding theories which have broadened the base of human understanding. The paper is designed to appreciate the profound ideas that sprung from the minds of the great philosophers of the modern western world. The syllabus comprises of six philosophers grouped under two traditions of thought: Rationalism and Empiricism and the seventh conciliating these two traditions with conflicting thoughts. It begins with Descartes' seminal views on epistemology and metaphysics and traces the emergence of ideas in a kind of chronological order which demonstrates methodical development of philosophical thought.

Course Learning Outcomes

This paper seeks to do three things: 1. it will enable students to witness how philosophers who were either predecessors or contemporaries evaluated the theories of others, thus will advise them in distinguishing good arguments from bad arguments. 2. it will enable students to have a better understanding of how a man thinks and what goes on into the making of human thought. 3. It will also make students aware that there is no place for superficial approach to the complex questions in life.

UNIT I: Issues in Rationalism and Empiricism

Recommended Reading:

Markie, Peter, "Rationalism vs. Empiricism", *The Stanford Encyclopedia of Philosophy* (Fall 2017 Edition), Edward N. Zalta (ed.)

Unit 2

UNIT II: RATIONALISM

1. Descartes : Method of Doubt, Mind body Dualism
2. Spinoza: God and Substance
3. Leibnitz : The concept of Monads and Pre-established Harmony

Recommended Readings:

Descartes, R. Discourse on Method, London: Penguin, 1968. (Chapters 1,2,4 and 5).

Spinoza: Ethics London: Penguin Classics, 2005 (Book 1 and 2).

Strickland, Lloyd. Leibniz's Monadology: A New Translation and Guide. Edinburgh, UK: Edinburgh University Press, 2014

UNIT III: EMPIRICISM

1. Locke: Critique of Innate Ideas ; Ideas and Qualities
2. Berkeley: Esse est Percipi; Denial of Matter (Immaterialism)
3. Hume: Ideas and Impressions; Causation

Recommended Readings:

Locke, John: An Essay Concerning Human Understanding, London:Penguin Classics,1997 (Book I and 2)

Berkeley: Three dialogues between Hylas and Philonous London: Penguin Classics, 1988 (First dialogue only)

Hume, David: An Enquiry Concerning Human Understanding. Oxford: Clarendon Press 1975 (Part I, section II and III; Part II, section VII)

Unit 4

UNIT IV: Critical Philosophy:

1. Kant: Classification of Propositions; Possibility of synthetic a priori judgements

Recommended Reading:

Kant, I. Prolegomena to Any Future Metaphysics, Translated by Paul Carus, Digireads.com Publishing, 2010, pp. 7-20

References

Markie, Peter, "Rationalism vs. Empiricism", *The Stanford Encyclopedia of Philosophy* (Fall 2017 Edition), Edward N. Zalta (ed.)

Descartes, R. Discourse on Method, London: Penguin, 1968. (Chapters 1,2,4 and 5).

Spinoza: Ethics London: Penguin Classics, 2005 (Book 1 and 2).

Strickland, Lloyd. Leibniz's Monadology: A New Translation and Guide. Edinburgh, UK: Edinburgh University Press, 2014

Locke, John: An Essay Concerning Human Understanding, London:Penguin Classics,1997 (Book I and 2)

Berkeley: Three dialogues between Hylas and Philonous London: Penguin Classics, 1988
(First dialogue only)
Hume, David: An Enquiry Concerning Human Understanding. Oxford: Clarendon Press 1975
(Part I, section II and III; Part II, section VII)
Kant, I. Prolegomena to Any Future Metaphysics, Translated by Paul Carus, Digireads.com
Publishing, 2010, pp. 7-20

Additional Resources:

1. Copleston, F.J. History of Philosophy. USA: Image Books, 1993 2. Falkenberg, R. History of Modern Philosophy, USA: Jefferson Publication , 2015 3. Moore, Bruder. Philosophy: The Power of Ideas, New Delhi: Tata MacGraw Hill, 2011 3. O' Connor, D.J. A Critical History of Western Philosophy. USA: MacMillan, 1964. 4. Stegmuller, W. Main Currents in Contemporary German, British and American Philosophy. Dordrecht,: D. Reidel Publishing, 1969. 5. Thomson, Garrett. An Introduction to Modern Philosophy. California: Wadsworth Publishing. 1993

Teaching Learning Process

Lectures, Tutorials, Discussions, Assignments and Tests.

Assessment Methods

Assignments and tests

Keywords

Rationalism, Empiricism, Knowledge, Ideas, Mind-Body, Materialism, Immaterialism, Qualities, Monads, Apriori, Aposteriori, Analytic judgements , Synthetic. judgements.

Social and Political Philosophy: Indian & Western
(CC (6))
Core Course - (CC) Credit:6

Course Objective

- This course aims at studying different range of social and political thinkers, theories and concepts.

- It would provide a broad survey of fundamental, social and political questions in current context discussing philosophical issues central to political and social thoughts.
-

Course Learning Outcomes

- to make students a better citizens by understanding the notion of democracy
 - to know rights of Individuals and communities.
 - to learn to live in cohesive manner in a multicultural setup.
-

Unit 1

UNIT-I: Understanding Political Philosophy:

References:

Bhargava, Rajeev. "What is Political Theory", What is Political Theory and Why do we need it?. New Delhi: Oxford University Press, 2010.

Kumar, Sunalini. Political Theory and Introduction, Bhargava, Rajeev & Acharya, Ashok. (eds). Socialism. Pearson, India, 2012.

Immanuel Kant. "On Enlightenment". (Towards Perpetual Peace and Other Writings, Yale, 2006).

Locke, John. The Second Treatise on Civil Governance, "On Liberty" 1690.

Rawls, John. "Fundamental Ideas" in justice as fairness, 1971.

Furthur Reading:

Berlin, I. "Two Concepts of Liberty" in *Four Essay on Liberty*, Oxford University Press.

Unit 2

UNIT-II: Communitarianism, Multiculturalism and Minority Rights:

Readings:

Taylor, Charles. *Multiculturalism: Examining the politics of recognition*. Princeton: Princeton University Press, 1994.

Kymlica, Will. *Multicultural Citizenship*, Justice and Minority Rights: A Liberal Theory of Minority Rights. pg-107-120, Oxford Clarendon Press, 2004.

Unit 3

UNIT-III: Contemporary Indian Thinker:

Essential Readings:

Tagore, R. "Nationalism in the west ", *Nationalism*. New Delhi: Rupa &co, New Delhi, 2005.

Gandhi, M. K. "Critique of Modern Civilization, (Hind Swaraj), Ch- 6-13th, Parel, A. (eds). Cambridge: Cambridge University Press, 1997.\

Roy, M.N. "New Political Philosophy" In *Radical Humanist: Selected Writings* Kolkata, Premetheus.

Rodrigue, Valerian (ed). 'Democracy', 'The Caste, Class and Democracy, The essential writing of Dr.B.R Ambedkar', OUP, 2013, pp.60-64, pp. 132-148.

Unit 4

UNIT-IV: Ideological Underpinning of Contemporary Indian Social and Political Movement- Marxist, Feminist, Dalit and Ecological movement.

Readings:

Rege, Sharmila. 'A Dalit Feminist Point of view', *Journal* 471, Nov. 1998, pp. 47-52.

Omvedt, Gail. "Ambedkarism: The theory of Dalit Liberation". *Dalit and democratic revolution*, Sage: pg. 223-259.

Menon, Nivedita. "Political Theory an Introduction", *Gender*. Bhargava, Rajeev & Acharya, Ashok.(eds). New Delhi: Pearson, New Delhi, 2012.

Practical

Not applicable

References

Already given within the units

Additional Resources:

Already cited in the Units

Teaching Learning Process

Lectures, Group Discussions and Debates.

Assessment Methods

Internal Assessment and Examination.

Keywords

Democracy, Right, Justice, Multiculturalism, Minority rights

Applied Ethics
(CC (7))
Core Course - (CC) Credit:6

Course Objective

The course objective is to apply the theoretical tools of Ethics in life situations as well as devise ethical resolutions in moral dilemmas as they come up.

This will gradually generate an ethical acumen amongst the students of philosophy.

Course Learning Outcomes

This course is designed to make students philosophically competent about their own decisions, to achieve clarity, develop comprehension skills and reach precision in arguments with reasons. A spectrum of issues ranging from morality, environment, real life situations, moral dilemmas and ongoing philosophical examination of the crisis in the field of artificial intelligence are a part of this course curriculum.

Unit 1

Applied Ethics

An Introduction to Applied Ethics

Essential Reading:

Singer Peter, Applied Ethics, Oxford University Press, 1986

Unit 2

Value of Human Life

1. Human Rights

2.Punishment

Essential Readings:

Motilal Shashi, Applied Ethics and Human Rights: Conceptual Analysis and Contextual Applications, London, Anthem Press, 2010

Nuttall Jon, Moral Questions: An Introduction to Ethics, Polity Press, 1993

Unit 3

Environmental Ethics

1. Nature as Means or End.
2. Respect for animals and ecology.

Essential Readings:

Singer Peter, Applied Ethics, Oxford University Press, 1986

Pojman Louis, Pojman Paul, McShane Katie ,Environmental Ethics: Readings in Theory and Application, Cengage Learning, 2017

Unit 4

Professional Ethics and Public Policy

1. Medical Ethics- Surrogacy, Doctor-patient relation, Euthanasia and the concept of Living Will
2. Media Ethics – Privacy
3. Artificial Intelligence

Essential Readings:

1.Stuart Russell, Peter Norwig, Artificial Intelligence: A Modern Approach, Pearson Publication, 2009

2.Frey R.G, Wellman, C.H. A Companion to Applied Ethics, Article Surrogate Motherhood by Tong Rosemary, Blackwell Publishing, 2005, pp369-381.

3. Jecker, N.S., Jonsen, A.R. and Pearlman, R.A. Eds, *Bioethics: An Introduction To The History, Method and Practice*, New Delhi: Jones and Bartlett, 2010
4. Godkin M.D., Dossetor John. B, *Living Will, Living Well: Reflections on Preparing an Advanced Directive*, The University Of Alberta Press, 2008
5. Archard, David, *Privacy, The Public Interest and a Prurient Public in Media Ethics*, Ed. Kieran Mathew, Routledge, 1998, pp82-94

References

- Godkin M.D., Dossetor John. B, *Living Will, Living Well: Reflections on Preparing an Advanced Directive*, The University Of Alberta Press, 2008
- Motilal Shashi (ed)(2010), *Applied Ethics and Human Rights: Conceptual Analysis and Contextual Applications*. London, Anthem Press
- Stuart Russell, Peter Norwig, *Artificial Intelligence: A Modern Approach*, Pearson Publication, 2009
- Pojman P Louis, Pojman Paul, McShane Katie, *Environmental Ethics: Readings in Theory and Application*, Cengage Learning, 2017
- Archard, David, *Privacy, The Public Interest and a Prurient Public in Media Ethics*, Ed. Kieran Mathew, Routledge, 1998, pp82-94
- Jecker, N.S., Jonsen, A.R. and Pearlman, R.A. Eds, *Bioethics: An Introduction To The History, Method and Practice*, New Delhi: Jones and Bartlett, 2010

Additional Resources:

- Cohen I. Cohen and Wellman Christopher Heath, *Contemporary Debates in Applied Ethics*, Wiley Blackwell, 2014
- Patterson and Lee Wilkins, *Media Ethics :Issues and Cases*, Rowman and Littlefield Publishers, 2018
- Rachel James, *The Elements of Moral Philosophy*, Oxford University Press, 2011

Teaching Learning Process

Interactive teaching, Lectures and Tutorials

Case studies where ever applicable

Power Point presentations

Questionnaires

Assessment Methods

Internal assessment

Presentation

Central examination.

Keywords

Human Rights, Punishment, Artificial Intelligence, Medical Ethics, Euthanasia, Living Will, Media Ethics, Environmental Ethics

Critical Thinking and Decision Making (SEC (1)) Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

This course is primarily focused to develop thinking skills. It aims at enabling a person to take decision in difficult situations. It is the ability to analyze the way one thinks and presents the evidence for ones own ideas rather than simply accepting it. It is creative, clear and to some extent reflective thinking. This paper helps in developing ideas and ability to create a vision, plan for the future and anticipate and solve problems.

Course Learning Outcomes

This course

1. Helps in generating productive/creative ideas for further use in difficult situation.
2. Creates enthusiasm for taking a risk of dealing with difficult issues and finding a way out for solution

3. Provides valuable intellectual traits like how to critically read, listen and write and develop faith in reason and encourage a flair for fairness and justice. As a result a learner learns step by step how to arrive at an ideal solution keeping in mind all situational factors.
4. Provides clarity in thinking as well as proper understanding of an issue to make it precise for further analysis.
5. Helps to use the skills of observation, analysis and evaluation and also provides sound reason for doubting and questioning.
6. Finally the learner becomes self-directed, self-monitored and self-corrective through this process of reflective thinking, and can proceed for right choice.

Unit 1

Unit I: CRITICAL THINKING: BASIC COMPONENTS

1. Critical Thinking: An Introduction
2. Cognitive Biases
3. Beliefs, Claims, issues and arguments.
4. Persuasion through Logic: Logos, Ethos and Pathos

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch 1-2.
2. Dewey, John, *How we think*. Mineola, N.Y. Dover Publications, 1997, Ch 6

Unit 2

Unit II: CRITICAL THINKING: A SECOND ORDER ACTIVITY

1. Clear thinking.
2. Vagueness, Ambiguity, Generality and Definition of terms
3. Argumentative essays
4. Credibility of claims and their sources

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch 3-4.

Unit 3

Unit III: RHETORIC AND ITS FALLACIES

1. Persuasion through rhetoric
2. Fallacies involved in rhetoric

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch 5.

Unit 4

Unit IV: CLEAR THINKING: KEYS FOR SOLUTION

1. Identification and analysis of the problem through case studies
2. Evaluating the Argument: Validity, Soundness and Strength; Reflecting upon the issue with Sensitivity and Fairness.
3. Evaluating Decision Options from Multiple Perspective.
4. Identifying Inconsistencies, Understanding Dilemma and Looking for Appropriate Solution within Limitations.

Recommended Reading:

1. Case Studies from both the recommended books
2. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch.2-5.
3. Dewey, John. *How we think*. Mineola, N.Y: Dover Publications, 1997, Ch.7, Ch 8.

References

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch1-4.
2. Dewey, John. *How we think*. Mineola, N.Y: Dover Publications, 1997, 68-14.

Additional Resources:

1. Watson, Jamie C. *Critical thinking : an introduction to reasoning well*. London/New York: Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc, 2015.
2. Kallet, Mike. *Think smarter : critical thinking to improve problem-solving and decision-making skills*. Hoboken, New Jersey: Wiley, 2014.
3. Bloom, Benjamin S., David R. Krathwohl, and Bertram B. Masia. *Taxonomy of educational objectives : the classification of educational goals*. New York: David McKay Company, 1956.

Teaching Learning Process

With the class room teaching for basic conceptual clarity the whole syllabus should be based on **case studies** from all walk of life, like social, economical, political, religious, gender,

environment, global perspective as well as the surrounding local issues. **Project works** need to be encouraged. Audio visuals should also be encouraged with projector for direct interactive sessions and peer understanding. **Logic games, e-learning methods, theme based movies and mock tests** may be conducted for better understanding and better application of the skill.

Lecture & Tutorials are essential

Assessment Methods

Same as university rule of 75% exam and 25% of internal assessment.
Presentations based on case history and creative modules should be the evaluative procedure.
Peer evaluation should be encouraged.
Objective questions to test reasoning skill should be encouraged.

Keywords

Beliefs, Claims, Arguments, Analysis and evaluation, Cognitive bias, Fallacy.

Feminism (GE (3)) Generic Elective - (GE) Credit:6

Course Objectives:

A course in Feminism is needed to sensitise students to a perspective of thought that acts as a filter—a lens through which all subjects must be studied. It seeks to create gender sensitization and develops a wholistic approach towards education. This course addresses the concerns of women in terms of debates on consciousness and soul, analyses their connect with nature and culture; and explains the development of feminist ideologies.

Course Learning Outcomes:

Study of Feminism arms the student with analytical skills to develop valid arguments to counter gender discrimination, sexism and patriarchal dominance. Feminist theory has a social agenda i.e. to initiate transformation in social structures, customs and practices. Thus the study of Feminism is not only an empowering tool against gender oppression but also against other systems of oppression such as race, class and colour.

Unit I

Patriarchy and the Origin of Feminism

*Lerner, Greda. "The Creation of Patriarchy." In *The Creation of Patriarchy*, 212-229. New York: OUP, 1986.

* Hooks, Bell. "Feminism: A Movement to End Sexist Oppression." In *Feminisms* edited by Sandra Kemp and Judith Squires, 22-27. New York: OUP, 2009.

Unit II

Feminism and Intersectionality

*Adichie, Chimamanda Ngozi. *We Should All Be Feminists*. London: Fourth Estate, 2014.

* Badron, Margot. "Islamic Feminism on the Move". In *Feminism in Islam*, 323-338. Oxford: One World, 2009.

Unit III

Body and Gender

* Nussbaum, Martha C. "Objectification". *Philosophy & Public Affairs* . 24, no.4(Autumn 1995): 249-291.

* Vanita, Ruth. "The Self Is Not Gendered: Sulabha's Debate with King Janaka." *NWSA Journal*, 15(2003): 76-93

Unit IV

Women and Environment

*Mies Maria and Shiva Vandana. "Ecofeminism." In *Feminisms* edited by Sandra Kemp and Judith Squires, 497-502. New York: OUP, 2009.

*Aggarwal, Bina. "The Gender and the Environmental Debate Lessons from India." *Feminist Studies*, 18, no.1(1992):119-158.

References

Unit I

Patriarchy and the Origin of Feminism

*Lerner, Greda. "The Creation of Patriarchy." In *The Creation of Patriarchy*, 212-229. New York: OUP, 1986.

* Hooks, Bell. "Feminism: A Movement to End Sexist Oppression." In *Feminisms* edited by Sandra Kemp and Judith Squires, 22-27. New York: OUP, 2009.

Unit II

Feminism and Intersectionality

*Adichie, Chimamanda Ngozi. *We Should All Be Feminists*. London: Fourth Estate, 2014.

* Badron, Margot. "Islamic Feminism on the Move". In *Feminism in Islam*, 323-338. Oxford: One World, 2009.

Unit III

Body and Gender

*Nussbaum, Martha C. "Objectification". *Philosophy & Public Affairs* . 24, no.4(Autumn 1995): 249-291.

* Vanita, Ruth. "The Self Is Not Gendered: Sulabha's Debate with King Janaka." *NWSA Journal*, 15(2003):76-93.

Unit IV

Women and Environment

*Mies Maria and Shiva Vandana. "Ecofeminism." In *Feminisms* edited by Sandra Kemp and Judith Squires, 497-502. New York: OUP, 2009.

*Aggarwal, Bina. "The Gender and the Environmental Debate Lessons from India." *Feminist Studies*, 18, no.1(1992):119-158.

Additional Resources:

*Jagger, Alison M. and Iris Marion Young, eds. *Companion to Feminist Philosophy: Blackwell Companion to Philosophy*. Oxford: Blackwell Publishers, 1998.

*Kemp, Sandra and Judith Squires, eds. *Feminisms*. New York: OUP, 2009.

Teaching Learning Process

Lectures, tutorials, workshops, film-screenings and interaction with experts in the field.

Assessment Methods

As per the norms of University of Delhi.

Keywords

Sexism, gender, biological determinism, pornography, patriarchy, eco-feminism.

Critical Thinking (GE (4)) Generic Elective - (GE) Credit:6

Course Objective

Critical Thinking aims at enabling a person to take decision in difficult situations. It is the ability to analyse the way one thinks and presents the evidence for ones own ideas rather than simply accepting it. It is creative, clear and to some extent reflective thinking. Being a cognitive trait, it trains students to construct good and sound arguments by eliminating false ones

Course Learning Outcomes

This course

1. Helps in generating productive/creative ideas for further use in difficult situation.
2. Creates enthusiasm for taking a risk of dealing with difficult issues and finding a way out for solution
3. Provides valuable intellectual traits like courage, empathy, perseverance and faith in reason and encourage a flair for fairness and justice. As a result a learner learns step by step how to arrive at an ideal solution keeping in mind all situational factors.
4. Provides clarity in thinking as well as proper understanding of an issue to make it precise for further analysis.
5. Helps to learn how to read, write and think critically, how to separate bad information from good information and helps in constructing cogent arguments.
6. Finally the learner becomes self-directed, self-monitored and self- corrective through this process of reflective thinking.

Unit 1

Unit 1: CRITICAL THINKING: BASIC COMPONENTS

1. Critical Thinking: An Introduction
2. Cognitive Biases
3. Meaningfulness, Objectivity, Truth and Knowledge
4. Arguments: Their Structure and Kinds
5. Persuasion through Logic: Logos, Ethos and Pathos

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch 1-2.

Unit 2

Unit 2: CRITICAL THINKING: A SECOND ORDER ACTIVITY

1. Clear Thinking
2. Vagueness, Ambiguity, Generality and Definition of Terms
3. Argumentative Essays
4. Credibility of Claims and Their Sources

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch 3-4.

Unit 3

Unit 3: RHETORIC AND ITS FALLACIES

1. Persuasion through rhetoric
2. Fallacies involved in rhetoric

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch5.

Unit 4

Unit 4: SCIENTIFIC REASONING:

1. Inductive reasoning and its fallacies
2. Causal Hypotheses and Causal Explanations
3. Methods of establishing cause and effect relationships
4. Mistakes in causal reasoning

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch 9-10.

Unit 5

Unit 5: VALUES AND REASONING:

1. Value judgments
2. Moral reasoning
3. Legal reasoning
4. Aesthetic reasoning

Recommended Reading:

1. Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch 11.

2.Hurley, Patric J. A Concise Introduction to Logic, 11th edn, CENGAGE Learning 2012 Ch 9

References

Moore, Brooke N., et al. *Critical thinking*. Dubuque: McGraw-Hill Companies, Inc, 2015, Ch3-4.

Teaching Learning Process

As per university guidelines, lectures and tutorials.

Assessment Methods

Same as university rule of having 75% final examination and 25% of internal assessment.

Keywords

Cognitive bias, Argument skills, Credibility, Rhetoric, Scientific reasoning, Value judgments

Semester IV

**Text of Indian Philosophy
(CC (8))
Core Course - (CC) Credit:6**

Course Objective(2-3)

The objective of this course is to engage the student in a participative framework to critically and creatively look at the dialogical and pluralistic epistemological traditions within the

mosaic of what is called the Indian Philosophical Textual Depository. The primary focus will be on the three sources of knowledge and cognitive activity: perception, inference and verbal testimony.

Course Learning Outcomes

After having done this course, the student is expected to have mastered the art of philosophically reading the given textual excerpts and to understand the issues hermeneutically afresh, keeping in mind the dialogical and pluralistic nuances employed in the epistemic enterprise.

Unit 1

TEXT: NYĀYABINDU OF DHARMAKĪRTI WITH DHARMOTTARA'S ṬĪKĀ

1. CHAPTER I : Pratyakṣa (Perception)

Unit 2

Text: *Nyaya Manjari*, Ahnika II, Section on 'Inference'

Unit 3

Text: *Sabara-Bhasya*, Adhyaya 1, Adhikarana 5 & 6 (section on Word generated Knowledge)

Unit 4

Text:

Syadvad-Manjari.

Chapter XXVIII 'The Jaina Doctrine of the

References

1. Th. Stcherbatsky, *Buddhist Logic, Volume II*, Delhi: Motilal Banarsidass Publishers Private Limited, Indian edition, 2008 (1993), pp. 1-46. Hindi translation and annotation by Srinivasa Shastri: *Nyāyabindu-ṭīkā of Dharmottara with Nyāyabindu of Dharmakīrti*, Meerut: Sahitya Bhandar, 1975.
2. Jayant Bhatta's *Nyaya-Manjari*, trans. Janaki Vallabha Bhattacharyya. Delhi: Motilal Banarsidass, 1978, pp. 226-284.
3. *Sabara-Bhasya*, trans. Ganganath Jha. Baroda: Oriental Institute, 1973, pp. 8-38.
4. Sri Mallisena Suri, *Syad-Vada-Manjari*, trans. F.W. Thomas. Delhi: Motilal Banarsidass, 1968, pp.152-160.

Additional Resources:

1. Bharadwaja, Vijay (1997), "Logic and Language in Indian Philosophy" in Brian Carr & Indira Mahalingam (eds), *Companion Encyclopedia of Asian Philosophy*. London & New York: Routledge, pp. 230-250.
 2. Bilimoria, Purushottama (2018), "Pramana Epistemology: Origins and Developments" in *Routledge History of World Philosophies:History of Indian Philosophy*. Ed. Purushottama Bilimoria. London & New York: Routledge, pp. 27-39.
 3. D'Sa, Francis X. (1980), *Sabdapramanyam in Sabara and Kumarila*, Vienna: Indological Institute, University of Vienna. (Chapter 5).
 4. Dunne, John. (2004), *Foundations of Dharmakīrti's Philosophy*, New York.
 5. Freschi, Elisa (2018), "Mimamsa" in *Routledge History of World Philosophies:History of Indian Philosophy*. Ed. Purushottama Bilimoria. London & New York: Routledge, pp. 148-156.
 6. Long, Jeffrey D. (2018), "Anekantavada, Nayavada, and Syadvada" in *Routledge History of World Philosophies:History of Indian Philosophy*. Ed. Purushottama Bilimoria. London & New York: Routledge, pp. 390-398.
 7. Mehta, Sonia (2017). *The Problem of Meaning in Buddhist Philosophy*. Delhi: Krishi Sanskriti Publication.
 8. Potter, Karl H. (ed) (1977). *Encyclopedia of Indian Philosophies: Vol.II. Indian Metaphysics and Epistemology: The Tradition of Nyaya-Vaisesika upto Gangesa*. Delhi: Motilal Banardidass Publishers Private Limited.
 9. Prasad, Hari Shankar (2007). *The Centrality of Ethics in Buddhism*, Delhi: Motilal Banarsidass Publishers Private Limited. (Chapter 10).
 10. Shaw, J.L. (2018), "The Nyaya on Inference and Fallacies" in *Routledge History of World Philosophies:History of Indian Philosophy*. Ed. Purushottama Bilimoria. London & New York: Routledge, pp. 184-194.
-

Teaching Learning Process

The teaching learning process consists of a close reading of the primary texts along with the suggested reading material, wherever necessary, and enabling student learning process by the teacher taking recourse to participative methodology.

Assessment Methods

Class tests

Assignments

Presentations

Memorising the key phrases/verses in the sutram

Open book tests

Seminars and colloquiums

Power point presentations

Keywords

Dharmakirti, Nyayabindu, Perception, Nyaya-Manjari, Inference, Mimamsa, Sabara-Bhasya, Sabda, Syad-Vada-Manjari, Nayavada

Text of Western Philosophy

(CC (9))

Core Course - (CC) Credit:6

Course Objective(2-3)

1. The Western philosophical tradition forms a key component of the discipline since the domain area borrows plenty of fodder from Western philosophical thinkers. Having been introduced to history of Western Philosophy, the students would now be expected to read and

critically examine the basic text of some prominent contemporary philosophical thinkers in West. This would enable the students to get a first hand exposure to core philosophical issues that bothered these Western philosophers.

2. Familiarity with this course would also enable the students to make a comparative analysis with other texts of philosophy as and when the opportunity demands.

3. Last but not least, the students would be in a position to critically examine contemporary philosophical concerns since they would have basic knowledge of core texts emanating from Western and non-Western sources. Ultimately, this would facilitate them develop a balanced philosophical outlook on contemporary issues.

Course Learning Outcomes

1. The idea is to encourage the students towards a comparative trajectory where they probe the similarities and differences between the Western and non-Western stands of thought. Hence, one of the key learning outcomes would be and should be to develop comparative skills.

2. Most Western philosophers were also the patriarch of modern statecraft. They imbued moral and ethical considerations quite heavily in their philosophical teachings. Thus, by focussing on individual philosophical thought from original texts, the students would be capable of differentiating between positive and normative worldview.

3. Since Philosophy, whether Western or Oriental, is all about values and rational thinking, the students would develop skills to place any public issue on the edifice of ethical foundations and provide moral weightage to their arguments.

Unit 1

Unit 1: From Idealism to Romanticism

1. J. G. Fichte, 'An attempt at a New Presentation of the Wissenschaftslehre', in William McNeill and Karen S Feldman (eds), *Continental Philosophy: An Anthology* (Malden, Massachusetts: Blackwell Publishers, 1998), pp. 24-33.

2. Friedrich Nietzsche, *Beyond Good and Evil* (London: Penguin Classics, 1975), Chapter I, pp. 5-33.

Unit 2

Unit 2: The Nature of Thinking

1. Heidegger, Martin. *What is Called Thinking?* (London: Harper & Row Publishers; 1969), Part I: Chapter I, pp. 3-18.

Unit 3

Unit 3: Philosophy Without Epistemology

1. Rorty, Richard. *Philosophy and the Mirror of Nature* (Princeton: Princeton University Press; 2017), Introduction and Chapter 8.

Unit 4

Unit 4: The defense of reason

1. Thomas Nagel, *The Last Word* (Oxford: Oxford University Press, 1997), Introduction, pp. 1-11.

Practical

Not applicable.

References

1. Friedrich Nietzsche, *Beyond Good and Evil* (London: Penguin Classics, 1975).
2. R. Rorty, *Philosophy and the Mirror of the Nature* (Princeton: Princeton University Press, 1979).
3. Thomas Nagel, *The Last Word* (Oxford: Oxford University Press, 1997).
4. Martin Heidegger, *Letter on Humanism* (Translated by Frank A Capuzzi).
5. Fichte, 'An attempt at a new presentation of the *Wissenschaftslehre*' in William McNeil (Ed), *Continental Philosophy: An Anthology*, pp. 24-33.

Teaching Learning Process

1. Mix of lecture and tutorials.
 2. Class participation through group discussion, debates and presentations.
 3. Short clippings having relevance and practical aspects.
-
-

Assessment Methods

1. Class assignments.
 2. Tests.
-
-

Keywords

1. Existence, Being, Subjectivity, Objectivity, Rationality, Relativism, Epistemology., Humanism.
-
-

**Truth Functional Logic
(CC (10))
Core Course - (CC) Credit:6**

Course Objective(2-3)

This paper aims to equip the students with an understanding of the basic logical concepts which helps to enhance their reasoning capacity, proving validity and invalidity of argument forms. They learn various logical tools and methods with the application of rule, axioms and theorems. The significance of this paper is that it prepares students to reason out in day to day life situations as well as to develop the skill to clear various competitive examination.

Course Learning Outcomes

Learning Outcomes

It enhances the logical reasoning and problem-solving skills.

Suggestions

1. An introduction showing the basic difference between propositional and predicate logic need to be given at the beginning.
2. Under Unit-1, stroke function should be mentioned explicitly.
3. Under Unit-2, sub-unit 4 (CNF and DNF) may be deducted to maintain uniform teaching, since the contents are too time consuming.
4. Rest of the portions may be continued to have a balanced logical reasoning.
5. Question banks should be prepared unit wise and circulated.
6. To have uniform teaching, a workshop for all college teachers may be conducted.

Unit 1

UNIT 1: LOGIC OF COMPOUND PROPOSITIONS (Sentential):

1. Logical Connectives: Conjunction, Negation and Disjunction
 2. Material Implication and Material Equivalence
 3. Truth Tables for Logical Connectives
 4. Interdefinability of logical connectives, Stroke function
 5. Symbolisation and Translation
 6. Statements and statement-forms: Logical status
 7. Argument and Argument form
 8. Truth table Method
 9. Shorter Truth Tables (*Reductio ad absurdum*)
-

UNIT II: PROVING VALIDITY (PROOF PROCEDURES)

1. Derivation Rules: Rules of Inference and Rules of Replacement
 2. Formal Proof of Validity
 3. Indirect Proof of Validity
 4. Conditional Proof of Validity
 5. Truth Tree method.
-

Unit 3

UNIT III: LOGIC OF SINGULAR/ UNIVERSAL PROPOSITIONS (Predicate)

1. Symbolization of Categorical Propositions
 2. The Four Rules of Inference (Quantification Rules)
 3. Restriction on Quantifier Rules
 - (a) Special Restriction on UG
 - (b) Special Restriction on EI
 4. Proving Validity
 5. Proving Invalidity
-

Unit 4

Unit- IV

- **Quantification Theory**

Proving Invalidity

References

- Copi. I.M. *Introduction to Logic*, 14th Edition. India: Pearson, 2012.

Additional Resources:

- Hurley, Patrick. *Introduction to Logic*. Delhi :Wordsworth, 2007.
- Jeffrey, R. *Formal Logic: Its scope and limits*. U.S.A: MacGraw Hill, 1967.
- Quine, W.V.O. *Methods of Logic*. London: Routledge, 1965.
- Sen, Madhucchanda. *Logic*. Delhi: Pearson, 2008.
- Copi. I.M. (2008). *Symbolic Logic*, 5th edition. India: Pearson, 2008.

- Jetli & Prabhakar. *Logic*. India: Pearson, 2012.
-

Teaching Learning Process

The paper will be taught by way of lectures and doing problems on the blackboard with justifications and encouraging students to practice exercises after completion of each chapter in their tutorial classes.

Assessment Methods

Internal assessment for 25 marks out of which 10 marks for class test, 10 marks for project/group discussion/ assignment and 5 marks for attendance.

75 marks for University Examination.

Keywords

Logical Connectives, Truth Tables, Truth Functions, Variable and Constants, Truth Trees, Formal Proof, Quantification

Art & Film Appreciation
(SEC (2))
Skill-Enhancement Elective Course - (SEC) Credit:4

Course Objective(2-3)

- The objective of the course is to enable a student to become an active and engaging viewer of art and cinema .
- To discern the aesthetic experience as different from art experience
- To enable a student to understand and appreciate films and other related art forms

Course Learning Outcomes

It is a skill to develop and enhance philosophical analysis and contextualizing in terms of Rasa ,empathy and disinterestedness.

Unit 1 Art and Experience

1. Meaning and Analysis

References

Satre, J.P, "The Work of Art" in Aesthetics, Harold Osborne,(London: Oxford University Press, 1972).

Hospers, John (1969) *Introduction Readings in Aesthetics*, Free Press.

Gupta, Shamala. *Art, Beauty and creativity*. (DK Printworld New Delhi 1999).

Hiyanna, M. (1997) Art Experience, Indira Gandhi National Centre for the Arts Manohar. Chapter-1.

UNIT II: Film as an Art Form

Documentaries, Commercial, Parallel Cinema, Web series as new cinematic art form.

References

Christopher, Falzon, *Philosophy goes to the Movies*, Routledge.

Vijaya, Mishra. (2009) *Specters of Sensibility: The Bollywood Film*. Routledge.

Arnheim, Rudolf, Film as Art, "*Film and Reality*" University of California Press.

https://www.academia.edu/37948527/The_Aesthetics_of_Digital_Art.pdf

<https://thirdcinema.wordpress.com/2015/10/27/indias-parallel-cinema/>

https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Parallel_cinema.html

UNIT III: Art, Social Values and Morality

1. Life art interface
2. Film and Cultural representation

References

Gupta, Shyamala. *Art, Beauty and creativity*. (DK Printworld New Delhi 1999).
Hiriyanna, M. *Art Experience* , Indira Gandhi National Centre for the Arts, Manohar.: Delhi, 1997, Chapter-7.
Clark, Kenneth. *The Nude: A Study in Ideal Form*. (Bollingen Series 35.2. New York: Pantheon Books, 1956).

Unit 4

UNIT IV: Art and Communication in and through Films

References

<https://thirdcinema.wordpress.com/2015/10/27/indias-parallel-cinema/>

https://ipfs.io/ipfs/QmXoybizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Parallel_cinema.html

Unit 5

References

Recommended Readings

- Harold, Osborne (1976) *Aesthetics*, OUP.
- Hospers, John (1969) *Introduction Readings in Aesthetics*, Free Press.
- Christopher, Falzon, *Philosophy goes to the Movies*, Routledge.
- Vijaya, Mishra. (2009) *Specters of Sensibility: The Bollywood Film*. Routledge.
- Sussane Langer. (1953) *Feeling and Form*, Longman Publishing House.
- Arnheim, Rudolf, *Film as Art, "Film and Reality"* University of California Press

Additional Resources:

<https://thirdcinema.wordpress.com/2015/10/27/indias-parallel-cinema/>

https://ipfs.io/ipfs/QmXoybizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Parallel_cinema.html

Teaching Learning Process

Lectures, Group Discussion, Film Screening and visit to Art Gallery

Assessment Methods

Internal Assessment by assignments and Test

Keywords

Rasa, disinterestedness, Coffee house cinema, commercial cinema, documentary, web series

Bio-Ethics (GE (5)) Generic Elective - (GE) Credit:6

Course Objective(2-3)

Aim:

The course aims at ethical analysis of the topics within the realm of bio-medical sciences and legal studies.

Learning Outcome:

It is a career-oriented curriculum which enables students to develop competence in policy making and participation in ethics committee of various medical and care institutes. It sensitizes the minds towards the ongoing ethical dilemmas.

Course Learning Outcomes

The learning outcomes of this course are multidimensional. It forms a strong base in the field of research of ethics and medicine care. It would also increase the students ability to identify their role in capacity building . It directly enforces students role in social responsibility

Unit 1

UNIT 1- DEFINING BIOETHICS

1. Introduction

Khuse, H and P. Singer. "What is Bioethics? A Historical Introduction." In *A Companion to Bioethics* 2nd ed., Edited by H. Kuhse and P. Singer, 3-11. UK: Wiley Blackwell, 2009.

2. Human Dignity and Human Rights

Barilan, Yechiel M. *Human Dignity, Human Rights and Responsibility*. Cambridge: MIT Press, 2014

Recommended Readings:

- 1) Sumner L.W., and Joseph Boyle, eds. *Philosophical Perspectives on Bioethics*. University of Toronto Press, 1996.
- 2) R.Andorno. "Human Dignity and Human Rights as a common ground for a global bioethics", *Journal of medicine and philosophy*. 34 (3): (2009) 223-240.
- 3) Kuhse, H., and Singer, P, eds. *The Cambridge Textbook of Bioethics*. Cambridge: Cambridge University Press. 2008.

Unit 2

UNIT 2- CORE CONCEPTS

1. Concept of Personhood

Tooley, Michael. "Personhood". In *A Companion to Bioethics* 2nd ed., Edited by H. Kuhse and P. Singer, 129-139 .UK: Wiley Blackwell, 2009.

2. Consent and Informed Consent

Williams, J. R. "Consent". In *Cambridge Textbook of Bioethics*, Edited By P. Singer and A. M. Viens, 11-16. Cambridge: Cambridge University Press, 2008.

Beauchamp, Tom L. "Informed consent: Its Historical Meaning and Present Challenges" In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 635-641. UK: Wiley Blackwell, 2015.

3. Autonomy, Privacy and Confidentiality

Slowther, Anne and Irwin Kleinman. "Confidentiality" In *Cambridge Textbook of Bioethics*, Edited By P.Singer and A. M. Viens, 43-48. Cambridge: Cambridge University Press, 2008.

Jennings, Bruce. "Autonomy." In *The Oxford handbook of Bioethics*. Edited by Steinbock, Bonnie, 72-89. New York: Oxford University Press. 2007.

4. Life and Death: Sanctity of Life, Right to Life, Right to Die

Harris, John. "Value of Life". In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 397-405. UK: Wiley Blackwell, 2015.

Recommended Readings:

1) Kuhse, H., and P. Singer, eds. *The Cambridge Textbook of Bioethics*. Cambridge: Cambridge University Press. 2008.

2) Steinbock, Bonnie, ed. *The Oxford handbook of Bioethics*. New York: Oxford University Press. 2007.

Unit 3

UNIT 3- ETHICAL DILEMMAS

1. Abortion

Marquis, Don. "Why Abortion is Immoral?" In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 49-60. UK: Wiley Blackwell, 2015.

Tooley, Michael. "Abortion and Infanticide." In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 23-37. UK: Wiley Blackwell, 2015.

Warren, Mary Anne. "Abortion." In *A Companion to Bioethics* 2nd Ed. Edited By Helga Kuhse and Peter Singer, 140-148 . UK: Wiley Blackwell, 2009.

2. Surrogacy

Steinbock, Bonnie. "The Surrogate Motherhood as Prenatal Adoption." *Law, Medicine and Healthcare* 6, no. 1 (1988): 44-50.

3. Euthanasia

Rachels, James. "Active and Passive Euthanasia." In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 248- 251. UK: Wiley Blackwell, 2015.

Nesbitt, Winston. "Is Killing no worse than Letting Die?" In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 252- 256. UK: Wiley Blackwell, 2015.

Recommended readings:

1) John D. Arras, Elizabeth Fenton, and Rebecca Kukla, eds. *The Routledge Companion to Bioethics*. New York and Oxon: Routledge, 2015.

2) Udo Schuklenk, Helga Kuhse and Peter Singer, eds. *Bioethics: An Anthology*, 3rd edition. UK: Wiley Blackwell, 2016.

Unit 4

UNIT 4- PERSONS AND LIVES

1. Value of life

Harris, John. "Value of Life". In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 397-405. UK: Wiley Blackwell, 2015.

2. Cloning

Tooley, Michael. "The Moral Status of the Coning of Humans." In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 156-171. UK: Wiley Blackwell, 2015.

Pence, Gregory. "Cloning." In *A Companion to Bioethics* 2nd Ed. Edited By Helga Kuhse and Peter Singer, 193-203 . UK: Wiley Blackwell, 2009.

3. Sex Determination

Purdy, Laura M. "Assisted Reproduction, Prenatal Testing and Sex Seleccction." In *A Companion to Bioethics* 2nd Ed. Edited By Helga Kuhse and Peter Singer, 178-192 . UK: Wiley Blackwell, 2009.

Recommended readings:

- 1) Steinbock, Bonnie, ed. *The Oxford handbook of Bioethics*. New York: Oxford University Press. 2007.
- 2) Kuhse, H., and P. Singer, eds. *A Companion to Bioethics*, 2nd ed. U.K.: Blackwell Publishing Ltd., 2009

References

- 1) Kuhse, H., and P. Singer, eds. *A Companion to Bioethics*, 2nd ed. U.K.: Blackwell Publishing Ltd., 2009.
- 2) Jecker, Nancy S., Albert R. Johnson, and Robert A. Pearlman, eds. *Bioethics : An Introduction to the history, method and practice*. New Delhi: Jones and Barlett, 2010.
- 3) Arthur L.Caplan and Robert Arp, eds. *Contemporary debates in Bioethics*. UK: Blackwell Publishing Ltd, 2014.

Additional Resources:

- 1) Chapple, Christopher Key. "Eternal Life, Death, and dying in Jainism." In *Religion, Death, and Dying: Perspectives on Dying and Death*, vol 1. Edited by Lucy Bregman. Santa Barbera: Praeger, 2009.
- 2) Crawford, S. Cromwell. *Hindu Bioethics for the Twenty-first Century*. New York: SUNY, 2003.
- 3) Keown, Damein. *Buddhism and Bioethics*. U.K.: Palgrave Macmillan, 2001.
- 4) Donaldson, Brianne. "Outlawing the Jain Fast-Unto-Death is a Bioethical issue," *Patheos* 2015. Retrieved on 1 May 2019.

<https://www.patheos.com/blogs/religionnow/2015/08/outlawing-the-jain-fast-unto-death-is-a-bioethical-issue/>

Teaching Learning Process

Lectures, tutorials, presentations by students. As per the university mandate

Assessment Methods

As per the university mandate

Keywords

Informed Consent, Medically Assisted Suicide, Confidentiality, Right to Die, Cloning

Symbolic Logic
(GE (6))
Generic Elective - (GE) Credit:6

Course Objective(2-3)

This course is designed for students who are comfortable with elementary mathematical and algebraic techniques. It will look at both truth functional logic and methods of deductive proof, quantification and predicate logic as well as the logic of relations

Course Learning Outcomes

This course helps in learning the various principles and methods of basic as well as higher logic. Through the development of its special symbols, this course (advanced logic) helps as an instrument for analysis and deduction. It helps in examining more complex arguments for

deriving clear rational conclusions. This paper helps in good score that provides better rank in form of results. This is an appropriate paper for applying the logical/mathematical skill and to make use of artificial intelligence effectively.

Unit 1

Unit 1: Basic Logical Concepts

1. Truth and validity
2. Deductive and Inductive Inference
3. Relevance of symbolic logic

Recommended readings:-

1. Copi, Irving Marmer. *Symbolic Logic: 5th Ed.* New York: Macmillan, 1979. Ch1.
2. Copi, Irving M. *Introduction to logic.* 6th Ed. New York London: Macmillan Collier Macmillan, 1982. Ch1.

Unit 2

Unit 2: Logical connectives

1. Uses of symbols
2. Symbolization
3. Propositional calculus: Truth tables

Recommended Readings:-

Copi, Irving Marmer. *Symbolic Logic: 5th Ed.* New York: Macmillan, 1979. Ch2.

Unit 3

Unit 3: The Method of Deduction

1. Formal proof of validity (Rules of inference and replacement)
2. Various techniques for proving validity/invalidity
3. Proofs of tautologies
4. Rules of conditional proof and strengthened rule of conditional proof
5. Indirect proof
6. Proving invalidity: Reductio ad absurdum method

Recommended Readings:-

Copi, Irving Marmer. *Symbolic Logic: 5th Ed.* New York: Macmillan, 1979. Ch3.

Unit 4

Unit 4: Quantification Theory

1. Symbolization of singular, general and multiply-general propositions
2. Proving validity
3. Proving invalidity

Recommended Readings:-

Copi, Irving Marmer. *Symbolic Logic: 5th Ed.* New York: Macmillan, 1979.Ch4.

Unit 5

Unit 5: The Logic of Relations

- 1.Symbolization (Relation and identity)
- 2.Some attributes of relations, identity and the definite description
- 3.Predicate variables and attributes of attributes

Recommended Readings:-

Copi, Irving Marmer. *Symbolic Logic: 5th Ed.* New York: Macmillan, 1979. Ch5.

References

1. Copi, Irving M. *Introduction to logic.* 6th Ed. New York London: Macmillan Collier Macmillan, 1982.
2. Copi, Irving Marmer. *Symbolic Logic: 5th Ed.* New York: Macmillan, 1979.

Additional Resources:

Hurley, Patrick J. *A concise introduction to logic.* Boston, MA: Wadsworth Cengage Learning, 2012.

Teaching Learning Process

Lectures & Tutorials as per university guidelines is applicable

Assessment Methods

75% for Examination and 25% for internal assessment as per University guide lines should be applicable

Keywords

Statements: simple & compound, Formal proof of validity, Tautology, Conditional proof, Quantification theory, Logic of relation .

Semester V

**Analytic Philosophy
(CC (11))
Core Course - (CC) Credit:6**

Course Objective(2-3)

The objective of the course in Analytic Philosophy for Honours students is to make them conversant with an important school of Western Philosophy in the 20th century that led to a revolutionary re-conceptualization of the subject matter and methodology of philosophy in terms of linguistic analysis, logic and mathematics. The Analytic tradition originated in the work of Gottlob Frege in Germany, Bertrand Russell and G. E. Moore in Britain and then again with the work of German Philosopher Ludwig Wittgenstein. Analytic philosophy is generally seen as the dominant philosophical tradition in the English-speaking world even today.

Course Learning Outcomes

The course in Analytic Philosophy for Hons., (C11), is designed keeping in view the following learning outcomes:

- a) Introducing students to the primary thinkers of one of the most important and influential school of thought in Western Philosophy.
- b) Acquainting students with the complex set of interconnected sub-traditions that Analytic Philosophy ramified into and which became equally influential in the twentieth century.
- c) Inculcating young minds with the basic training associated with the tradition, such that it is prepared to engage in critical and reflective thinking.

d) Enabling students to reduce complex issues into simpler components that will facilitate clearer understanding

Unit 1

UNIT 1: Frege: Philosophy of Language

1) “The Thought: A Logical Inquiry” – Gottlob Frege, *Mind* – Vol. 65, No. 259 (Jul. 1956), Oxford University Press, pages 289-311

Unit 2

UNIT II: Bertrand Russell: Epistemology

Knowledge by Acquaintance & Knowledge by Description
(Chapter 5 of Bertrand Russell, *The Problems of Philosophy* - OUP, Indian reprint, 1984)

Unit 3

UNIT III: Russell & Wittgenstein: Language & Reality

- 1) “The Philosophy of Logical Atomism” – Bertrand Russell, (Lecture 1), Routledge Classics, 2010, pp 1-15
- 2) “Tractatus Logico Philosophicus” – Ludwig Wittgenstein, (Propositions 2 & 3 of the text - Picture Theory of Meaning,) translated by Frank P. Ramsey and Charles K. Ogden, Kegan Paul, 1922

Unit 4

UNIT IV: A. J. Ayer: Logical Analysis

- 1) Elimination of Metaphysics – A. J. Ayer, *Language Truth & Logic*, Penguin, 1936, Chapter 1
-

References

Russell, Bertrand. *The Problems of Philosophy: Bertrand Russell*, ..London: Oxford University Press, 1959. (Chapters 1-5)

Ayer, A. J. *Language, Truth and Logic*. London: Victor Gollancz, 1938. (Chapter 1)

Wittgenstein, Ludwig. *Tractatus Logico-philosophicus*. Atlantic Highlands, NJ: Humanities Press International, 1992. (Proposition 2 & 3)

Wittgenstein, Ludwig. *Philosophical Investigations: Philosophische Untersuchungen*. Oxford: Blackwell, 1968. (Selected Sections -1, 11,12,23,43,65,66,67,69,83,84 & 91)

Additional Resources:

Martinich, Aloysius. *Analytic Philosophy: An Anthology*. 2nd ed. Malden, MA: Blackwell, 2011.

Glock, Hans-Johann. *What Is Analytic Philosophy?*Cambridge, UK: Cambridge University Press, 2008.

Schwartz, Steve. *A Brief History of Analytic Philosophy: From Russell to Rawls*. Chichester: Wiley-Blackwell, 2012.

Urmson, James O. *Philosophical Analysis: Its Development Between the Two World Wars*. New York: Oxford University Press, 1978.

Teaching Learning Process

Lectures & Tutorials

Assessment Methods

According to University rules

Class work and Home Assignments – 25% of Total Marks

- Oral tests
- Quizzes (MCQs)

- Presentations (seminar)
- Short & long essay type term papers – at least one per topic

End-Sem Exams – 75% of Total Marks

Keywords

philosophical analysis, positivism, facts, propositions, picture, meaning, language, knowledge, logical atomism, metaphysics

Continental Philosophy (CC (12)) Core Course - (CC) Credit:6

Course Objective(2-3)

Course Objectives:

The main objective of this course is to make students familiar with the leading figures of 19th and 20th century Continental philosophy.

Continental Philosophy refers to a set of traditions of 19th and 20th Century philosophy in mainland Europe. Their philosophy is opposed to Analytic philosophy. Continental philosophy emerged as a response to several historical events and forces that called into question the prevailing philosophical, political, religious, and moral orders. Thus, we see a kind of collective disillusionment emerge after 2nd world war.

Continental philosophers generally reject [scientism](#), the view that the natural sciences are the only or most accurate way of understanding phenomena. This contrasts with analytic philosophers. This philosophy develops a critical and skeptical attitude toward Enlightenment rationality, religion and science. Existentialism which comes under Continental philosophy might be seen as an attempt to give an account of what is distinctively human but not along lines centered on our ability to think and be rational. It typically holds that man as a conscious being can change the conditions of possible experience, and tend to see their philosophical inquiries which is closely related to personal, moral, or political transformation.

Existential themes are those aspects of human existence that present a distinctive challenge to us that goes beyond immediate material needs. The central authors read include Alexander Kojève's reading of Hegel, Kierkegaard, Heidegger, Sartre, MerleauPonty, Paul-Michel Foucault and Husserl.

The objective is to gain an overview of Continental European Philosophy since Hegel, with special emphasis on Existentialism and Phenomenology.

Course Learning Outcomes

- Make students gain familiarity with, and clear understanding of, the major thinkers of Continental tradition and their philosophy.
- Improved critical reading of the texts, their rational and logical understanding, and writing abilities.
- Students will learn to develop scientific, logical and rational inquiry for understanding the thinkers and their philosophy. Students will be able to do a comparative analysis of all thinkers which will further enhance their debating skills. Students will develop the ability to think critically and to read and analyze scientific literature.
- This will help the students to develop openness to new ideas.
- Create awareness among the students of the complexity of issues and willingness to examine issues from many different perspectives.
- Students will reflect on and critically evaluate new and unfamiliar concepts.
- Exposure to various texts of Continental Philosophy
- Students will develop strong oral and written communication skills through the effective presentation of Projects, Quiz as well as through Seminars.
- Finally it will give a holistic development of their personality

Unit 1

UNIT I: Understanding Dialectics: Interpretations of Hegel and Kierkegaard

1. Hegel. Alexandre Kojève. 1980. *Introduction to the Reading of Hegel: Lectures on The Phenomenology of the Spirit*, pp. 3-30. Ithaca & London: Cornell University Press.

2. Søren Kierkegaard. 2003. Essay 6: "Against the Crowd", pp. 23-24; Essay 7: "Suspending the Ethical", pp.25-29;& Essay 79: "Inwardness and Subjectivity", pp.320-323. "Provocations: Spiritual Writings of Kierkegaard", Compiled and Edited by Charles E. Moore, The Bruderhof Foundation. Inc. Farmington, USA.

Unit 2

UNIT II: Transcendental and Existential Phenomenology: Perspectives of Husserl and Heidegger

3. Edmund Husserl. 2003. "Phenomenological Method and Intentionality of Consciousness." In *Husserl's Phenomenology*, pp.13-21 & pp. 39-43. Ed. Dan Zahavi. California: Stanford University Press.

4. Nellickappilly, Sreekumar. 2005. "Martin Heidegger: The Ontology of Dasein in the concept of Truth". In *Aspects of Western Philosophy*, Chapter 35, NPTEL IITM, IIT Madras.

Unit 3

UNIT III : Embodiment : Sartre and Merleau-Ponty

5. Jean-Paul Sartre, 1984. "The Concept of Look" in *Being and Nothingness*, pp.252-270. Trans. Hazel E. Barnes. New York: Washington Square Press.

6. Maurice Merleau-Ponty, 1991. "The Battle over Existentialism". In *Sense and Non-Sense*. Part II, Chapter 6, pp.71-83. Evanston: Northwestern University Press.

Unit 4

UNIT IV : Docile Body, Essence of Technology: Perspectives of Foucault and Heidegger

7. . Martin Heidegger.1977. The Question Concerning Technology and Other Essays, Part I- " *The Question Concerning Technology*", pp. 3-35. Translated and with an Introduction by William Levitt. New York & London: Garland Publishing, INC.

8. Michel Foucault.1984. The Foucault Reader. Part II-Docile Bodies, pp.179-187. edited by Paul, Rabinow. New York : Pantheon Books.

References

Recommended Readings:

- Atkins, Kim (ed.). 2005. *Self and Subjectivity*. Malden: Blackwell Publishers.

- Joseph.S. 1985. *A Commentary on Jean-Paul Sartre's Being and Nothingness*. Chicago & London: The University of Chicago Press,
- David R.2010. *Understanding Phenomenology*.UK: Ashford Colour Press Ltd.
- Simon. 2001. *Continental Philosophy: A Very Short Introduction*. New York: Oxford University Press.
- Simon. 2006.*The Idea of Continental Philosophy*. Edinburgh: Edinburgh University Press

Additional Resources:

Suggested Readings

- Johannes, Climacus. 2019. “Concluding Unscientific Postscript to Philosophical Fragments” Accessed.
https://en.wikipedia.org/wiki/Concluding_Unscientific_Postscript_to_Philosophical_Fragments
- Kearney, Richard, and Mara Rainwater. 1996. eds. *The Continental Philosophy Reader*. London: Routledge.
- McNeill, William, and Karen Feldman. 1997. eds. *Continental Philosophy: An Anthology*. Oxford: Blackwell.
- Sokolowski, 1999. Robert, *Introduction to Phenomenology*. Cambridge.
- Solomon, C. Robert.2001. *From Rationalism to Existentialism*. Rowman & Littlefield Publishers.
- Solomon, Robert. 1988. *Continental Philosophy Since 1750: The Rise and Fall of the Self*. Oxford and New York: Oxford University Press.
- West, David. 1996. *An Introduction to Continental Philosophy*. Cambridge, U.K.: Polity.

Teaching Learning Process

Teaching-Learning Process

Teaching-learning is a continuous process which is surrounded by student’s attitude to learn share the knowledge, academic curiosity, reading & practicing, creativity, thinking ability and extending your knowledge levels. This course demands interaction among the students and their ability to think independently

The B.A. (Honours) Continental Philosophy aims to make the student proficient in understanding their Philosophy, Culture and Society through the transfer of knowledge in the classroom as well as in life. In the classroom this will be done through blackboard and chalk lectures, charts, PowerPoint presentations, and the use of audio-visual resources that are available on the internet such as virtual lab. An interactive mode of teaching will be used. The student will be encouraged to participate in discussions, group discussions and deliver seminars on some topics. A problem-solving approach will be adopted wherever suitable.

Assessment Methods

Assessment methods:

The student will be assessed over the duration of the programme by many different methods. These include short objectives-type quizzes, assignments, written and oral examinations, group discussions and presentations, problem-solving exercises, seminars, preparation of reports. The wide range of assessment tasks aim to break the monotony of having a single assessment method. Students will strictly follow the course policies.

Students should strictly follow the course policies.

Grade will be determined on the basis of graded assignments as specified below: Evaluation:

- i. Four Assignments/ Projects: 10% each
 - ii. Three in-class quizzes/oral tests: 5% each
 - iii. Paper Presentations: 5%
 - iii. Final exam: 10%
 - iv. Attendance and participation 5%
-

Keywords

Keywords

Absolute Idealism, rationality, Objectivism, Subjectivism, consciousness, freedom, Bad-faith, Phenomenology, Essence, existence, modernism, being-for-itself, being-in-itself, Others, Freedom, Master, Slave, Dialectical Method, Animal Desire, Human Desire, technology, revealing, Enframing, Intentionality, Dasein, Existence, Essence etc.

**Philosophy of Mind
(DSE (1))
Discipline Specific Elective - (DSE) Credit:6**

Course Objective(2-3)

The philosophy of mind is one of the most exciting areas within philosophy. This course is an introduction to the Philosophy of Mind. The objectives are: 1. To introduce students to some of the central problems and concepts in Philosophy of mind. 2. To develop student's abilities to understand and examine in detail the key arguments in Philosophy of Mind. 3. To provide the students a firm basis for the development of their philosophical knowledge and understanding to analyse and evaluate the key theories about the nature of mind and its relation to the world.

Course Learning Outcomes

After completing the course, the students will have

1. An overview of the most important directions within the philosophy of mind in the 20th century.
 2. An insight into issues that connect philosophy of mind to modern cognitive science
 3. An understanding to appreciate that how human thinking involves context constituted by the body.
 4. An understanding that thinking extends beyond the brain and is embedded in the body's habitual encounters with the world.
 5. A cognizance how concepts involve the role of sensory, motor, affective experiences and are thus embodied.
-

UNIT I The Mind/Body Problem

Essential Readings:

1. Descartes, R. "Meditations II and VI". In *Philosophy of Mind: Classical and Contemporary Readings*, edited by David Chalmers, 10-21. Oxford: Oxford University Press, 2002.
2. Ryle, G. "Descartes' Myth," In *Philosophy of Mind: Classical and Contemporary Readings*, edited by David Chalmers. 32-38. Oxford: Oxford University Press, 2002.

Recommended Readings:

Chalmers, David. "Naturalistic Dualism". In *The Blackwell Companion to Consciousness*, edited by Susan Schneider and Max Velmans, 263-273. Oxford: Wiley Blackwell, 2017.

UNIT-II Identity Theory and Functionalism

1. Smart, J.J.C. "Sensations and Brain Processes". In *Philosophy of Mind: Classical and Contemporary Readings*, edited by David J. Chalmers. 60-68. Oxford: Oxford University Press, 2002.
2. Putnam, H. "The Nature of Mental States." In *Philosophy of Mind: Classical and Contemporary Readings*, edited by David J. Chalmers, 73-79. Oxford: Oxford University Press, 2002.

Recommended Readings:

Crane, T. *The Mechanical Mind: A Philosophical Introduction to Minds, Machines and Mental Representation*, (2nd edition). New York: Routledge, 2003.

Levin, Janet, "Functionalism", *The Stanford Encyclopedia of Philosophy* (Fall 2018 Edition), Edward N. Zalta (ed.),

Unit 3

UNIT III Emergence and Embodiment

1. Hempel, Carl and Paul Oppenheim. "On the Idea of Emergence". In *Emergence: Contemporary Readings in Philosophy and Science*, edited by Mark A. Bedau and Paul Humphreys, 61-68. Cambridge, The MIT Press, 2008.
2. Bahler, Brock. "Merleau-Ponty on Embodied Cognition: A Phenomenological Interpretation of Spinal Cord Epidural Stimulation and Paralysis". *Essays in Philosophy*, Vol 17(2), 2016.

References

Chalmers, David, J., ed., *Philosophy of Mind: Classical and Contemporary Readings*. Oxford: Oxford University Press. 2002.

Heil, John. *Philosophy of Mind: A Contemporary Introduction* (3rd edition). London: Routledge, 2013

UNIT-IV Consciousness

Velmans, Max "An Epistemology for the Study of Consciousness" In *The Blackwell Companion to Consciousness* edited by Susan Schneider and Max Velmans, Wiley Blackwell, 2017.

Recommended Readings:

1. Searle, John. "Biological Naturalism". In *The Blackwell Companion to Consciousness*, edited by Susan Schneider and Max Velmans, 327-336. Oxford: Wiley Blackwell, 2017.
2. Banks, William, P, ed., *Encyclopedia Of Consciousness*. Oxford: Elsevier Academic Press, 2009.
3. Churchland, Patricia. *Matter and Consciousness: A Contemporary Introduction to the Philosophy of Mind*. Cambridge (MA): MIT Press, 1988.
4. Chalmers, David, J.,ed., *Philosophy of Mind: Classical and Contemporary Readings*. Oxford: Oxford University Press. 2002.
5. Heil, John. *Philosophy of Mind: A Contemporary Introduction (3rd edition)*. London: Routledge, 2013.
6. Kim, Jaegwon. *Philosophy of Mind, (3rd edition)*. Oxford: Westview Press, 2010.

Additional Resources:

Recommended Readings:

Churchland, Patricia. *Matter and Consciousness: A Contemporary Introduction to the Philosophy of Mind*. Cambridge (MA): MIT Press, 1988.

Crane, Tim. *The Mechanical Mind: A Philosophical Introduction to Minds, Machines and Mental Representation*,(2nd edition), New York Routledge, 2003.

Kim, Jaegwon. *Philosophy of Mind, (3rd edition)*. Oxford: Westview Press, 2010.

Teaching Learning Process

Lectures and Tutorials

Assessment Methods

Assignments, Presentations, Examination.

Keywords

Mind, body, dualism, behaviorism, functionalism, artificial intelligence, consciousness, cognition.

Philosophy of Science
(DSE (2))
Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

Introducing students to central philosophical concepts concerning reflection upon scientific methodology, authenticity of scientific theories and the progress in science. Fostering them to develop in them the analytical skills for understanding in a non-dogmatic framework. The course does not require a prior knowledge of science.

Course Learning Outcomes

Students are equipped with an articulated basis for the philosophical analysis of scientific methodology. They no more remain under the impact of scientific dogmas. Their ability to express their arguments with clarity and precision is enhanced with the study of Popper, Kuhn, Lakatos, Feyerabend, sequence of theories regarding scientific methodology and rationality of science, students have understanding of latest changing trends in philosophy of science.

UNIT I: Fundamentals of Philosophy of Science

- Feynman, R.P.: "The Feynman Lectures on Physics" Vol 1, pp-27-30, 52-56, Pearson Education, 2012
- Hume: The Traditional Problem of Induction

Recommended Readings:

- Feynman, R.P.: "The Feynman Lectures on Physics" Vol 1, pp-27-30, 52-56, Pearson Education, 2012
- Hume: *An Enquiry Concerning Human Understanding*, section IV (parts I-II), also in *Epistemology: Contemporary Readings* ed. By Michael Huemer, Routledge, London, 2002, pp 298-306

Further Readings:

- Hanson, N. R.,(1972) *A Guide to Philosophy of Science*, London. George Allen &Unwin,
- Ladyman, James,(2002) *Understanding Philosophy of Science*, London Routledge
- Smith, Peter G.(2003.), *Theory and Reality*, The University of Chicago Press, Chicago,

- Swinburne, R, (ed.)(1974)*The Justification of Induction*, Oxford ,Oxford University Press
- Feynman, R.P.: "The Feynman Lectures on Physics" Vol 1, pp-27-30, 52-56, Pearson Education, 2012
- Hume: *An Enquiry Concerning Human Understanding*, section IV (parts I-II), also in *Epistemology: Contemporary Readings* ed. By Michael Huemer, Routledge, London, 2002, pp 298-306

Unit 2

UNIT II: Observation and Explanation

- Theory Ladenness of Observation
- On Explanation

Recommended Readings:

- Hanson, N. R., *Patterns of Discovery*, Cambridge University Press, Cambridge, 1958, pp. 4-30.
- Cartwright, Nancy. "The Truth Can't Explain Much". *American Philosophical Quarterly* 17 (1980): 159-163.

Further Readings:

- Dilworth, C.(1981), *Scientific Progress*, London: D. Reidel.
- Hanson, N. R.(1958). *Patterns of Discovery*, Cambridge. Cambridge University press, 27.
- Hanson, N. R,(1972)*A Guide to Philosophy of Science*, London. George Allen &Unwin.
- Ladyman, James,(2002) *Understanding Philosophy of Science*, London Routledge.
- Smith, Peter G.(2003.), *Theory and Reality*, The University of Chicago Press, Chicago.
- Cartwright, Nancy. "The Truth Can't Explain Much". *American Philosophical Quarterly* 17 (1980): 159-163.

Unit III: The Methodology of Science-I

- Popper: The Problem of Demarcation
- Popper: Falsificationism
- Lakatos: Scientific Research Programmes

Recommended Readings:

- Popper, K., *Conjectures and Refutations*, 2nd ed., Routledge,1963, pp.33-46.
- Popper, K., *The Logic of Scientific Discovery*, Routledge, 1959, pp. 10-20, 57-54.

- Lakatos, I., "The Methodology of Scientific Research Programmes", *Philosophical Papers*, vol. 1, John Worrell and Gregory Curie, Cambridge University Press, U K, 1978, pp.47-67.

Further Readings:

- Dilworth, C.(1981), *Scientific Progress*, London: D. Reidel.
- Hanson, N. R.(1972) *A Guide to Philosophy of Science*, London. George Allen &Unwin.
- Ladyman, James,(2002) *Understanding Philosophy of Science*, London Routledge.
- Nola, R. and Sankey, H. (eds.)(2000), *After Popper, Kuhn and Feyerabend* London Kluwer Academic Publishers.
- Smith, Peter G.(2003.), *Theory and Reality*, The University of Chicago Press, Chicago.
- Swinburne, R. (ed.)(1974) *The Justification of Induction*, Oxford ,Oxford University Press.
- Popper, K., *Conjectures and Refutations*, 2nd ed., Routledge,1963, pp.33-46.
- Popper, K., *The Logic of Scientific Discovery*, Routledge, 1959, pp. 10-20, 57-54.
- Lakatos, I., "The Methodology of Scientific Research Programme" in *Philosophical Papers*, vol. 1, John Worrell and Gregory Curie, Cambridge University Press, U K, 1978, pp.47-67

UNIT IV: The Methodology of Science-II

- Kuhn: Paradigm and Paradigm Change
- Feyerabend: Epistemological Anarchism

Recommended Readings:

- Kuhn, T., *The Structure of Scientific Revolutions*, International Encyclopedia of Unified Sciences, vol.II, Chicago University Press, U. S. A., 1962, chapters 1-2, 11-12.
- Feyerabend, P., "How to Defend Society Against Science" in *Introduction to Philosophy*, J. Perry and M. Bradman (ed.), 3rd edition, Oxford University Press, 1999, pp. 277-283.
- Dilworth, C.(1981), *Scientific Progress*, London: D. Reidel
- Hanson, N. R.(1972) *A Guide to Philosophy of Science*, London. George Allen &Unwin,
- Ladyman, James,(2002) *Understanding Philosophy of Science*, London Routledge.
- Nola, R. and Sankey, H. (eds.)(2000), *After Popper, Kuhn and Feyerabend* London Kluwer Academic Publishers
- Smith, Peter G.(2003.), *Theory and Reality*, The University of Chicago Press, Chicago,
- Kuhn, T., *The Structure of Scientific Revolutions*, International Encyclopedia of Unified Sciences, vol.II, University Chicago Press, U. S. A., 1962, chapters 1-2, 11-12.
- Feyerabend, P., "How to Defend Society Against Science" in *Introduction to Philosophy*, J. Perry and M. Bradman (ed.), 3rd edition, Oxford University Press, 1999, pp. 277-283.

References

Recommended Readings

UNIT I

- Feynman, R. P., *The Feynman Lectures in Physics* (California: Pearson Education, 2012) vol.-1 27-30, 52-56.
- Hume, D.: *An Inquiry Concerning Human Understanding*, section IV, (parts I-II), Also in *Epistemology: Contemporary Readings*, ed. by Michael Huemer, (London:Routledge, 2002) 298-306.

UNIT II

- Hanson, N. R., *Patterns of Discovery* (Cambridge: Cambridge University Press, 1958) 4-30.
- Cartwright, Nancy. "The Truth Can't Explain Much". *American Philosophical Quarterly* 17 (1980): 159-163.

UNIT III

- Popper, K., *Conjectures and Refutations*, 2nd ed., (London: Routledge,1963) 33-46.
- Popper, K., *The Logic of Scientific Discovery*, (London: Routledge, 1959) 10-20, 57-54.
- Lakatos,I., "The Methodology of Scientific Research Programme" in *Philosophical Papers*, vol. 1, John Worrell and Gregory Curie, Cambridge University Press, U K, (1978).47-67.

UNIT IV

- Kuhn, T., *The Structure of Scientific Revolutions*, International Encyclopedia of Unified Sciences, vol.II, University Chicago Press, U. S. A., 1962, chapters 1-2, 11-12.
- Feyerabend, P., "How to Defend Society Against Science" in *Introduction to Philosophy*, J. Perry and M. Bradman (ed.), 3rd edition, Oxford University Press, 1999, 277-283.

Additional Resources:

Further Readings

- Dilworth, C., *Scientific Progress*, London: D. Reidel, 1981
- Hanson, N. R. *Patterns of Discovery*, Cambridge: Cambridge University press.1958.
- Hanson, N. R, *A Guide to Philosophy of Science*, London: George Allen &Unwin.1972.
- Ladyman, James, *Understanding Philosophy of Science*, London Routledge. 2002.

- Nola, R. and Sankey, H. (eds.), *After Popper, Kuhn and Feyerabend* London Kluwer Academic Publishers. 2002.
 - Smith, Peter G., *Theory and Reality*, The University of Chicago Press, Chicago, 2003.
 - Swinburne, R. (ed.) *The Justification of Induction*, Oxford ,Oxford University Press. 1974.
 - Feynman, R.P.: "*The Feynman Lectures on Physics*" Vol 1, pp-27-30, 52-56, Pearson Education, 2012.
 - Hume: *An Enquiry Concerning Human Understanding*, section IV (parts I-II), also in *Epistemology: Contemporary Readings* ed. By Michael Huemer, Routledge, London, 2002, 298-306.
 - Hanson, N. R., *Patterns of Discovery*, Cambridge University Press, Cambridge, 1958, 4-30.
 - Cartwright, Nancy. "The Truth Can't Explain Much" . *American Philosophical Quarterly* 17 (1980): 159-163.
 - Popper, K., *Conjectures and Refutations*, 2nd ed., Routledge,1963, .33-46.
 - Popper, K., *The Logic of Scientific Discovery*, Routledge, 1959, 10-20, 57-54.
 - Lakatos,I., "The Methodology of Scientific Research Programme" in *Philosophical Papers*, vol. 1, John Worrell and Gregory Curie, Cambridge University Press, U K, 1978, 47-67.
 - Kuhn, T., *The Structure of Scientific Revolutions*, International Encyclopedia of Unified Sciences, vol.II, University Chicago Press, U. S. A., 1962, chapters 1-2, 11-12.
 - Feyerabend, P., "How to Defend Society Against Science" in *Introduction to Philosophy*, J. Perry and M. Bradman (ed.), 3rd edition, Oxford University Press, 1999, 277-283.
-

Teaching Learning Process

- Lectures
 - PPT Presentations
 - Open book tests
 - Assignments
 - Discussion in Tutorials
-

Assessment Methods

presentations and home assignments, projects

Keywords

Kuhn, Popper, Paradigm Shift, The Problem of Induction, Falsificationism, Scientific Revolution, Anarchist Epistemology

**Philosophy of Law
(DSE (3))
Discipline Specific Elective - (DSE) Credit:6**

Course Objective(2-3)

The course in Philosophy of Law, seeks to:

- a. Familiarize students with the nature and purpose of law by examining questions such as “What is (the nature of) law?”, “How, if at all, is law connected with morality?” and “What is justice?”, and to instruct students about possible answers and arguments provided in legal philosophy and theory.
- b. Introduce students to philosophical schools such as Legal Positivism and Natural Law.
- c. Help students critically examine the institution of legal punishment that pertains to the coercive impact of law. Questions such as, “Is it ever right to punish someone?”, “What does it mean to say someone is innocent until proven guilty?”, “What are the various theories justifying punishment?”, “Is capital punishment wrong?” will be explored with a view to enhance student sensitivity and understanding of a legal issue of common and general interest.

Course Learning Outcomes

The ideal outcome of this course is to make students understand the concept of law, its place in our lives, its formal structure, rules and modalities. Students should be able to discuss and argue on crucial legal questions that impact the life of common citizens with sensitivity, acumen, precision and insight.

Unit 1

UNIT I

Law: Concept, Meaning and Definition

1. The Concept of Law; the Nature of Law - The Case of the Speluncean Explorers – Lon Fuller
2. Traditional Natural Law Theory - Thomas Aquinas
3. Legal Positivism: John Austin- -Law as Command
4. H. L. A. Hart - Law as a System of Rules; Primary and Secondary Rules; Criticism of Austin
5. Ronald Dworkin - Law as Integrity

The Case of the Speluncean Explorers - Lon Fuller, Harvard Law Review Vol. 62, No. 4, February 1949

(2-5 from Altman, Andrew. *Arguing about Law: An Introduction to Legal Philosophy*. Australia: Wadsworth, 2001.)

The Rule of Law and the Importance of Procedure, Jeremy Waldron, Nomos, Vol. 50, Getting to the Rule of Law (2011), pp. 3-31 Published by: American Society for Political and Legal Philosophy

Unit 2

UNIT II

Sources of Law

1. Constitutional Law - law laid down in a Constitution - Comparative Constitutional Law, Gunter Frankenberg, Cambridge University Press, 2012
2. Conventional Law - The Common Law & Civil Law -
3. Statutory Law - Law made through Govt. Legislation
(For 2 & 3 - The Identity of Legal Systems , Joseph Raz, California Law Review, Vol. 59, No. 3, A Tribute to Hans Kelsen (May, 1971), California Law Review, Inc. publishers; pp. 795-815)

Unit 3

UNIT III

Law and Morality

1. What is Legal Obligation?
2. Voluntarist theories to Obey the Law: Consent, Fair play
3. Non-voluntarist theories to Obey the Law: Necessity; Instrumental justification
4. Do We have a Moral Obligation to Obey the Law?

The Obligation to Obey the Law, J. L. Mackie, *Virginia Law Review*, Vol. 67, No. 1, The Symposium in Honor of A. D. Woosley: Law and Obedience (Feb., 1981), pp. 143-158

Law and Morality: Readings in Legal Philosophy, 3rd edn, David Dyzenhaus, Sophia Reibetanz Moreau & Arthur Ripstein, (eds), University of Toronto Press, 2007

Unit 4

UNIT IV

Criminal Responsibility, Desert & Punishment

1. Definitions: Crime, Punishment, Responsibility, Mens Rea
2. Theories of Punishment
3. Capital Punishment Legal Perspective

(The Oxford Handbook of Philosophy of Criminal Law, John Deigh and David Dolinko (eds), 2011) - Chapters 8, 9, 14, 15 & 17)

References

Altman, Andrew. *Arguing about Law: An Introduction to Legal Philosophy*. Australia: Wadsworth, 2001. (Chapter 2)

Mackie, J. L. "Obligations to Obey the Law." *Virginia Law Review* 67, no. 1 (1981): 143-58. doi:10.2307/1072837.

Paranjape, N. V. *Criminology and Penology*. 12th ed. Allahabad: Central Law Publications, 2005. (Chapter 1- The Concept of Crime)

An Analysis of Hart's Theory of Primary and Secondary Rules, MIT Open Course Ware

The Oxford Handbook of Philosophy of Criminal Law, edited by John Deigh and David Dolinko, 2011

Additional Resources:

Golding, Martin Philip., and William A. Edmundson. *The Blackwell Guide to the Philosophy of Law and Legal Theory*. Oxford: Blackwell, 2005.

Coleman, Jules L., and Scott J. Shapiro. *The Oxford Handbook of Jurisprudence and Philosophy of Law*. Oxford: Oxford University Press, 2002.

Marmor, Andrei. *Philosophy of Law*. Princeton Univ Press, 2011.

Masterman, Roger, and Robert Schütze. *The Cambridge Companion to Comparative Constitutional Law*. Cambridge, United Kingdom: Cambridge University Press, 2019.

Frankenberg, Günter. "Comparative Constitutional Law." Chapter. In *The Cambridge Companion to Comparative Law*, edited by Mauro Bussani and Ugo Mattei, 171–90. Cambridge Companions to Law. Cambridge: Cambridge University Press, 2012. doi:10.1017/CBO9781139017206.011.

Teaching Learning Process

Lectures, Tutorials and preceptorials

Assessment Methods

As per University guidelines:

Assessment will include: a) class assignments, quizzes, and group discussions;

b) Term Papers both long and short to be submitted as home assignments;

c) MCQ/Short answer type assignments both as class work and home work

Keywords

Law, legal obligation, natural law, positivism, crime, punishment, Constitutionalism, legal rules

**Indian Materialism
(DSE(4))
Discipline Specific Elective - (DSE) Credit:6**

Course Objective(2-3)

The objective is to familiarise the student with the nature, significance and import of materialism as a strong philosophical motif present in the Indian philosophical traditions and to critically evaluate its theoretical framework in the activity of philosophizing in the contemporary human predicament.

Course Learning Outcomes

The student after having done this course is expected to have a fair understanding of the theoretical construct as well as the argumentative force of materialism as a philosophical theory and its significance in reading the Indian intellectual traditions today.

Unit 1

1. Ancient Indian Materialism and Its sources: Pre-Carvaka (Sanjaya, Ajita Kesakambhili, Makkhali Gosala, Raikva, Satyakama Jabali, Purana Kashyapa), Early Samkhya and Vaisheshika Atomism. Mlechhas/Asuras/Dasyas

Unit 2

2. Characteristic Features of Carvaka/Lokayata: Metaphysics, Epistemology and Ethics.

The Materialistic View: Rational, Realistic, Naturalistic, Scientific, Humanistic, Anti-dogmatic and Anti- ritualistic; Refutation of Idealism, Spiritualism and Religion

Unit 3

3. Indian Materialism and Its Influence in Contemporary Social Movements - Marxist/Atheist/Rationalist/Self-Respect/ Popular Science/ Anti Caste-Movements

Unit 4

4. Contemporary Thinkers of Indian Materialism: M.N.Roy, Rahul Sankrityayan, Periyar, Debiprasad Chattopadhyaya, D D Kosambi, Gora, A T Kovoov (Rationalist Movement), Narendra Dabhikar (Andha Shraddha Nirmoolan Samiti)

References

1. Franco, Eli (2011), "Lokayata" in *Brill's Encyclopedia of Hinduism, Vol. III*, ed. Knut A. Jacobsen. Lieden/Boston: Brill, pp. 629-642.

Parasher-Sen (2011), "Foreigner (Mleccha) in *Brill's Encyclopedia of Hinduism, Vol. III*, ed. Knut A. Jacobsen. Lieden/Boston: Brill, pp. 76-81.

Bhattacharya, R (2013) "Development of Materialism in India" *Esercizi Filosofici* 8, pp. 1-12

2. Bhatta, Jayarasi, *Tattvopaplavasimha*, Section on 'Refutation of Inference', in *A Source Book in Indian Philosophy*, eds. S. Radhakrishnan & Charles A. Moore, 6th Printing, Princeton, New Hersey: Princeton University OPess, pp. 236-246.

Madhava Acarya, *Sarvadarsanasamgraha*. Section on 'Carvaka'. trans. E.B. Cowell & A.E. Gough. London: Kegan Paul, Trubner & Co. Ltd, 1904, pp .2-11.

Chattopadhyaya, Debiprasad (2008). *Lokayata - Study in Anceint Materialism*. Bombay: Peoples Publishing House.

3. Tambas-Lyche, Harald (2011), "Caste" in *Brill's Encyclopedia of Hinduism, Vol. III*, ed. Knut A. Jacobsen. Lieden/Boston: Brill, pp. 25-38.

4.. Roy, M.N. (1987). *Materialism*. Delhi: Ajanata Publications.

Additional Resources:

Chattopadhyaya, D. (1976), *What is Living and What is Dead in Indian Philosophy*

Chattopadhyaya, D. (2008). *Lokayata* (selected excertps only)

Dale, M Reipe (1961). *Natuaralistic Tradition in IndainThought*

Gokhale, P.P. (1993). "Carvaka's Theory of Pramanas: A Restatement" *Philosophy East & West*, Vol. 43, No.I, pp. 675-682.

Mills, Ethan (2015), 'Jayarasi's Delightful Destruction of Epistemology" *Philosophy East & West*, Vol. 65, No.2, pp. 498-541.

Quack, Jihannes (2012). *Disenchanted India - Organised Rationalism and Criticism of Religion in India*. Delhi: Oxford University Press, pp 3-21.

Teaching Learning Process

The teaching learning process consists of a close reading of the primary sources as well as the chosen secondary material so as to critically appreciate the presence of materialism and its variegated nuances in the Indian intellectual history.

Assessment Methods

Class room lectures, debates and panel discussions on chosen themes, seminars, periodical tests and thematic presentations.

Keywords

Materialism/Lokayata/Carvaka; Carvaka Critique of Metaphysics, Epistemology and Ethics; Mleccha; Critique of Idealism and Religion; Jayarasi's critique of Inference in *Tattvapaplavasimha*, Caste, Atheist movements, Social Movements for Equality, Contours of Indian Materialism.

**Bio Ethics
(DSE (5))
Discipline Specific Elective - (DSE) Credit:6**

Course Objective(2-3)

Aim:

The course aims at ethical analysis of the topics within the realm of bio-medical sciences and legal studies.

Learning Outcome:

It is a career-oriented curriculum which enables students to develop competence in policy making and participation in ethics committee of various medical and care institutes. It sensitizes the minds towards the ongoing ethical dilemmas.

Course Learning Outcomes

The learning outcomes of this course are multidimensional. It forms a strong base in the field of research of ethics and medicine care. It would also increase the students ability to identify their role in capacity building . It directly enforces students role in social responsibility

Unit 1

UNIT 1- DEFINING BIOETHICS

1. Introduction

Khuse, H and P. Singer. "What is Bioethics? A Historical Introduction." In *A Companion to Bioethics* 2nd ed., Edited by H. Kuhse and P. Singer, 3-11. UK: Wiley Blackwell, 2009.

2. Human Dignity and Human Rights

Barilan, Yechiel M. *Human Dignity, Human Rights and Responsibility*. Cambridge: MIT Press, 2014

Recommended Readings

- 1) Sumner L.W., and Joseph Boyle, eds. *Philosophical Perspectives on Bioethics*. University of Toronto Press, 1996.
- 2) R.Andorno. "Human Dignity and Human Rights as a common ground for a global bioethics", *Journal of medicine and philosophy*. 34 (3): (2009) 223-240.
- 3) Kuhse, H., and Singer, P, eds. *The Cambridge Textbook of Bioethics*. Cambridge: Cambridge University Press. 2008.

Unit 2

UNIT 2- CORE CONCEPTS

1. Concept of Personhood

Tooley, Michael. "Personhood". In *A Companion to Bioethics* 2nd ed., Edited by H. Kuhse and P. Singer, 129-139 .UK: Wiley Blackwell, 2009.

2. Consent and Informed Consent

Williams, J. R. "Consent". In *Cambridge Textbook of Bioethics*, Edited By P. Singer and A. M. Viens, 11-16. Cambridge: Cambridge University Press, 2008.

Beauchamp, Tom L. "Informed consent: Its Historical Meaning and Present Challenges" In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 635-641. UK: Wiley Blackwell, 2015.

3. Autonomy, Privacy and Confidentiality

Slowther, Anne and Irwin Kleinman. "Confidentiality" In *Cambridge Textbook of Bioethics*, Edited By P.Singer and A. M. Viens, 43-48. Cambridge: Cambridge University Press, 2008.

4. Life and Death: Sanctity of Life, Right to Life, Right to Die

Harris, John. "Value of Life". In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 397-405. UK: Wiley Blackwell, 2015.

Recommended Readings:

- 1) Kuhse, H., and P. Singer, eds. *The Cambridge Textbook of Bioethics*. Cambridge: Cambridge University Press. 2008.
- 2) Steinbock, Bonnie, ed. *The Oxford handbook of Bioethics*. New York: Oxford University Press. 2007.

Unit 3

UNIT 3- ETHICAL DILEMMAS

1) Medical experimentation and research(humans and animals)

Bernard. E. Rolling. "The Moral status of Animals and their use as Experimental Subjects." In *A Companion to Bioethics* 2nd Ed. Edited By Helga Kuhse and Peter Singer, 495-509 . UK: Wiley Blackwell, 2009.

Florencia Luna and Ruth Macklin. "Research Involving Human Beings." In *A Companion to Bioethics* 2nd Ed. Edited By Helga Kuhse and Peter Singer, 457-468 . UK: Wiley Blackwell, 2009.

2) Ethical issues in organ donation after medical assisted death

Janet Radcliffe Richards. "A world of Transferable Parts" In *A Companion to Bioethics* 2nd Ed. Edited By Helga Kuhse and Peter Singer, 375-389 . UK: Wiley Blackwell, 2009.

3) Cloning

Tooley, Michael. "The Moral Status of the Coning of Humans." In *Bioethics: An Anthology* 3rd ed. Edited by Helga Kuhse, Udo Schuklenk and Peter Singer, 156-171. UK: Wiley Blackwell, 2015.

Pence, Gregory. "Cloning." In *A Companion to Bioethics* 2nd Ed. Edited By Helga Kuhse and Peter Singer, 193-203 . UK: Wiley Blackwell, 2009.

4) Eugenics

Darr, Judith. "The Reproductive Revolution. In *The New Eugenics: Selective Breeding in an Era of Reproductive Technologies*. 1-27. USA: Yale University Press, 2017.

Recommended readings:

1) John D. Arras, Elizabeth Fenton, and Rebecca Kukla, eds. *The Routledge Companion to Bioethics*. New York and Oxon: Routeledge, 2015.

2) Udo Schuklenk, Helga Kuhse and Peter Singer, eds. *Bioethics: An Anthology*, 3rd edition. UK: Wiley Blackwell, 2016.

Unit 4

UNIT 4- HEALTH AND SOCIAL RESPONSIBILITY

1. Concept of mental well being

Kennett, Jeannett . "Mental Disorder, Moral Agency and the Self." In *The Oxford Handbook of Bioethics*. Edited by Bonnie Steinbock, 90-113. New York: Oxford University Press. 2007.

2. Assisted reproduction and social dilemmas

Mykitiuk, Roxanne and Jeff Nisker. "Assisted Reproduction" In *Cambridge Textbook of Bioethics*, Edited By P.Singer and A. M. Viens, 112-120. Cambridge: Cambridge University Press, 2008.

3. Healthcare for the underprivileged and the elderly

Dennis Mckerlie. "Justics and the Elderly." In *The Oxford Handbook of Bioethics*. Edited by Bonnie Steinbock, 190-208. New York: Oxford University Press. 2007.

Recommended readings:

- 1) Steinbock, Bonnie, ed. *The Oxford handbook of Bioethics*. New York: Oxford University Press. 2007.
- 2) Kuhse, H., and P. Singer, eds. *A Companion to Bioethics*, 2nd ed. U.K.: Blackwell Publishing Ltd., 2009

References

- 1) Kuhse, H., and P. Singer, eds. *A Companion to Bioethics*, 2nd ed. U.K.: Blackwell Publishing Ltd., 2009.
- 2) Jecker, Nancy S., Albert R. Johnson, and Robert A. Pearlman, eds. *Bioethics : An Introduction to the history, method and practice*. New Delhi: Jones and Barlett, 2010.
- 3) Arthur L.Caplan and Robert Arp, eds. *Contemporary debates in Bioethics*. UK: Blackwell Publishing Ltd, 2014.

Additional Resources:

- 1) Chapple, Christopher Key. "Eternal Life, Death, and dying in Jainism." In *Religion, Death, and Dying: Perspectives on Dying and Death*, vol 1. Edited by Lucy Bregman. Santa Barbara: Praeger, 2009.
- 2) Crawford, S. Cromwell. *Hindu Bioethics for the Twenty-first Century*. New York: SUNY, 2003.

3) Keown, Damein. *Buddhism and Bioethics*. U.K.: Palgrave Macmillan, 2001.

4) Donaldson, Brianne. "Outlawing the Jain Fast-Unto-Death is a Bioethical issue," *Patheos* 2015. Retrieved on 1 May 2019.

<https://www.patheos.com/blogs/religionnow/2015/08/outlawing-the-jain-fast-unto-death-is-a-bioethical-issue/>

Teaching Learning Process

Lectures, tutorials, presentations by students. As per the university mandate

Assessment Methods

As per the university mandate

Keywords

Informed consent, Medically Assisted suicide, Confidentiality, Right to Die, Cloning, Eugenics, Mental Well-Being, Assisted Reproduction

Semester VI

**Philosophy of Religion: Indian and Western
(CC (13))**

Core Course - (CC) Credit:6

Course Objective(2-3)

To familiarise the students with basic concepts of religion and its philosophical significance.

To develop a wider vision for contemporary issues in religion.

Course Learning Outcomes

The students will acquire a general understanding of religious issues .

They will learn to think critically about religious issues.

Unit 1

Unit-1- Nature of Religion and Arguments for the Existence of God

1) Study of Religion and its relation to Philosophy of Religion

2.a) Proofs for the existence of God: Ontological Argument (with reference to St. Anselm, Gaunilon's Criticism, Descartes version, Kant's and Bertrand Russell's critique)

b) Cosmological Argument (Thomas Aquinas' version, J.L.Mackie's critique of cosmological argument).

c) Teleological Argument (William Paley: Classic version, David Hume's critique)

3. Overview of Religious language in the article : Religious language.

Recommended Readings-

Baruch A Brody ed, Reading in Philosophy of Religion, , Part-1, 1.17, , New Jersey PHI Publication, 1974, pp 168-186

Meister Chad, (ed.), Philosophy of Religion Reader, New York, Routledge, 2008

Unit 2

Unit-2- Challenges to Religion

1)Religious Diversity and responses to it. (Inclusivism, Exclusivism and pluralism)

2. Science and Religion: by Daniel C. Demmett

3. Evidentialism- 'Ethics of Belief' by William Clifford

Recommended Readings-

Meister Chad, (ed.),Philosophy of Religion Reader, New York, Routledge, 2008

Quinn Philip L, and Talliaferro Charles, A companion To Philosophy Of Religion, Blackwell Publishers , 1997

Unit 3

Unit-3 - Religious Implications of Bhakti and Dharma

1)The Concept of Bhakti: Naradbhaktisutra by Subrahmanya Sarma

Sarma, Subrahmanya, ed., Narada's Aphorisms On Bhakti, The Adhyatmaprakasha press, Bangalore, India, 1938

2. The Concept of Dharma (Pūrva-mīmāṃsā)

Olivelle, Patrick, Dharma: Studies in it's Semantic, Cultural and Religious History, MLBD , 2009

Unit 4

Unit-4- Understanding the Concept of Isvara and Brahman and God

1)The concept of Brahman(Absolute) and Isvara(God) according to Samkara and Ramanuja

2)Debate between Russell and Copleston on the existence of God.

Recommended Readings-

Dasgupta, S.N.,History of Indian Philosophy. Vol.1, OUP, 1922-1955

Russell, Bertrand , Why am I not a Christian, Routledge , Indian edition, 2004

References

Baruch A Brody ed. ,*Reading in Philosophy of Religion*, , Part-1, 1.17, , New Jersey PHI Publication, 1974, pp 168-186

Meister Chad, (ed.),*Philosophy of Religion Reader*, New York, Routledge, 2008

Hinnells, J.R.*The Routledge Companion to the Study of Religion* ,Oxon. Routledge 2005

Quinn Philip L, and Talliaferro Charles, *A Companion To Philosophy Of Religion*, Blackwell Publishers , 1997

Olivelle, Patrick, *Dharma: Studies in its Semantic and Cultural and Religious History*, MLBD,2009

Dasgupta, S.N.,*History of Indian Philosophy*. Vol.1, OUP, 1922-1955

Russell, Bertrand , *Why am I not a Christian*, Routledge , Indian edition, 2004

Sarma, Subrahmanya, ed., *Narada's Aphorisms On Bhakti*, The Adhyatmaprakasha press, Bangalore, India, 1938

Teaching Learning Process

Lectures

Debates and Discussion

Power Point Presentation

Field trips

Assessment Methods

Internal assessments

Projects

Keywords

God, Religion, Belief, Self, Religious Language, Bhakti, Dharma, Absolute, Pluralism

**Philosophy of Language: Indian and Western
(CC (14))
Core Course - (CC) Credit:6**

Course Objective

This course enables students to develop the ability to read and interpret philosophical texts. In the section of Western text, the classical debate between Frege/ Russell/ Strawson, makes students have a meaningful intellectual encounter with the articles by these philosophers of language. The article by Donnellan helps further to understand these philosophers more intensely. The Indian text section exposes students to the problems of understanding language, meaning, reference and other related concepts in Indian philosophy. Getting a comparative understanding of Indian and Western perspectives of these philosophical issues is one of the objectives of this course.

Course Learning Outcomes

Students are equipped with an enhanced ability to explain key distinctions in theories of Frege, Russell and Strawson. Grasping the philosophical position of Nyaya school of philosophy and understanding the theory of meaning of words and sentences in Nyaya Siddhanta Muktaavali. Students are able to know, towards the end of the course, what they learnt and communicate to others their understanding of the fundamental issues in philosophy of language.

Unit 1

UNIT I: Theories of Meaning

- Gottlob, Frege: On Sense and Reference

- Bertrand Russell: On Denoting

Essential Readings:

- Frege, G., "On Sense and Reference", tr. by M. Black in *Translations from the Philosophical Writings of Gottlob Frege*, P. Geach and M. Black (eds. and Trans.), Oxford, Blackwell, 3rd edition, 1980, pp. 1-11.
- Russell, B., "On Denoting", *Mind*, 1905, pp. 479-493.

Further Readings:

- Lycan, William. (2008). *Philosophy of Language: A Contemporary Introduction*, New York: Routledge.
- Jerrold, Katz. J. (1971) *The Philosophical Relevance of Linguistic theory in The Philosophy of Language*, (ed.) Searle, Oxford University Press.
- Russell, Bertrand, (1918) *The Philosophy of Logical Atomism*, in R C Marsh, *Logic and Knowledge*, New York: Routledge.
- Morris, Michael. (2007). *An Introduction to the Philosophy of Language*, Cambridge University Press, Cambridge.
- Frege, G., "On Sense and Reference", tr. by M. Black in *Translations from the Philosophical Writings of Gottlob Frege*, P. Geach and M. Black (eds. and Trans.), Oxford, Blackwell, 3rd edition, 1980, pp. 1-11.
- Russell, B., "On Denoting", *Mind*, 1905, pp. 479-493.

Unit 2

UNIT II: Critique of the Theory of Meaning

- Strawson, P. F. "On Referring".
- Donnellan, K. "Reference and Definite Description".

Recommended Readings:

- Strawson, P. F., "On Referring", *Mind*, 1950, pp. 320-344.
- Donnellan, K., "References and Definite Descriptions", *The Philosophical Review*, vol.-75, 1966, pp. 281-304.

Further Readings:

- Lycan, William. (2008). *Philosophy of Language: A Contemporary Introduction*, New York: Routledge.
- Jerrold, Katz. J. (1971) *The Philosophical Relevance of Linguistic theory in The Philosophy of Language*, (ed.) Searle, Oxford University Press.
- Russell, Bertrand, (1918) *The Philosophy of Logical Atomism*, in R C Marsh, *Logic and Knowledge*, New York: Routledge.

- Morris, Michael. (2007). *An Introduction to the Philosophy of Language*, Cambridge University Press, Cambridge.
- Strawson, P. F., "On Referring", *Mind*, 1950, pp. 320-344.
- Donnellan, K., "References and Definite Descriptions", *The Philosophical Review*, vol.-75, 1966, pp. 281-304.

Unit 3

UNIT III: Verbal Knowledge

- Nature of Verbal Knowledge
- Means of Knowing Denotative Function
- Division of Words
- Implication (lakṣaṇa)

Recommended Readings:

- *Nyaya Siddhanta Muktaṭvali* of Visvanatha, English Translation: Nyaya Philosophy of Language, Tr. by John Vattanky, S. J., Sri Satguru Publications, Delhi, 1995. Sections 1A, 2A, 3A, 5A, 6A, 6B.

Further Readings:

- Jha, V. N. (1992) *Śabdakhaṇḍa of the Nyāyasiddhāntamuktāvalī*, Sambhāṣā, Vol. 13.
- Kunjuni Raja, K. (1963). *Indian Theories of Meaning*, Adyar Library, Madras, 1963.
- Matilal, B. K. (1996). *Logic, Language, and Reality*, Delhi: Motilal Banarsidass, Delhi.
- Shastri, D. N. (1964) *Critique of Indian Realism*, Agra: Agra University.
- *Nyaya Siddhanta Muktaṭvali* of Visvanatha, English Translation: Nyaya Philosophy of Language, Tr. by John Vattanky, S. J., Sri Satguru Publications, Delhi, 1995.

Unit 4

UNIT - IV Causes of Verbal Knowledge

- Contiguity (āsatti)
- Semantic Competency (yogyatā)
- Syntactic Expectancy (ākāṅkṣā)
- Intention of the Speaker (tātparya)

Recommended Readings:

- *Nyaya Siddhanta Muktaṭvali* of Visvanatha, English Translation: Nyaya Philosophy of Language, Tr. by John Vattanky, S. J., Sri Satguru Publications, Delhi, 1995. Sections 8A, 9A, 10A, 11A,

Further Readings:

- Jha, V. N. (1992) *Śabdakhaṇḍa of the Nyāyasiddhāntamuktāvalī*, Sambhāṣā, Vol. 13.
- Kunjuni Raja, K. (1963). *Indian Theories of Meaning*, Adyar Library, Madras, 1963.
- Matilal, B. K. (1996). *Logic, Language, and Reality*, Delhi: Motilal Banarsidass, Delhi.
- Shastri, D. N. (1964) *Critique of Indian Realism*, Agra: Agra University.
- *Nyaya Siddhanta Muktaṭvali* of Visvanatha, English Translation: Nyaya Philosophy of Language, Tr. by John Vattanky, S. J., Sri Satguru Publications, Delhi, 1995.

References

UNIT I

- Frege, G., "On Sense and Reference", tr. by M. Black in *Translations from the Philosophical Writings of Gottlob Frege*, P. Geach and M. Black (eds. and Trans.), Oxford, Blackwell, 3rd edition, 1980, pp. 1-11.
- Russell, B., "On Denoting", *Mind*, 1905, pp. 479-493.

UNIT II

- Strawson, P. F., "On Referring", *Mind*, 1950, pp. 320-344.
- Donnellan, K., "References and Definite Descriptions", *The Philosophical Review*, vol.-75, 1966, pp. 281-304.

UNIT III & UNIT IV

- *Nyaya Siddhanta Muktaṭvali* of Visvanatha, English Translation: Nyaya Philosophy of Language, Tr. by John Vattanky, S. J., Sri Satguru Publications, Delhi, 1995.

Additional Resources:

- Donnellan, Keith. "Reference and Definite Descriptions", *Philosophical Review*, (1966), pp 281-304.
- Jerrold, Katz. J. (1971) *The Philosophical Relevance of Linguistic theory in The Philosophy of Language*, (ed.) Searle, Oxford University Press.
- Jha, V. N. (1992) *Śabdakhaṇḍa of the Nyāyasiddhāntamuktāvalī*, Sambhāṣā, Vol. 13.
- Kunjuni Raja, K. (1963). *Indian Theories of Meaning*, Adyar Library, Madras, 1963.
- Lycan, William. (2008). *Philosophy of Language: A Contemporary Introduction*, New York: Routledge.

- Matilal, B. K. (1996). *Logic, Language, and Reality*, Delhi: Motilal Banarsidass, Delhi.
 - Russell, Bertrand, (1918) *The Philosophy of Logical Atomism*, in R C Marsh, *Logic and Knowledge*, New York: Routledge.
 - Shastri, D. N. (1964) *Critique of Indian Realism*, Agra: Agra University.
 - Frege, G., "On Sense and Reference", tr. by M. Black in *Translations from the Philosophical Writings of Gottlob Frege*, P. Geach and M. Black (eds. and Trans.), Oxford, Blackwell, 3rd edition, 1980, pp. 1-11.
 - Russell, B., "On Denoting", *Mind*, 1905, pp. 479-493.
 - Jerrold, Katz. J. (1971) *The Philosophical Relevance of Linguistic theory in The Philosophy of Language*, (ed.) Searle, Oxford University Press.
 - Russell, Bertrand, (1918) *The Philosophy of Logical Atomism*, in R C Marsh, *Logic and Knowledge*, New York: Routledge.
 - Morris, Michael. (2007). *An Introduction to the Philosophy of Language*, Cambridge University Press, Cambridge.
-

Teaching Learning Process

Lectures, PPT Presentations. Open book tests, Assignments, Discussion in Tutorials

Assessment Methods

Presentations and home assignments, projects

Feminism (DSE (6)) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

Course Objectives:

A course in Feminism is needed to sensitise students to a perspective of thought that acts as a filter—a lens through which all subjects must be studied. It seeks to create gender sensitization and develops a wholistic approach towards education. This course addresses the concerns of women in terms of debates on consciousness and soul, analyses their connect with nature and culture; and explains the development of feminist ideologies.

Course Learning Outcomes

Course Learning Outcomes:

Study of Feminism arms the student with analytical skills to develop valid arguments to counter gender discrimination, sexism and patriarchal dominance. Feminist theory has a social agenda i.e. to initiate transformation in social structures, customs and practices. Thus the study of Feminism is not only an empowering tool against gender oppression but also against other systems of oppression such as race, class and colour

Unit 1

Unit I

Patriarchy and the Origin of Feminism

*Lerner, Greda. "Introduction" and "The Creation of Patriarchy". In *The Creation of Patriarchy* by Gerda Lerner, 3-14 & 212-229. New York: OUP, 1986.

*Adichie, Chimamanda Ngozi. *We Should All Be Feminists*. London: Fourth Estate, 2014.

Unit 2

Unit II

Epistemology

*Anderson, Elizabeth. "Feminist Epistemology: An Interpretation and a Defence", *Hypatia* 10, no.3(1995):50-84.

*Gatens, Moira. "The Feminist Critique of Philosophy." In *Feminism and Philosophy: Perspective on Difference and Equality* by Moira Gatens, 85-99. UK: Polity Press, 1991.

Unit 3

Unit III

Body and Gender

*Birke, Lynda. "Life as we have known It: Feminism and Biology of Gender." In *Science and sensibility: gender enquiry, 1780-1945* edited by Marina Benjamin, 243-264. UK: Oxford; MA: Cambridge; USA: B. Blackwell, 1991.

* Vanita, Ruth. "The Self Is Not Gendered: Sulabha's Debate with King Janaka." *NWSA Journal*, 15(2003):76-93.

Unit 4

Unit IV

Women, Society and Environment

*Chakravarty, Uma. "Whatever happened to the Vedic Dasi? Orientalism, Nationalism and a Script for the Past." In *Recasting Women: Essays in Indian Colonial History* edited by Kumkum Sangari and Sudesh Vaid, 27-87. New Brunswick, New Jersey: Rutgers University Press, 1990.

* Lughod, Lila Abu. "Do Muslim Women Really Need Saving? Anthropological Reflections on Cultural Relativism and Its Others." *American Anthropologist*, 47, no.3(2002):783-790.

*Mies Maria and Shiva Vandana. "Ecofeminism." In *Feminisms* edited by Sandra Kemp and Judith Squires, 497-502. New York: OUP, 2009.

References

Unit I

Patriarchy and the Origin of Feminism

*Lerner, Greda. "Introduction' and "The Creation of Patriarchy". In *The Creation of Patriarchy* by Gerda Lerner, 3-14 & 212-229. New York: OUP, 1986.

*Adichie, Chimamanda Ngozi. *We Should All Be Feminists*. London: Fourth Estate, 2014.

Unit II

Epistemology

*Anderson, Elizabeth. "Feminist Epistemology: An Interpretation and a Defence", *Hypatia* 10, no.3(1995):50-84.

*Gatens, Moira. "The Feminist Critique of Philosophy." In *Feminism and Philosophy: Perspective on Difference and Equality* by Moira Gatens, 85-99. UK: Polity Press, 1991.

Unit III

Body and Gender

*Birke, Lynda. "Life as we have known It: Feminism and Biology of Gender." In *Science and sensibility: gender enquiry, 1780-1945* edited by Marina Benjamin, 243-264. UK: Oxford; MA: Cambridge; USA: B. Blackwell, 1991.

* Vanita, Ruth. "The Self Is Not Gendered: Sulabha's Debate with King Janaka." *NWSA Journal*, 15(2003):76-93.

Unit IV

Women, Society and Environment

*Chakravarty, Uma. "Whatever happened to the Vedic Dasi? Orientalism, Nationalism and a Script for the Past." In *Recasting Women: Essays in Indian Colonial History* edited by Kumkum Sangari and Sudesh Vaid, 27-87. New Brunswick, New Jersey: Rutgers University Press, 1990.

* Lughod, Lila Abu. "Do Muslim Women Really Need Saving? Anthropological Reflections on Cultural Relativism and Its Others." *American Anthropologist*, 47, no.3(2002):783-790.

*Mies Maria and Shiva Vandana. "Ecofeminism." In *Feminisms* edited by Sandra Kemp and Judith Squires, 497-502. New York: OUP, 2009.

Additional Resources:

Additional Resources:

*Jagger, Alison M. and Iris Marion Young, eds. *Companion to Feminist Philosophy: Blackwell Companion to Philosophy*. Oxford: Blackwell Publishers, 1998.

*Hooks, Bell. "Feminism: A Movement to End Sexist Oppression". In *Feminisms* edited by Sandra Kemp and Judith Squires, 22-27. New York: OUP, 2009.

*Kemp, Sandra and Judith Squires, eds. *Feminisms*. New York: OUP, 2009.

*Mies, Maria and Vandana Shiva. *Eco-Feminism*. Jaipur: Rawat Publications, 1993.

*Padia, Chandrakala, ed. *Feminism, Tradition and Modernity*. Shimla: IAS, 2002.

Teaching Learning Process

Lectures, tutorials, film screenings, seminars, interactions with experts in the field and workshops.

Assessment Methods

As per the guidelines of University of Delhi.

Keywords

Sex, gender, biological determinism, sexism, patriarchy, feminist method.

**Indian Theories of Consciousness
(DSE (7))
Discipline Specific Elective - (DSE) Credit:6**

Course Objectives:

The objective of this course is to make students familiar with Indian Classical texts. This course will be an introduction to the various schools of Indian philosophical traditions and their theories of consciousness. The formulation of this paper is to clearly exhibit that there also exists an amazing variety of the theories of consciousness in Indian philosophy. Focus will be on interactive learning where students will engage themselves into rigorous and an analytical examination of key arguments and doctrine in a manner that enables them for contemporary engagement and reflection.

- i. The aim is to make students familiar with and develop a clear understanding of the major concepts such as the nature of the self (Atman/Brahman), paravidya and aparavidya, No-soul theory, karma and rebirth, etc. within spectrum of Indian theories of consciousness.
- ii. To develop a deeper understanding of the nature of the self which ultimately reveals one's own existence or being.
- iii. The reading of original texts help students to know the fundamental tenants of different schools of Classical Indian thought.
- iv. Exposure to various methodologies, interpretations used in the writing style of ancient Indian philosophers..

v. Lastly, this paper helps to enhance students' ratiocinative abilities and writing skills which are essential for establishing logical conclusions in all aspects of human existence.

Course Learning Outcomes

COURSE LEARNING OUTCOME

- Students will have knowledge of the Indian Theories of Consciousness given in Mandukyopanishad, Bhagavadgita, Buddhism, Jainism, Samkhya, Charvaka, Nyaya and Advaita Vedanta.
- In all four units students will learn to develop scientific, logical and rational inquiry for understanding the Indian Philosophical systems. Students will be able to do a comparative analysis of all systems which will further enhance their debating skills.
- Students will develop strong oratory and writing skills through the effective presentation of projects, debates, as well as through Seminars, conference, workshops.

Unit 1

UNIT-I

1. *Mandukyopanishad.*, Tr. and Annotated by Swami Nikhilananda, Advaita Ashram, Calcutta, 2000, PP. 7-85.
2. *Bhagavadgītā*: Chapter II, Verses 11-30; The Bhagavadgītā (Text and Translation) by R. C. Zahner, Oxford University Press, New York, 1973.

Unit 2

UNIT-II

3. *The Questions of King Milinda*, Book II, Translated from Pali by T. W. Rhys David, Motilal Banarsidas, Delhi, 1965, pp 40-99.
4. *Tattvārtha Sūtra of Umāsvātī*: Chapter II, The Institute of Jainology, Harper Collins Publishers, USA, 1994, pp 33-63.

Unit 3

UNIT-III

5. *Nyāyamañjarī of Jayanta Bhaṭṭa*, Dehātmavāda (Śarīrātmavādī-cārvāka-mata), Indian Council of Philosophical Research, New Delhi, 1990, pp 109-128

6. *Samkhya Karika of Ishvara Krishna*, Verse. 15-38, tr. by Larson, *Classical Samkhya*, MLBD, Delhi, 1969.

Unit 4

UNIT-IV

7. Sankara's introduction to the *Brahmasutra* called *Upodghata*, pp.1-4, *Brahmasutrasamkarabhashya* (edited by Vasudeva Sharma) Published by Tukaram Javaji, Nimaya Sagara, Bombay.

References

Recommended Readings:

- Hume, R.E. *Thirteen Principal Upaniṣads*. Oxford: Oxford University Press, 1921.
- Radhakrishnan, S. *The Principal Upaniṣads*. London: George Allen & Unwin, 1974.
- Swami, Gambhirananda, trans. *Brahmasūtra-śāṅkara-bhāṣya*. Calcutta: Advaita Ashram
- Swami Vireshwarananda, trans. *Brahmasūtra-śāṅkara-bhāṣya*. Calcutta : Advaita Ashram, 2003, pp 1-16.

Additional Resources:

- Organ, Troy Wilson. *The Self in Indian Philosophy*. London: Mouton & Co., 1964.
- Pandey, Sangam Lal. *Pre-Samkara Advaita Philosophy*, 2nd ed. Allahabad: Darsan Peeth, 1983.
- Paul S. and Anthony J. Tribe. *Buddhist Thought: A Complete Introduction to the Indian Tradition*. London: Routledge, 2000.

• Stcherbatsky, Theodore. *The Soul Theory of Buddhists*, 1st ed. Varanasi: Bharatiya Vidya Prakasana, 1970.

- Gupta, Bina, *Cit Consciousness*. OUP.:New Delhi 2003.

Teaching Learning Process

Teaching-Learning Process:

This course demands interaction among the students and their ability to think independently of the various interpretation of the texts. An interactive mode of teaching will be used. The understanding is developed by reading the texts in classroom with focus on acquainting students with sanskrit language as well as their english translations. Word by word all the verses mentioned in the syllabus will be covered along with their explanations. Commentaries on the various texts will also be introduced to the students. The students will be encouraged to participate in discussions, group discussions and deliver seminars on relevant topics.

Assessment Methods

Assessment Methods:

Students should strictly follow the course policies.

Grade will be determined on the basis of graded assignments as specified below: Evaluation:

- Four Assignments/ Projects: 10% each
- Three in-class quizzes/oral tests: 5% each
- Paper Presentations: 5%
- final exam: 10%
- Attendance and participation 5%

Keywords

Keywords:

Materialism, Idealism, Brahman, Atman, Cit, Consciousness, Turiya, Karma, Rebirth, Self, Upanishad, Prakriti, Purusha, Jiva, Ajiva etc.

**Aesthetics
(DSE (8))**

Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

Course Objective (2-3) The course is aimed to make students understand various philosophical traditions and approaches to contextualise the nature, meaning and definition of art, craft, beauty, creativity and aesthetic experience. The course also includes an eclectic collection of textual references.

Course Learning Outcomes**Course Learning Outcomes**

The course prepares the students to pursue and qualify for a career in art, culture and media studies.

Unit 1**Unit-1:**

An Introduction to the Nature and Meaning of Aesthetics:

1. Philosophy of Art, Beauty, Creativity and Imagination
2. Art and Craft, Comparison of Art Forms
3. Art, Emotion, Rasa, Disinterestedness and Empathy

Recommended Readings:

Gupta, S. Art, Beauty and Creativity, (Delhi: D.K Printers, 1999) Chapters I,3,4,5,7,8 and 9
Saxena, SK, Art and Philosophy: Seven Aestheticians (Pragati Publications, 1995). Chapter on 'Langer'

Ghosh, R. K. ,Great Indian Thinkers on Art: Creativity, Aesthetic Communication and Freedom(Delhi: Sundeep PrakashanBlack and White, 2006) Relevant chapters

Unit 2

Unit-2: Axiological Aspect

Art and Morality: Comparison and Contrast

Recommended Readings:

Hiriyanna, M. 'Art and Morality' in Art Experience, (Indira Gandhi National Centre for the Arts: Manohar, Revised edition: 1997)

Sartre, Jean Paul, 'The Work of Art' in Aesthetics, Harold Osborne, (London: Oxford University Press, 1972).

Clark, Kenneth. 'Introduction' in The Nude: A Study in Ideal Form. (Bollingen Series 35.2. New York: Pantheon Books, 1956).

Unit 3

Unit-3: Aesthetic Delight and Art activity in relation to Spiritualism: Indian Texts

1. Rasa in comparison with Spiritual bliss
2. Art as a Spiritual Activity

Recommended Readings:

Hiriyanna, M. Art Experience, (Indira Gandhi National Centre for the Arts, Manohar: Delhi, This edition: 1997). Chapters 1 and 5.

Coomaraswamy, A. The Transformation of Nature in Art, (Sterling Publishers, 1995) Chapter-1

Unit 4: Art, Craft and Aesthetic Attitude: Western Texts

1. Idea of Art
2. Kant's Disinterestedness
3. Psychical Distance

Recommended Readings:

Paul Valery, 'The Idea of Art in Aesthetics by Harold Osborne (London: Oxford University Press, 1972).

'Disinterestedness and Desire in Kant's Aesthetics' in The Journal of Aesthetics and Art Criticism, Paul Guyer (Vol. 36, No. 4 (Summer, 1978), pp. 449- 460. Online source: Stable URL: <http://www.jstor.org/stable/430485>

'Edward Bullough and the Psychical Distance' by George Dickie in Philosophy and Phenomenological Research, Vol. 22, No. 2 (Dec., 1961), pp. 233-238. Online Source: <https://www.jstor.org/stable/2104844>

Unit 5

only four units in the curriculum

Practical

Practical This course has a lot of content to engage in discussions and deliberations about art and culture issues. So, real life instances can enrich the class room discussions and assignments for a better comprehension of the course.

References

References :

Recommended Readings:

- Coomaraswamy, A. K. *The Transformation of Nature in Art*. Sterling Publishers, 1995.
- Ghosh, R. *Great Indian Thinkers on Art: Creativity, Aesthetic Communication and Freedom*. Delhi: Sandeep Prakashan (Black and White), 2006.
- Gupta, S. *Art, Beauty and Creativity*. Delhi: D.K Printers, 1999.
- Saxena, SK. *Art and Philosophy: Seven Aestheticians*. Pragati Publication ,1995.
- Gupta, Shyamala. *Saundarya Tatva Mīmāṃsā*. Seema Sahitya Bhavan, 1993. Hindi Source.
- Saxena, Manjula. *Aesthetics: Saundarya aur kala ka Darshanika Vivechana*. New Delhi: DK Printworld : New Delhi, 2008. A good source book in Hindi.
- Hiriyanna, M. *Art Experience*. Indira Gandhi National Centre for the Arts, Manohar, 1997.

- Osborne, H. *Aesthetics*. London: Oxford University Press, 1972.

Additional Resources:

Aldrich, V.C ,Philosophy of Art,(Prentice Hall, 1963).

Gnoli,R. Aesthetic Experience according to Abhinavagupta, (Artibus Asiae Publishers, 1957).

- Hanfling, O. ed. Philosophical Aesthetics: An Introduction, (Blackwell, 1992)

Coomaraswamy, A K, The Dance of Shiva(Fourteen Indian Essays with an Introductory Preface by Romain Rolland) (Munshiram Manoharlal: Delhi, This edition,2012)

Teaching Learning Process

Since it is a study of arts and beauty, students need to bring to class room discussions and in their assignments, a reference to artistic experience. Visit to museums and galleries etc. discussions about literature , music and cinema will add value to understanding of Aesthetics.

Assessment Methods

Assessment Methods: The method of assessment is as per the University system of semester exams for 75% and Internal assessment which comprises of class attendance, tests and assignment assessment forms the rest 25%

Keywords

Aesthetics, Art and craft, Art and emotion, Kant, Bullough, Hiriyana , Coomaraswamy, Paul Valery, Sartre, Rasa , Aesthetic Experience

Knowledge and Skepticism
(DSE (9))
Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

.We all want knowledge, but do we know what knowledge is? This is a course in epistemology: the theory of knowledge which aims to acquaint students with the various aspects of knowledge and to instruct them on the biggest challenge it faces viz. scepticism. We will come to know about various theories related to what knowledge is, we will see what definitions of knowledge have been offered, whether knowledge is even possible, how to refute those who say that knowledge is not possible at all.

Course Learning Outcomes

The learning outcomes aimed at are the following:

1. To learn about general issues in epistemology
2. To learn about the problems regarding the definition of knowledge
- 3.. To learn about the justification of knowledge
4. To consider the challenge from radical scepticism and the responses

Unit 1

Unit 1: Knowledge and its Definition

1. Types of knowledge
2. Truth and Belief
3. The Problem of the Criterion
4. Gettier Cases
5. Responding to Gettier Cases

Recommended Readings:

Pritchard, Duncan. *What is this thing called Knowledge?*, Third Edition. RKP, 2013, Chapters 1 and 3 (Part 1)

Title of Chapter 1: Some Preliminaries

Title of Chapter 3: Defining Knowledge

Gettier, Edmund. *Is Justified True Belief Knowledge? Analysis* 23 (6), 121-123. 1963.

Unit 2

Unit 2: Knowledge and Justification

1. The nature of Justification
2. Informatism
3. Coherentism
4. Foundationalism

Recommended Reading:

Pritchard, Duncan. *What is this thing called knowledge?, Third Edition*. RKP, 2013, Chapter 4 (Part 1)

Title of Chapter: The Structure of Knowledge

Unit 3

Unit 3: The Problem of Other Minds

1. How do we have knowledge about other minds
2. Strategies and arguments regarding knowledge of other minds
3. Perceiving someone else's mind

Recommended Reading:

Pritchard, Duncan. *What is this thing called Knowledge?, Third Edition*. RKP, 2013, Chapter 14 (Part IV)

Title of Chapter: Scepticism about Other Minds

Unit 4

Unit 4: Radical Scepticism

1. Radical Scepticism and Closure
2. Mooreanism
3. Contextualism
4. The Refutation of Scepticism

Recommended Reading:

Pritchard, Duncan. *What is this thing called Knowledge?*, Third Edition. RKP, 2013, Chapter 15 (Part IV)

Title of Chapter: Radical Scepticism

Vogel, Jonathan. "The Refutation of Scepticism." In *Contemporary Debates in Epistemology*, edited by Steup Matthias and Sosa Ernest, 72-84. Blackwell, 2005.

References

- Pritchard, Duncan. *What is This Thing Called Knowledge?*. RKP, 2013.
- Gettier, Edmund. *Is Justified True Belief Knowledge?* Analysis 23 (6), 121-123. 1963.
- Vogel, Jonathan. "The Refutation of Skepticism." In *Contemporary Debates in Epistemology*, edited by Steup Matthias and Sosa Ernest, 72-84. Blackwell, 2005.

Additional Resources:

- Sosa, Ernest. *Epistemology*. Princeton University Press, 2017.
- Steup, Matthias & Ernest Sosa, ed. *Contemporary Debates in Epistemology*. Wiley-Blackwell, 2005.
- Dancy, Jonathan, Ernest Sosa and Matthias Steup, ed. *A Companion to Epistemology, Second Edition*. Blackwell, 2010.
- Chisholm, R.M. *Theory of Knowledge*. U.S: Prentice Hall, 1966.
- Hamlyn, D. *Theory of Knowledge*. London: Macmillan, 1970.
- Lehrer, K. *Knowledge*. Oxford: Clarendon Press, 1974.

Teaching Learning Process

Lectures and Tutorials

Assessment Methods

As per the university examination rules

Keywords

Knowledge, Conditions of knowledge, Scepticism, Foundationalism, Truth, Belief, Justification. Closure

Philosophy of Logic (DSE (10)) Discipline Specific Elective - (DSE) Credit:6

Course Objective(2-3)

We reason using propositions all the time. And logic, broadly, is about good and bad reasons. The use of reason, and the investigation of that use, goes hand in hand in philosophy. Philosophy of logic considers questions that are taken to be at the heart of philosophy: what is a proposition? What is truth? What is an inference? What is necessity? Is it sensibly ascribed to propositions or objects? Is "existence" a predicate? What is logical form? What is the correct logical analysis of modal sentences? Is it possible to translate all sentences of a natural language into an artificial language? Can logic be done without any information regarding the world? Can logic tell us anything about the world? These are some questions, and there are many more that arise as we wonder about the meaning of being a reasoning creature. IN the course we will undertake to study some of these questions.

Course Learning Outcomes

1. To learn about philosophy of logic, philosophical logic and philosophy and logic
2. To understand basic theories and problems regarding the notion of a proposition

3. To have a better understanding of terms like "analytic", "a priori", de dicto, de re, possible worlds, essentialism
 4. To grasp the fundamental problems regarding existence, reference and presupposition.
-

UNIT 1: Logic and Philosophy

A: Philosophy of Logic

B: Philosophical Logic

C: Philosophy and Logic

Chapter 1 of A.C. Grayling's *An Introduction to Philosophical Logic*, Blackwell Publishing, 2008, pp 1-11

UNIT 2: The Bearers of Truth

1: The Proposition

2. Sense, Reference and Opacity

3. Propositions as meanings and its criticism

4. Nominalism and realism

Chapter 2 of A.C.Grayling's *An Introduction to Philosophical Logic*, Blackwell, 2008, 12-32

UNIT 3: Necessity, Analyticity and the A Priori

1. Analyticity, Necessity, Possible Worlds

2. Problems with Possible Worlds

3. Essentialism, essence, origin and structure

4. Necessity again

Chapter 3 in A.C Grayling's *An Introduction to Philosophical Logic*, Blackwell, 2008, pp. 33-87

UNIT 4: Existence and Descriptions

1. Is "exists" a predicate?

2. The theory of descriptions

3.Strawson on Descriptions

4. Referential and Attributive uses of Descriptions

Chapter 4 in A.C. Grayling's *An Introduction to Philosophical Logic*, Blackwell, 2008, pp. 88-121

References

1. Grayling, A. C. (2008). *Introduction to Philosophical Logic*, Wiley-Blackwell. (Third Edition, 1997)

Additional Resources:

1. Strawson, P. F. (1952). *Introduction to Logical Theory*, Routledge.
 2. Burgess, John P. (2009). *Philosophical Logic*. Princeton University Press.
 3. Sainsbury, Mark (2000). *Logical Forms: An Introduction to Philosophical Logic*. Wiley-Blackwell.
 4. Haack, Susan (1978). *Philosophy of Logics*. Cambridge University Press.
 5. Cohnitz, Daniel & Estrada-González, Luis (2019). *An Introduction to the Philosophy of Logic*. Cambridge University Press.
 6. Read, Stephen (1994). *Thinking About Logic: An Introduction to the Philosophy of Logic*. Oxford University Press.
-

Teaching Learning Process

Lectures and Tutorials, PPT Presentations

Assessment Methods

Examinations, Class tests, Weekly Quizzes

Keywords

Logic, Philosophy, Philosophical Logic, Propositions, Truth, Existence, Descriptions, Possible Worlds.

दिल्ली विश्वविद्यालय UNIVERSITY OF DELHI

Bachelor of Science (Honours) Physics

(Effective from Academic Year 2019-20)



Revised Syllabus as approved by

Date:	Academic Council	No:
Date:	Executive Council	No:

Applicable for students registered with Regular Colleges.

List of Contents

Preamble	1
Learning Outcomes-Based Curriculum Framework for Undergraduate Education in Physics.....	3
1. INTRODUCTION.....	3
2. LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK FOR PROGRAMME IN B.SC. (HONS.) PHYSICS	4
2.1 NATURE AND EXTENT OF THE PROGRAMME IN B.SC. (HONS.) PHYSICS	4
2.2 AIMS OF BACHELOR’S DEGREE PROGRAMME IN B.SC. (HONS.) PHYSICS ...	5
3. GRADUATE ATTRIBUTES FOR B.SC. (HONS.) PHYSICS	5
4. QUALIFICATION DESCRIPTORS FOR GRADUATES IN B.Sc. (HONS.) PHYSICS	7
5. PROGRAMME LEARNING OUTCOMES IN B.Sc. (HONS.) PHYSICS	8
6. TEACHING LEARNING PROCESSES	9
6.1 TEACHING LEARNING PROCESSES FOR CORE COURSES	10
6.1.1 Teaching Learning Processes for Theory component of Core Courses.....	11
6.1.2 Teaching Learning Processes for Physics Laboratory component of Core Courses ..	11
6.1.3 Teaching Learning Processes for Computational Physics component of Core Courses	12
6.2 TEACHING LEARNING PROCESSES FOR DISCIPLINE SPECIFIC ELECTIVES	12
6.2.1 Tutorials	13
6.3 TEACHING LEARNING PROCESSES FOR SKILL ENHANCEMENT COURSES	13
6.4 TEACHING LEARNING PROCESSES FOR GENERIC ELECTIVES	13
7. ASSESSMENT METHODS.....	14
7.1 ASSESSMENT METHODS FOR CORE COURSES	15
7.1.1 Assessment Methods for the Theory component of Core courses.....	15
7.1.2 Assessment Methods for the Physics Laboratory component of Core courses	15
7.1.3 Assessment Methods for the Computational Physics component of Core courses	16
7.2 ASSESSMENT METHODS FOR DISCIPLINE SPECIFIC ELECTIVES.....	16
7.3 ASSESSMENT METHODS FOR SKILL ENHANCEMENT COURSES	16
7.4 ASSESSMENT METHODS FOR GENERIC ELECTIVES	16
8. STRUCTURE OF COURSES IN B.SC. (HONS.) PHYSICS.....	17
8.1 CREDIT DISTRIBUTION FOR B.SC. (HONS.) PHYSICS	17
8.2 SEMESTER-WISE DISTRIBUTION OF COURSES	20

9. DETAILED COURSES FOR PROGRAMME IN B.SC. (HONS.) PHYSICS, INCLUDING COURSE OBJECTIVES, LEARNING OUTCOMES, AND READINGS.	26
9.1. CORE COURSES	26
9.2. DISCIPLINE SPECIFIC ELECTIVE (DSE)	77
9.3. SKILL-ENHANCEMENT COURSES (SEC)	131
9.4. GENERIC ELECTIVE (GE)	161
ANNEXURE	225

Preamble

Higher Education in India is in need of reform. On the one hand, while there is a need for increased access to higher education in the country, it is also necessary to improve the quality of higher education. New initiatives and sustained efforts are needed to develop and enhance the spirit of enquiry, analytical ability and comprehension skills of the young generation of students. An emerging knowledge based society requires that they are able to acquire and generate new knowledge and skills, and can creatively apply them to excel in their chosen vocations. Our higher education system needs to inculcate exemplary citizenship qualities and motivate students to contribute to the society at large. Such abilities and qualities of our youth will be crucial for the country to face the challenges of the future.

One of the reforms in undergraduate (UG) education, initiated by the University Grants Commission (UGC) at the national level in 2018, is to introduce the Learning Outcomes-based Curriculum Framework (LOCF) which makes it student-centric, interactive and outcome-oriented with well-defined aims and objectives.

The Department of Physics and Astrophysics, University of Delhi took up the task of drafting the LOCF for UG Physics courses according to guidelines sent in March 2019 by the Undergraduate Curriculum Review Committee (UGCRC)-2019 of the University of Delhi. The Committee of Courses of the Department constituted a Steering Committee, whose composition is given in Annexure 1A, to plan and formulate the LOCF for UG Physics courses of the University. The Steering Committee formed Subject Working Groups (Annexure 1B) to formulate the content of different sets of courses. The Subject Working Groups included teachers from more than twenty colleges of the University, who have experience of teaching the respective courses. About eighty faculty members from the Department of Physics and Astrophysics and Physics Departments of colleges of the University have contributed to this important task. The inputs of the Subject Working Groups were compiled, and the present document prepared by a final drafting team (Annexure 1C).

The University of Delhi offers the undergraduate B.Sc. (Honours) Physics programme, the B.Sc. Physical Sciences programme with Physics and Electronics disciplines, as well as general elective courses in Physics for students of Honours programmes in disciplines other than Physics. The LOCF has been prepared for all of the above.

An earlier draft of the LOCF of the University of Delhi was put in the public domain for stakeholders' comments in May 2019. This was a revised version of the existing Choice Based Credit System (CBCS) undergraduate programme at the University of Delhi. We thank the stakeholders who took time and made effort to give us feedback on the earlier draft. Many of the comments received have helped us improve the LOCF draft.

We acknowledge the use of the document "Learning Outcomes based Curriculum Framework (LOCF) for Undergraduate Programme B.Sc. (Physics) 2019" put up by the UGC on its website in May 2019 (https://www.ugc.ac.in/pdfnews/1884134_LOCF-Final_Physics-report.pdf) and prepared by its Subject Expert Committee for Physics. This document has helped in clarifying the features of the LOCF and is the original source of a significant part of the text of the present document.

Keywords

Core Courses (CC)

Course Learning Outcomes (CLO)

Ability Enhancement Compulsory Course (AECC)

Discipline Specific Electives (DSE)

Generic Electives (GE)

Learning Outcome-based Curriculum Framework (LOCF)

Programme Learning Outcomes

Skill Enhancement Courses (SEC)

Student Centric

Teaching Learning Processes

Learning Outcomes-Based Curriculum Framework for Undergraduate Education in Physics

1. INTRODUCTION

The learning outcomes-based curriculum framework for a degree in B.Sc. (Honours) Physics is intended to provide a comprehensive foundation to the subject, and to help students develop the ability to successfully continue with further studies and research in the subject. The framework is designed to equip students with valuable cognitive abilities and skills so that they are successful in meeting diverse needs of professional careers in a developing and knowledge-based society. The curriculum framework takes into account the need to maintain globally competitive standards of achievement in terms of the knowledge and skills in Physics, as well develop scientific orientation, enquiring spirit, problem solving skills and values which foster rational and critical thinking.

Due to the large diversity in India, a central university like the University of Delhi gets students from very different academic backgrounds, regions and language zones. While maintaining high standards, the learning outcome-based curriculum provides enough flexibility to teachers and colleges to respond to diverse needs of students.

The learning outcome-based curriculum framework for undergraduate courses in Physics also allows for flexibility and innovation in the programme design to adopt latest teaching and assessment methods and include introduction to new areas of knowledge in the fast-evolving subject domains. The process of learning is defined by the following steps which form the basis of final assessment of the achievement at the end of the program.

- (i) Development of an understanding and knowledge of basic Physics. This involves exposure to basics facts of nature discovered by Physics through observations and experiments. The other core component of this development is introduction to physics concepts and principles, their theoretical relationships in laws of Physics, and deepening of their understanding via appropriate problems.
- (ii) The ability to use this knowledge to analyze new situations and learn skills and tools like laboratory techniques, computational methods, and mathematics to find solutions, interpret results and make meaningful predictions.
- (iii) The ability to synthesize the acquired knowledge and experience for an improved comprehension of the physical problems and to create new skills and tools for their possible solutions.

2. LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK FOR PROGRAMME IN B.SC. (HONS.) PHYSICS

2.1 NATURE AND EXTENT OF THE PROGRAMME IN B.SC. (HONS.) PHYSICS

The B.Sc. (Hons.) Physics programme builds on the basic Physics taught at the +2 level in all the schools in the country. Ideally, the +2 senior secondary school education should achieve a sound grounding in understanding the basic Physics with sufficient content of topics from modern Physics and contemporary areas of exciting developments in physical sciences. The curricula and syllabi should be framed and implemented in such a way that the basic connection between theory and experiment and its importance in understanding Physics is made clear to students. This is very critical in developing a scientific temperament and the urge to learn and innovate in Physics and other sciences. Unfortunately, our school system in most parts of the country lacks the facilities to achieve the above goal, and it is incumbent upon the college/university system to fill the gaps in the scientific knowledge and understanding of the country's youth who complete school curricula and enter university education.

Physics is an experimental and theoretical science that studies systematically the laws of nature operating at length scales from the sub-atomic domains to the entire universe. The scope of Physics as a subject is very broad. The core areas of study within the disciplinary/subject area of the B.Sc. (Hons.) Physics programme are: Classical and Quantum Mechanics, Electricity and Magnetism, Thermal and Statistical Physics, Wave theory and Optics, Physics of the Materials, Digital Electronics, and specialized methods of Mathematical Physics and their applications in different branches of the subject. Along with the theoretical course work students also learn physics laboratory methods for different branches of physics, specialized measurement techniques, analysis of observational data, including error estimation, and scientific report writing. The latest addition to Physics pedagogy incorporated in the LOCF framework is computational physics, which involves adaptation of Physics problems for algorithmic solutions, and modelling and simulation of physical phenomenon. The elective modules of the framework offer students choice to gain knowledge and expertise in more specialized domains of Physics like Nuclear and Particle physics, Nanophysics, Astronomy and Astrophysics, etc. and interdisciplinary subject areas like Biophysics, Geophysics, Environmental Physics, Medical Physics, etc.

The physics-based knowledge and skills learnt by students also equip them to be successful in careers other than research and teaching in Physics.

2.2 AIMS OF BACHELOR'S DEGREE PROGRAMME IN B.SC. (HONS.) PHYSICS

The LOCF based UG educational program in Physics aims to

- create the facilities and learning environment in educational institutions to consolidate the knowledge acquired at +2 level, motivate students to develop a deep interest in Physics, and to gain a broad and balanced knowledge and understanding of physical concepts, principles and theories of Physics.
- provide opportunities to students to learn, design and perform experiments in lab, gain an understanding of laboratory methods, analysis of observational data and report writing, and acquire a deeper understanding of concepts, principles and theories learned in the classroom through laboratory demonstration, and computational problems and modelling.
- develop the ability in students to apply the knowledge and skills they have acquired to get to the solutions of specific theoretical and applied problems in Physics.
- to prepare students for pursuing the interdisciplinary and multidisciplinary higher education and/or research in interdisciplinary and multidisciplinary areas, as Physics is among the most important branches of science necessary for interdisciplinary and multidisciplinary research.
- to prepare students for developing new industrial technologies and theoretical tools for applications in diverse branches of the economic life of the country, as Physics is one of the branches of science which contribute directly to technological development; and it has the most advanced theoretical structure to make quantitative assessments and predictions, and
- in light of all of the above to provide students with the knowledge and skill base that would enable them to undertake further studies in Physics and related areas, or in interdisciplinary/multidisciplinary areas, or join and be successful in diverse professional streams including entrepreneurship.

3. GRADUATE ATTRIBUTES FOR B.SC. (HONS.) PHYSICS

Some of the characteristic attributes of a graduate in Physics are

- **Disciplinary knowledge**
 - (i) Comprehensive knowledge and understanding of major concepts, theoretical principles and experimental findings in core areas of Physics -like Classical and Quantum mechanics, Thermodynamics and Statistical mechanics, Electricity, Magnetism and Electromagnetic theory, Wave Theory, Optics, Solid State Physics, and Analogue and Digital electronics; and in the chosen disciplinary elective sub-fields of the subject like Nuclear and Particle Physics, Analytical dynamics, Astronomy and Astrophysics, Advanced Mathematical Physics, Nanophysics and interdisciplinary subfields like Biophysics, Geophysics, Atmospheric Physics, Medical Physics, Embedded Systems, etc.
 - (ii) Ability to use physics laboratory methods and modern instrumentation for designing and implementing new experiments in physics, interdisciplinary/multidisciplinary research areas and industrial research.

- **Skilled communicator:** Ability to transmit abstract concepts and complex information relating to all areas in Physics in a clear and concise manner through scientific report writing. Ability to express complex relationships and information through graphical methods and proper tabulation. Ability to explain complex processes through simulation and modelling. Ability to express complex and technical concepts orally in a simple, precise and straightforward language for better understanding.
- **Critical thinking:** Ability to distinguish between relevant and irrelevant facts and information, discriminate between objective and biased information, apply logic to arrive at definitive conclusions, find out if conclusions are based upon sufficient evidence, derive correct quantitative results, make rational evaluations, and arrive at qualitative judgments according to established rules.
- **Sense of inquiry:** Capability for asking relevant/appropriate questions relating to the issues and problems in the field of Physics and beyond. Planning, executing and reporting the results of theoretical or experimental investigation.
- **Team player/worker:** Capable of working effectively in diverse teams in both classroom, laboratory, Physics workshop and in field-based situation.
- **Skilled project manager:** Capable of identifying/mobilizing appropriate resources required for a project, and managing a project through to completion, while observing responsible and ethical scientific conduct, safety and laboratory hygiene regulations and practices.
- **Digitally Efficient:** Capable of using computers for computational and simulation studies in Physics. Proficiency in appropriate software for numerical and statistical analysis of data, accessing and using modern e-library search tools, ability to locate, retrieve, and evaluate Physics information from renowned physics archives, proficiency in accessing observational and experimental data made available by renowned research labs for further analysis.
- **Ethical awareness/analytical reasoning:** The graduates should be capable of demonstrating the ability to think and analyze rationally with modern and scientific outlook and adopt unbiased objectives and truthful actions in all aspects of work. They should be capable of identifying ethical issues related to their work. They should be ready to appropriately acknowledge direct and indirect contributions received from all sources, including from other personnel in the field of their work. They should be willing to contribute to the free development of knowledge in all forms. Further, unethical behavior such as fabrication, falsification or misrepresentation of data, or committing plagiarism, or not adhering to intellectual property rights should be avoided.
- **Social, National and International perspective:** The graduates should be able to develop a perspective about the significance of their knowledge and skills for social well-being and a sense of responsibility towards human society and the planet. They should have a national as well as an international perspective about their work and career in the chosen field of academic and research activities.
- **Lifelong learners:** Capable of self-paced and self-directed learning aimed at personal development and for improving knowledge/skill development and reskilling in all areas of Physics.

4. QUALIFICATION DESCRIPTORS FOR GRADUATES IN B.Sc. (HONS.) PHYSICS

The qualification descriptor for B.Sc. (Hons.) Physics graduates include the following: They should be able to:

- Demonstrate
 - (i) a systematic and coherent understanding of basic Physics including the concepts, theories and relevant experimental techniques in the domains of Mechanics, Electricity and Magnetism, Waves and Optics, Thermal Physics, Quantum Mechanics, Statistical Mechanics, Mathematical Physics and their applications in other areas of Physics;
 - (ii) the ability to relate their understanding of physics to other sciences and hence orient their knowledge and work towards multi-disciplinary/inter-disciplinary contexts and problems;
 - (iii) procedural knowledge that creates different types of professionals related to different areas of study in Physics and multi/interdisciplinary domains, including research and development, teaching, technology professions, and government and public service;
 - (iv) skills in areas of specializations of their elective subfields so that they can continue with higher studies and can relate their knowledge to current developments in those subfields.
- Use knowledge, understanding and skills required for identifying problems and issues relating to Physics, and its interface with other subjects studied in the course; collect relevant quantitative and/or qualitative data from a wide range of sources including various research laboratories of the world, and do analysis and evaluation using appropriate methodologies.
- Communicate the results of studies undertaken accurately in a range of different contexts using the main concepts, constructs and techniques of Physics and other subjects studied in the course. Develop communication abilities to present these results in technical as well as popular science meetings.
- Ability to meet their own learning needs, drawing on a range of pedagogic material available on the internet and books, current research and development work and professional materials, and in interaction with other science professionals.
- Demonstrate Physics-related technological skills that are relevant to Physics-related trades and employment opportunities.
- Apply their knowledge, understanding and skills to new/unfamiliar contexts beyond Physics to identify and analyze problems and issues, and to solve complex problems.

5. PROGRAMME LEARNING OUTCOMES IN B.Sc. (HONS.) PHYSICS

Students graduating with the B.Sc. (Honours) Physics degree should be able to

- Acquire
 - (i) a fundamental/systematic and coherent understanding of the academic field of basic Physics in areas like Mechanics, Electricity and Magnetism, Waves and Optics, Thermal and Statistical Physics, Quantum Mechanics, Mathematical Physics and their applications to other core subjects in Physics;
 - (ii) a wide ranging and comprehensive experience in physics laboratory methods in experiments related to mechanics, optics, thermal physics, electricity, magnetism, digital electronics, solid state physics and modern physics. Students should acquire the ability for systematic observations, use of scientific research instruments, analysis of observational data, making suitable error estimates and scientific report writing;
 - (iii) procedural knowledge that creates different types of professionals related to the disciplinary/subject area of Physics, including professionals engaged in research and development, teaching and government/public service;
 - (iv) knowledge and skills in areas related to their specialization area corresponding to elective subjects within the disciplinary/subject area of Physics and current and emerging developments in the field of Physics.
- Demonstrate the ability to use skills in Physics and its related areas of technology for formulating and tackling Physics-related problems and identifying and applying appropriate physical principles and methodologies to solve a wide range of problems associated with Physics.
- Recognize the importance of mathematical modelling, simulation and computational methods, and the role of approximation and mathematical approaches to describing the physical world and beyond.
- Plan and execute Physics-related experiments or investigations, analyze and interpret data/information collected using appropriate methods, including the use of appropriate software such as programming languages and purpose-written packages, and report accurately the findings of the experiment/investigations while relating the conclusions/findings to relevant theories of Physics.
- Demonstrate relevant generic skills and global competencies such as
 - (i) problem-solving skills that are required to solve different types of Physics-related problems with well-defined solutions, and tackle open-ended problems that belong to the disciplinary area boundaries;
 - (ii) investigative skills, including skills of independent investigation of Physics-related issues and problems;
 - (iii) communication skills involving the ability to listen carefully, to read texts and research papers analytically and to present complex information in a concise manner to different groups/audiences of technical or popular nature;
 - (iv) analytical skills involving paying attention to detail and ability to construct logical arguments using correct technical language related to Physics and ability to translate them with popular language when needed;
 - (v) ICT skills;
 - (vi) personal skills such as the ability to work both independently and in a group.
- Demonstrate professional behavior such as

- (i) being objective, unbiased and truthful in all aspects of work and avoiding unethical, irrational behavior such as fabricating, falsifying or misrepresenting data or committing plagiarism;
- (ii) the ability to identify the potential ethical issues in work-related situations;
- (iii) be committed to the free development of scientific knowledge and appreciate its universal appeal for the entire humanity;
- (iv) appreciation of intellectual property, environmental and sustainability issues;
- (v) promoting safe learning and working environment.

6. TEACHING LEARNING PROCESSES

The teaching learning processes play the most important role in achieving the desired aims and objectives of the undergraduate programs in Physics. The LOCF framework emphasizes learning outcomes for every physics course and its parts. This helps in identifying most suitable teaching learning processes for every segment of the curricula. Physics is basically an experimental science with a very elaborate and advanced theoretical structure. Systematic observations of controlled experiments open up windows to hidden properties and laws of nature. Physics concepts and theories are meant to create a systematic understanding of these properties and laws. All principles and laws of physics are accepted only after their verification and confirmation in laboratory, or observations in the real world, which require scientists trained in appropriate experimental techniques, and engineers to design and make advanced scientific instruments. At the same time physics graduates also need a deep understanding of physics concepts, principles and theories, which require familiarity with different branches of mathematical physics. To achieve these goals, the appropriate training of young individuals to become competent scientists, researchers and engineers in future has to be accomplished. For this purpose, a very good undergraduate program in Physics is required as a first step. An appropriate teaching-learning procedure protocol for all the colleges is therefore essential. To be specific, it is desirable to have:

- Sufficient number of teachers in permanent positions to do all the class room teaching and supervise the laboratory experiments to be performed by the students.
- All teachers should be qualified as per the UGC norms and should have good communication skills.
- Sufficient number of technical and other support staff to run laboratories, libraries, and other equipment and to maintain the infrastructural facilities like buildings, ICT infrastructure, electricity, sanitation, etc.
- Necessary and sufficient infrastructural facilities for the class rooms, laboratories and libraries.
- Modern and updated laboratory equipment needed for the undergraduate laboratories and reference and text books for the libraries.
- Sufficient infrastructure for ICT and other facilities needed for technology enabled learning like computer facilities, PCs, laptops, Wi-Fi and internet facilities with all the necessary software.

Teachers should make use of these approaches for an efficient teaching-learning process:

- i. Class room teaching with lectures using traditional as well as electronic boards.
- ii. Demonstration of the required experiments in laboratory and sessions on necessary apparatuses, data analysis, error estimation and scientific report writing for effective and efficient learning of laboratory techniques.

- iii. Imparting the problem solving ability which enables a student to apply physical and mathematical concepts to a new and concrete situation is essential to all courses. This can be accomplished through examples discussed in the class or laboratory, assignments and tutorials.
- iv. CBCS curriculum has introduced a significant content of computational courses. Computational physics should be used as a new element in the physics pedagogy, and efforts should be made to introduce computational problems, including simulation and modeling, in all courses.
- v. Teaching should be complimented with students' seminar to be organized very frequently.
- vi. Guest lectures and seminars should be arranged by inviting eminent teachers and scientists.
- vii. Open-ended project work should be given to all students individually, or in groups of 2-3 students depending upon the nature of the course.
- viii. Since actual undergraduate teaching is done in affiliated colleges which have differing levels of infrastructure and student requirements, the teachers should attend workshops organized by the University Department for college faculty on teaching methodology, reference materials, latest laboratory equipment and experiments, and computational physics software for achieving uniform standards. Common guidelines for individual courses need to be followed/evolved.
- ix. Internship of duration varying from one week anytime in the semester, and/or 2-6 weeks during semester break and summer breaks should be arranged by the college for the students to visit other colleges/universities/HEI and industrial organizations in the vicinity. If needed, financial assistance may also be provided for such arrangements.
- x. Special attempts should be made by the institution to develop problem-solving skills and design of laboratory experiments for demonstration at the UG level. For this purpose, a mentor system may be evolved where 3-4 students may be assigned to each faculty member.
- xi. Teaching load should be managed such that the teachers have enough time to interact with the students to encourage an interactive/participative learning.

In the first year students are fresh from school. Given the diversity of their backgrounds, and the lack of adequate infrastructure and training in science learning in many schools, special care and teacher attention is essential in the first year. Mentorship with senior students and teachers can help them ease into rigors of university level undergraduate learning.

A student completing the Physics (Hons.) course under the CBCS takes 14 core courses, 4 discipline specific elective (DSE) courses, 4 general elective (GE) courses, two skill enhancement courses (SEC) and two ability enhancement compulsory courses (AECC). Since different categories of courses have different objectives and intended learning outcomes, the most efficient and appropriate teaching learning processes would not be same for all categories of courses.

6.1 TEACHING LEARNING PROCESSES FOR CORE COURSES

The objective of Core courses is to build a comprehensive foundation of physics concepts, principles and laboratory skills so that a student is able to proceed to any specialized branch. Rather than a quantitative amalgamation of disparate knowledge, it is much more preferable

that students gain the depth of understanding and ability to apply what they have learnt to diverse problems.

All Core courses have a theory component. In addition, every core course has a physics laboratory component, or a computational physics component, which are integrated with their theoretical component. Even though the learning in theory and lab components proceeds in step, the teaching learning processes for the different components need specific and different emphases.

6.1.1 Teaching Learning Processes for Theory component of Core Courses

A significant part of the theoretical learning in core courses is done in the traditional lecture cum black-board method. Demonstrations with models, power-point projection, student project presentations, etc., are some other methods which should be judiciously used to enhance the learning experience. Problem solving should be integrated into theoretical learning of core courses and proportionally more time should be spent on it. It is advisable that a list of problems is distributed to students before the discussion of every topic, and they are encouraged to solve these in the self-learning mode, since teachers are unlikely to get time to discuss all of them in the class room.

Under the current CBCS system the teaching of core courses suffers from a serious lacuna. A structural reform under CBCS system to allow for tutorial sessions to accompany the core course would greatly facilitate theoretical learning of these courses.

6.1.2 Teaching Learning Processes for Physics Laboratory component of Core Courses

Students learn essential physics laboratory skills mainly while preparing for experiments, performing them in the laboratory, and writing appropriate laboratory reports. Most of this learning takes place in the self-learning mode. However, teachers' role is crucial at critical key points. Physics laboratory learning suffers seriously if students do not get appropriate guidance at these key points. Many students get their first proper exposure to physics laboratory work in their first year of undergraduate studies. Hence, laboratory teaching to first year students requires special care.

Demonstration on the working of required apparatuses should be given in few beginning laboratory sessions of all courses. Sessions on the essentials of experimental data analysis, error estimation, and scientific report writing are crucial in the first year physics laboratory teaching. Once the essentials have been learnt, sessions may be taken on applications of these for specific experiments in lab courses of later years. Students should be encouraged to explore experimental physics projects outside the curricula.

Many college laboratories lack latest laboratory equipment due to resource crunch. For example, very few laboratories have equipment for sensor and microprocessor based data acquisition, whose output can be directly fed into a computer for further analysis. Colleges need to make strategic planning, including student participation under teacher guided projects, to gradually get their laboratories equipped with latest equipment. The Department of the Physics and Astrophysics of the University can provide key guidance and help in this regard.

It is recommended that the maximum size of group for all Physics Laboratory courses should be 12-15 students.

6.1.3 Teaching Learning Processes for Computational Physics component of Core Courses

The CBCS has introduced computational physics as an integral component of undergraduate physics core courses. This is a crucial advance in the pedagogy of undergraduate physics learning. Computational physics is an essential tool to introduce physics concepts and principles into domains which cannot be accessed via analytical methods. Since computational work can easily be done outside the designated laboratory hours, it strengthens the self-learning ability among students.

Essential programming skills are the foremost requirement of computational physics learning. Many students get their first exposure to computers as a working tool (rather than a means of communication and entertainment) in computational lab courses. A great degree of hand holding is necessary during first computational physics courses. The second requirement of computational physics learning is the ability to transform a physics problem into a computable problem for which a suitable program can be written. Appropriate problem based assignments are crucial in developing this ability. Every computational physics lab course should involve sessions on essential computational techniques, and the reduction of relevant physics problems to computational problems. Advanced level student project can be easily integrated into the learning of computational physics. Every student should be encouraged to undertake at least one project in a computational lab course. Since computational work can easily be done outside the scheduled laboratory hours, mentorship can be very useful in helping students become comfortable with computers. Colleges should ensure that students from weaker economic backgrounds have adequate access to computers.

It is recommended that the maximum size of group for all computational Physics Laboratory courses should be 12-15 students per group.

6.2 TEACHING LEARNING PROCESSES FOR DISCIPLINE SPECIFIC ELECTIVES

The objective of DSE papers is to expose students to domain specific branches of physics and prepare them for further studies in the chosen field. While students must learn basic theoretical concepts and principles of the chosen domain, a sufficient width of exposure to diverse topics is essential in these papers. Student seminars and projects can be a very fruitful way to introduce students to the latest research level developments. Students should be encouraged to use their computational physics skills to work on publicly available observational data put out by many research labs and observatories worldwide.

Besides a theory component, every DSE paper has either an associated tutorial, or a physics laboratory, or a computational physics component. Teaching learning processes for theory, physics laboratory and computational physics components described above in sub-sections 6.1.1, 6.1.2 and 6.1.3 for core courses, should be applicable for DSE courses too.

6.2.1 Tutorials

It provides an opportunity for attending closely to learning issues with individual students, and hence an effective means to help create interest in the subject and assess their understanding. Pre-assigned weekly problem sets and assignments help structure tutorial sessions and should be used as often as possible. Students' performance in tutorials should be used for determining their internal assessment marks for the course.

It is recommended that the maximum size of group in a tutorial should be 8-10 students per group.

6.3 TEACHING LEARNING PROCESSES FOR SKILL ENHANCEMENT COURSES

Skill Enhancement papers are intended to help students develop skills which may or may not be directly applicable to physics learning. These courses introduce an element of diversity of learning environments and expectations. Efforts should be made that students gain adequate 'hands-on' experience in the desired skills. The theory parts of these courses are intended to help students get prepared for such experiences. Since the assessment of these courses is largely college based, teachers should make full use of it to design novel projects.

It is recommended that the maximum size of group in the Laboratory for SEC courses should be 12-15 students per group.

6.4 TEACHING LEARNING PROCESSES FOR GENERIC ELECTIVES

Physics GE papers are taken by students of other honours courses. Most of these students would have studied physics at the school level, so these courses are not meant to be introductory. However, the teaching of these courses should be oriented to expose the non-physics students to the wonders of physics. Basic level projects that focus on real life applications of physics can be a useful means to generate student interest and motivate them for self-study.

Besides a theory component, every GE paper has either an associated physics laboratory, or a computational physics or a tutorial component. Teaching learning processes for theory, physics laboratory and computational physics components described above in sub-sections 6.1.1, 6.1.2 and 6.1.3 for core courses, and for tutorials described in sub-section 6.2.1 should be applicable for GE courses too.

At the end, the main purpose of Physics teaching should be to impart higher level objective knowledge to students in concrete, comprehensive and effective ways. Here, effectiveness implies gaining knowledge and skill which can be applied to solve practical problems as

well as attaining the capability of logical thinking and imagination which are necessary for the creation of new knowledge and new discoveries. Once the students understand ‘why is it worth learning?’ and ‘how does it connect to the real world?’, they will embrace the curriculum in a way that would spark their imagination and instill a spirit of enquiry in them, so that in future they can opt for further investigations or research. All in all, the teacher should act as a facilitator and guide and not as a guardian of the curriculum.

7. ASSESSMENT METHODS

In the undergraduate education of Physics leading to the B.Sc. (Honours) Physics degree, the assessment and evaluation methods should focus on testing the conceptual understanding of basic concepts and theories, experimental techniques, development of mathematical skills, and the ability to apply the knowledge acquired to solve new problems and communicate the results and findings effectively.

The two perennial shortfalls of the traditional science examination process in our country are the reliance on rote learning for written exams, and a very perfunctory evaluation of laboratory skills. Greater emphasis on problem solving and less importance to textbook derivations discourages rote learning. Theory examinations should be based primarily on unseen problems. Continuous evaluation of students’ work in the laboratory, and testing them on extensions of experiments they have already performed can give a more faithful evaluation of their laboratory skills.

Needless to say, there should be a continuous evaluation system for students. This will enable teachers not only to ascertain the overall progress of learning by the students, but also to identify students who are slow learners and for whom special care should be taken. An appropriate grading system is the ‘relative grading system’. It introduces a competitive element among students, but does not excessively penalizes weaker students.

Since the Learning Objectives are defined clearly for each course in the LOCF framework, it is easier to design methods to monitor the progress in achieving the learning objectives during the course and test the level of achievement at the end of the course.

The courses offered in the undergraduate Physics are the first courses at the college/university level. Formative Assessment for monitoring the progress towards achieving the learning objectives is an important assessment component, which provides both teachers and students feedback on progress towards learning goals. University of Delhi examination system has 20 percent internal assessment for theory component, and 50 percent for physics laboratory and computational physics laboratory components. These marks should be distributed in periodic assessments in different modes to serve the intended purpose.

Since core courses, discipline specific courses, skill enhancement courses and general elective courses have qualitatively different kinds of objectives and learning outcomes, one model of assessment methods will not work for these different kinds of courses.

7.1 ASSESSMENT METHODS FOR CORE COURSES

Core courses and associated physics laboratory and computational physics curricula lead to the essential set of learning outcomes, which every physics graduate is expected to have. Their assessment methods require rigour, comprehensiveness and uniformity about what is minimally expected from students. Regular interactions mediated through the University Department among teachers teaching these courses in different colleges is helpful in this regard. Since depth of understanding of core topics is a highly desirable outcome, assessment for these courses should put greater emphasis on unseen problems, including extensions of textbook derivations done in class.

7.1.1 Assessment Methods for the Theory component of Core courses

The evaluation scheme of the University of Delhi allots 20 percent marks for internal assessment of theory papers. Teachers should use a judicious combination of the following methods to assess students for these marks: i) periodic class tests, ii) regular problem based assignments, iii) unannounced short quizzes, iv) individual seminar presentations v) longer assignments for covering theory and derivations not discussed in regular lectures, vi) True/False Tests, and vii) Multiple Choice Tests for large classes.

To help students prepare themselves for formative assessment during the semester, and to motivate them for self-learning, it is advisable that a Model Problem Set is made available to them in the beginning of the course, or problem sets are given before discussion of specific topics in class.

In preparing students for Substantive Summative Assessment at the end of the semester it is helpful if a Model/mock question paper is made available to them in the beginning of the course.

7.1.2 Assessment Methods for the Physics Laboratory component of Core courses

The 50 percent internal assessment for the evaluation scheme for laboratory courses is best used in continuous evaluation of students' performance in the lab. This evaluation should include these components: i) Regular evaluation of experiments through (a) written report of each experiment and (b) Viva-Voce on each experiment, ii) Test through setting experiments by assembling components, iii) written test on experiments done in the lab and data analysis, iv) Designing innovative kits to test the comprehension and analysis of the experiment done by the students, and v) audio visual recording of the experiments being performed by students and its self-appraisal.

The end semester laboratory examination should ideally involve extensions of experiments done by students during the semester. Two or more experiments can be combined for this purpose. Open ended problems for which students can get the answer by designing their own experimental method should also be tried.

7.1.3 Assessment Methods for the Computational Physics component of Core courses

Computational Physics lab evaluation allots 50 percent marks to the internal evaluation of students' performance during the semester. Students should be assessed for every computational assignment done during the semester. This should involve assessment of their program, report and a viva-voce. Periodic tests on unseen problems may form a part of the internal assessment.

It is essential that the end semester examination is based upon unseen computational physics problems.

7.2 ASSESSMENT METHODS FOR DISCIPLINE SPECIFIC ELECTIVES

Discipline specific courses build upon general principles learnt in core courses, and also prepare students for further studies in specific domains of physics. Given the time constraint of only one semester, specific domain exposure is mostly introductory in character. Assessment for these courses should have significant component of open ended methods like seminars and project work. Students have greater chance of proving their individual initiative and ability for self-learning in these methods. These methods also have greater flexibility to reward students for out of curriculum learning.

Besides a theory component, every DSE paper has either an associated tutorial, or a physics laboratory, or a computational physics component. Assessment methods for theory, Physics laboratory and computational physics components described above in sub-sections 7.1.1, 7.1.2 and 7.1.3 for core courses, should be applicable for DSE courses too.

Students should be assessed for their performance in **tutorials**, and this assessment should contribute to their internal assessment marks. Their work on pre-assigned problem sets/assignments, and participation in tutorial discussions should be taken into account while assessing their performance.

7.3 ASSESSMENT METHODS FOR SKILL ENHANCEMENT COURSES

Learning in skill enhancement courses is largely experience based. Student performance in these courses is best assessed under continuous evaluation. Students could be assigned a specific task for a class or group of classes, and they could be assessed for their success in meeting the task.

7.4 ASSESSMENT METHODS FOR GENERIC ELECTIVES

General Elective courses are taken by students specializing in disciplines other than physics. The assessment methods for these courses should be oriented towards kindling student interest in the subject. Testing their ability to apply physics concepts in various practical situations through simple problems, and student specific writing and presentation assignments are most suited for assessing students' learning outcomes for these courses. Giving students greater choice of questions to be answered in semester end examinations,

and asking a larger fraction of open-ended qualitative questions is recommended for these courses.

Besides a theory component, every GE paper has either an associated tutorial, or a physics laboratory, or a computational physics component. Assessment methods for theory, Physics laboratory and computational physics components described above in sub-sections 7.1.1, 7.1.2 and 7.1.3 for core courses, should be applicable for GE courses too.

Students should be assessed for their performance in **tutorials**, and this assessment should contribute to their internal assessment marks. Their work on pre-assigned problem sets/assignments, and participation in tutorial discussions should be taken into account while assessing their performance.

8. STRUCTURE OF COURSES IN B.SC. (HONS.) PHYSICS

8.1 CREDIT DISTRIBUTION FOR B.SC. (HONS.) PHYSICS

The B.Sc.(Hons.) Physics programme consists of 148 credits based on the Choice Based Credit System (CBCS) approved by the UGC. In a course 1 hour per week of theory or tutorial corresponds to one credit. 2 hours per week of practicals or hands-on work also correspond to one credit. The 148 credits include 84 credits of Core Courses (CC) and 8 credits of Ability Enhancement Compulsory Courses (AECC) which are mandatory. Choice is provided through 24 credits of Discipline Specific Electives (DSE), 8 credits of Skill Enhancement Courses (SEC) and 24 credits of Generic Elective Courses (GEC), the latter to be chosen from disciplines other than Physics.

Table 8.1 Table showing distribution of credits.

Semester	Core Courses (CC) each with 06 credit All 14 courses are compulsory	Generic Elective (GE). To be selected from GE listings of other disciplines	Skill Enhancement Course (SEC) Select any 2 Out of 11 courses	Discipline Specific Elective (DSE) Select four out of 20 courses	Ability Enhancement Compulsory Courses (AECC) Select any 2 out of 3 courses	Total Credit
Sem I	CC-I CC-II	GEC-1		-	AECC-1	22
Sem II	CC-III CC-IV	GEC-2		-	AECC-2	22
Sem III	CC-V CC-VI CC-VII	GEC-3	SEC-1	-	-	28
Sem IV	CC- VIII CC-IX CC-X	GEC-4	SEC-2	-	-	28
Sem V	CC-XI CC-XII	-		DSE-1 DSE-2	-	24
Sem VI	CC- XIII CC- XIV	-		DSE-3 DSE-4	-	24
Total Credit	84	24	8	24	8	148

Table 8.2 DETAILS OF COURSES UNDER B.Sc. (Hons.) PHYSICS

Course	*Credits
No. of Courses × (Theory + Practical/Tutorials) = Total	
=====	
<u>I. Core Course (CC)*</u>	
(14 Courses)	$14 \times (4 + 2)^{\#} = 84$
<u>II. Elective Course</u>	
(8 Courses)	
A.1. Discipline Specific Elective*	$4 \times (4 + 2)^{\#} = 24$
(4 Courses)	or
	$4 \times (5 + 1)^{\#\#} = 24$
B.1. Generic Elective/Interdisciplinary*	$4 \times (4 + 2)^{\#} = 24$
(4 Courses)	or
	$4 \times (5 + 1)^{\#\#} = 24$
Optional Dissertation or project work in place of one Discipline Specific Elective Course (6 credits) in 6th Semester	
<u>III. Ability Enhancement Courses (AECC)</u>	
1. Ability Enhancement Compulsory	
(2 Courses of 4 credit each)	$2 \times 4 = 8$
Environmental Science	
English/MIL Communication	
2. Ability Enhancement Elective (Skill Enhancement Courses) *	
(2 Courses of 4 credit each)	$2 \times (2 + 2)^{\#} = 8$

Total Credits	148

College should evolve a system/policy about ECA/Interest/Hobby/ Sports/NCC/ NSS/related courses on its own.

#Theory with practical/ Hands-on exercise

##Theory with tutorials

* Wherever there is a practical there will be no tutorial and vice-versa. The maximum size of group for practical papers is recommended to be 12 to 15 students and for tutorials 8 to 10 students per group.

8.2 SEMESTER-WISE DISTRIBUTION OF COURSES

CORE COURSES (CC)

Table 8.3 All the courses have 6 credits with 4 credits of theory (4 hours per week) and 2 credits of practicals (4 hours per week).

Core Course type	Unique Paper Code	Semester	Core Course Name
CC-I	32221101	I	Mathematical Physics – I (Theory + Lab)
CC-II	32221102	I	Mechanics (Theory + Lab)
CC-III	32221201	II	Electricity and Magnetism (Theory + Lab)
CC-IV	32221202	II	Waves and Optics (Theory + Lab)
CC-V	32221301	III	Mathematical Physics – II (Theory + Lab)
CC-VI	32221302	III	Thermal Physics (Theory + Lab)
CC-VII	32221303	III	Digital Systems and Applications (Theory + Lab)
CC-VIII	32221401	IV	Mathematical Physics – III (Theory + Lab)
CC-IX	32221402	IV	Elements of Modern Physics (Theory + Lab)
CC-X	32221403	IV	Analog Systems and Applications (Theory + Lab)
CC-XI	32221501	V	Quantum Mechanics and Applications (Theory + Lab)
CC-XII	32221502	V	Solid State Physics (Theory + Lab)
CC-XIII	32221601	VI	Electromagnetic Theory (Theory + Lab)
CC-XIV	32221602	VI	Statistical Mechanics (Theory + Lab)

DISCIPLINE SPECIFIC ELECTIVES (DSE)

Table 8.4 All the courses have 6 credits with 4 credits of theory and 2 credits of practical or 5 credits of theory and 1 credit of Tutorials.

Discipline Specific (Physics) Elective courses (Credit: 06 each): Select any 02 courses (DSE-1 and DSE-2)* in V semester and select any 02 courses (DSE-3 and DSE-4) in VI semester from the following options. **(Numbers in brackets indicate number of hours per week dedicated.)**

No.	Unique Paper Code	DSE Course Name
Odd Semester – V Semester only (DSE-1 and DSE-2)		
1	32227501	Experimental Techniques (4) + Lab (4)
2	32227502	Advanced Mathematical Physics (4) + Lab (4)*
3	32227504	Nuclear and Particle Physics (5) + Tutorial (1)
4	32227505	Physics of Devices and Communication (4) + Lab (4)
5	32227506	Astronomy and Astrophysics (5) + Tutorial (1)
6	32227507	Atmospheric Physics (4) + Lab (4)
7	32227508	Biological Physics (5) + Tutorial (1)
8	32227518	Embedded Systems– Introduction of Microcontroller (4) + Lab(4)
9	xxx3	Linear Algebra and Tensor Analysis (5) + Tutorial (1)*
Even Semester – VI semester only (DSE-3 and DSE-4)		
10	32227612	Nano Materials and Applications (4) + Lab (4)
11	32227613	Communication System (4) + Lab (4)
12	32227615	Medical Physics (4) + Lab (4)
13	32227616	Applied Dynamics (4) + Lab (4)
14	32227621	Digital Signal processing (4) + Lab (4)
15	32227624	Physics of the Earth (5) + Tutorial (1)
16	32227625	Advanced Mathematical Physics II (5) + Tutorial (1)
17	32227626	Classical Dynamics (5) + Tutorial (1)
18	32227627	Dissertation (8)
19	32227628	Verilog and FPGA based system design (4) + Lab (4)
20	xxx4	Advanced Quantum Mechanics (5) + Tutorial (1)

*Papers listed at S. No. 02 (Advanced Mathematical Physics) and 09 (Linear Algebra and Tensor Analysis) are not allowed to be taken together as DSE-1 and DSE-2 in Semester-V.

SKILL ENHANCEMENT COURSES (SEC)

Table 8.5 All courses have 4 credits with 2 credits of theory and 2 credits of Practical /Hands-On/Projects and Field Work to be decided by the College. Teachers may give a long duration project based on a SEC paper in the Practical Lab.

S.No.	Unique Paper Code	Semester	SEC Name
1	32223901	III/IV	Physics Workshop Skills
2	32223902	III/IV	Computational Physics Skills
3	32223903	III/IV	Electrical Circuit and Network Skills
4	32223904	III/IV	Basic Instrumentation Skills
5	32223905	III/IV	Renewable Energy and Energy Harvesting
6	32223906	III/IV	Engineering design and prototyping/Technical Drawing
7	32223907	III/IV	Radiation Safety
8	32223908	III/IV	Applied Optics
9	32223909	III/IV	Weather Forecasting
10	XXX1	III/IV	Introduction to Physical Computing
11	XXX2	III/IV	Numerical Analysis

ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)

Table 8.6 All the courses have 4 credits. The detailed content of these courses is NOT mentioned in this document. (See the course document of the relevant department.)

No.	AECC Name
1	English
2	Modern Indian Language Communication
3	Environmental Science

GENERAL ELECTIVE COURSES (GE)

Table 8.7 All the courses have 6 credits including Theory/Practicals/ Projects. These courses are meant for students in Honours programmes of other disciplines.

No.	Unique Paper Code	Semester	GE Course Name
1	32225101	I	Electricity and Magnetism + Lab
2	32225102	I	Mathematical Physics + Lab
3	32225103	I	Digital, Analog and Instrumentation + Lab
4	32225104	I	Applied Dynamics + Lab
5	32225105	I	Medical Physics + Lab
6	32225201	II	Mechanics + Lab
7	32225202	II	Elements of Modern Physics + Lab
8	32225203	II	Solid State Physics + Lab
9	32225204	II	Embedded Systems – Introduction of Microcontroller + Lab
10	32225205	II	Biological Physics + Tutorial
11	32225310	III	Waves and Optics + Lab
12	32225311	III	Quantum Mechanics + Lab
13	32225312	III	Communication System + Lab
14	32225313	III	Verilog and FPGA based system design + Lab
15	32225314	III	Nano Materials and Applications + Lab
16	32225415	IV	Thermal Physics and Statistical Mechanics + Lab
17	32225416	IV	Digital Signal processing + Lab
18	32225417	IV	Nuclear and Particle Physics + Tutorial
19	32225418	IV	Astronomy and Astrophysics + Tutorial
20	32225419	IV	Atmospheric Physics + Lab
21	32225420	IV	Physics of the Earth + Tutorial

Table 8.8 Semester-wise breakup of types of courses with their credits.**Core Courses are listed in Table 8.3****GE courses are to be chosen from the course listings of other Departments.****SEC courses are to be chosen from Table 8.5****DSE courses are to be chosen from Table 8.4**

S.No.	Course opted	Course name	Credits
I	Ability Enhancement Compulsory Course-I	English/ MIL communication/ Environmental Science	4
	Core course I	Mathematical Physics-I	4
	Core Course-I Practical*	Mathematical Physics-I Lab	2
	Core course-II	Mechanics	4
	Core Course-II Practical*	Mechanics Lab	2
	Generic Elective -1	GE-1	4/5
	Generic Elective – 1 Practical/Tutorial*	GE-1 Lab/Tutorial	2/1
II	Ability Enhancement Compulsory Course-II	English/MIL communication/ Environmental Science	4
	Core course-III	Electricity and Magnetism	4
	Core Course-III Practical*	Electricity and Magnetism Lab	2
	Core course-IV	Waves and Optics	4
	Core Course-IV Practical *	Waves and Optics Lab	2
	Generic Elective -2	GE-2	4/5
	Generic Elective -2 Practical/Tutorial*	GE-2 Lab/Tutorial	2/1
III	Core Course-V	Mathematical Physics-II	4
	Core Course-V Practical*	Mathematical Physics-II Lab	2
	Core course-VI	Thermal Physics	4
	Core Course-VI Practical*	Thermal Physics Lab	2
	Core course-VII	Digital Systems and Applications	4
	Core Course-VII Practical*	Digital Systems & Applications Lab	2
	Skill Enhancement Course -1	SEC-1	2
	Skill Enhancement Course -1 Practical*	SEC-1 Lab/Hands-on/field work/project	2
	Generic Elective -3	GE-3	4/5
	Generic Elective -3 Practical/Tutorial*	GE-3 Lab/Tutorial	2/1
IV	Core course-VIII	Mathematical Physics III	4
	Course-VIII Practical/Tutorial*	Mathematical Physics-III Lab	2
	Core course-IX	Elements of Modern Physics	4
	Course-IX Practical/Tutorial*	Elements of Modern Physics Lab	2
	Core Course-X	Analog Systems and Applications	4
	Course- X Practical/Tutorial*	Analog Systems & Applications Lab	2
	Skill Enhancement Course -2	SEC -2	2
	Skill Enhancement Course -2 Practical*	SEC -2 Lab/Hands-on/field work/project	2
	Generic Elective -4	GE – 4	4/5
	Generic Elective-4 Practical/Tutorial*	GE – 4 Lab/Tutorial	2/1
	Core course-XI	Quantum Mechanics & Applications	4
V	Core Course-XI Practical*	Quantum Mechanics Lab	2
	Core course-XII	Solid State Physics	4
	Core Course-XII Practical*	Solid State Physics Lab	2
	Discipline Specific Elective -1	DSE-1	4/5

	Discipline Specific Elective -1 Practical/Tutorial*	DSE-1 Lab/Tutorial	2/1
	Discipline Specific Elective -2	DSE-2	4/5
	Discipline Specific Elective- 2 Practical/Tutorial*	DSE-2 Lab/Tutorial	2/1
VI	Core course-XIII	Electro-magnetic Theory	4
	Core Course-XIII Practical*	Electro-magnetic Theory Lab	2
	Core course-XIV	Statistical Mechanics	4
	Core Course-XIV Practical*	Statistical Mechanics Lab	2
	Discipline Specific Elective -3	DSE-3	4/5
	Discipline Specific Elective -3 Practical/Tutorial*	DSE-3 Lab/Tutorial	2/1
	Discipline Specific Elective-4	DSE-4	4/5
	Discipline Specific Elective -4 Practical/Tutorial*	DSE-4 Lab/Tutorial	2/1
		TOTAL	148

*** Wherever there is a practical there will be no tutorial and vice-versa.
The maximum size of group for practical papers is recommended to be 12-15
students and for tutorials 8-10 students per group.**

9. DETAILED COURSES FOR PROGRAMME IN B.SC. (HONS.) PHYSICS, INCLUDING COURSE OBJECTIVES, LEARNING OUTCOMES, AND READINGS.

9.1. CORE COURSES

CC-I: Mathematical Physics-I (32221101)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

The emphasis of course is to equip students with the mathematical and critical skills required in solving problems of interest to physicists. The course will also expose students to fundamental computational physics skills enabling them to solve a wide range of physics problems. The skills developed during course will prepare them not only for doing fundamental and applied research but also for a wide variety of careers.

Course Learning Outcomes

After completing this course, student will be able to

- Draw and interpret graphs of various functions.
- Solve first and second order differential equations and apply these to physics problems.
- Understand the concept of gradient of scalar field and divergence and curl of vector fields.
- Perform line, surface and volume integration and apply Green's, Stokes' and Gauss's Theorems to compute these integrals.
- Apply curvilinear coordinates to problems with spherical and cylindrical symmetries.
- Understand elementary probability theory and the properties of discrete and continuous distribution functions.
- In the laboratory course, the students will be able to design, code and test simple programs in C++ in the process of solving various problems.

Unit 1

Calculus

Functions: Recapitulate the concept of functions. Plot and interpret graphs of functions using the concepts of calculus.

(2 Lectures)

First Order Differential Equations: First order differential Equations: Variable separable, homogeneous, non-homogeneous, exact and inexact differential equations and Integrating Factors. Application to physics problems.

(5 Lectures)

Second Order Differential Equations: Homogeneous Equations with constant coefficients. Wronskian and general solution. Particular Integral with operator method, method of undetermined coefficients and method of variation of parameters. Cauchy-Euler differential equation and simultaneous differential equations of First and Second order.

(13 Lectures)

Unit 2

Vector Analysis

Vector Algebra: Scalars and vectors, laws of vector algebra, scalar and vector product, triple scalar product, interpretation in terms of area and volume, triple cross product, product of four vectors. Scalar and vector fields.

(5 Lectures)

Vector Differentiation: Ordinary derivative of a vector, the vector differential operator ∇ . Directional derivatives and normal derivative. Gradient of a scalar field and its geometrical interpretation. Divergence and curl of a vector field. Laplacian operator. Vector identities.

(8 Lectures)

Vector Integration: Ordinary Integrals of Vectors. Double and Triple integrals, Jacobian. Notion of infinitesimal line, surface and volume elements. Line, surface and volume integrals of Scalar and Vector fields. Flux of a vector field. Gauss' divergence theorem, Green's and Stokes Theorems, their verification (no rigorous proofs) and applications.

(14 Lectures)

Orthogonal Curvilinear Coordinates: Orthogonal Curvilinear Coordinates. Derivation of Gradient, Divergence, Curl and Laplacian in Cartesian, Spherical and Cylindrical Coordinate Systems.

(6 Lectures)

Unit 3

Probability and statistics: Independent and dependent events, Conditional Probability. Bayes' Theorem, Independent random variables, Probability distribution functions, special distributions: Binomial, Poisson and Normal. Sample mean and variance and their confidence intervals for Normal distribution.

(7 Lectures)

Practical : 60 Hours

The aim of this Lab is not just to teach computer programming and numerical analysis but to emphasize its role in solving problems in Physics.

- The course will consist of practical sessions and lectures on the related theoretical aspects of the Laboratory. The recommended group size is not more than 15 students.
- Evaluation to be done not only on the programming but also on the basis of formulating the problem.
- Aim at teaching students to construct the computational problem to be solved.
- Students can use any one operating system: Linux or Microsoft Windows.

- At least 12 programs must be attempted from the following covering the entire syllabus.
- The list of programs here is only suggestive. Students should be encouraged to do more practice. Emphasis should be given to assess student's ability to formulate a physics problem as mathematical one and solve by computational methods.

Topics	Descriptions with Applications
Introduction and Overview	Computer architecture and organization, memory and Input/output devices,
Basics of scientific computing	Binary and decimal arithmetic, Floating point numbers, single and double precision arithmetic, underflow and overflow - emphasize the importance of making equations in terms of dimensionless variables, Iterative methods
Algorithms and Flow charts	Purpose, symbols and description,
Introduction to C++	<p>Introduction to Programming: Algorithms: Sequence, Selection and Repetition, Structured programming, basic idea of Compilers. Data Types, Enumerated Data, Conversion & casting, constants and variables, Mathematical, Relational, Logical and Bit wise Operators. Precedence of Operators, Expressions and Statements, Scope and Visibility of Data, block, Local and Global variables, Auto, static and External variables.</p> <p>Programs:</p> <ul style="list-style-type: none"> • To calculate area of a rectangle • To check size of variables in bytes (Use of sizeof() Operator) • converting plane polar to Cartesian coordinates and vice versa
C++ Control Statements	<p>if-statement, if-else statement, Nested if Structure, Else-if statement, Ternary operator, Goto statement, switch statement, Unconditional and Conditional looping, While loop, Do-while loop, For loop, nested loops, break and continue statements</p> <p>Programs:</p> <ul style="list-style-type: none"> • To find roots of a quadratic equation • To find largest of three numbers • To check whether a number is prime or not • To list Prime numbers up to 1000
Random Number generator	Generating pseudo random numbers To find value of pi using Monte Carlo simulations. To integrate using Monte Carlo Method

Maclaurin and Taylor's series	Approximate functions like $\sin(x)$, $\cos(x)$ by a finite number of terms of Taylor's series.
Arrays and Functions	Sum and average of a list of numbers, largest of a given list of numbers and its location in the list, sorting of numbers in ascending descending order using Bubble sort and Sequential sort, Binary search, 2-dimensional arrays, matrix operations (sum, product, transpose etc)
Solution of Algebraic and Transcendental equations by Bisection, Newton Raphson and Secant methods	Solution of linear and quadratic equation, solving $\alpha = \tan\alpha$; $I=I_0 [(\sin \alpha)/ \alpha]^2$ in optics, square root of a number.
Data Analysis and Least Square Fitting (Linear case)	Uncertainty, error and precision, mean, standard deviation and error in the mean. Combining uncertainties, Least squares method for fitting data: linear ($y = ax+b$), power law($y = ax^b$) and exponential ($y = ae^{bx}$). To find parameters a, b and errors in them using method of least squares. Ohms law- calculate R, Hooke's law - Calculate spring constant.
Numerical differentiation (Forward and Backward and central difference formulae – Using basic definition)	Given Position with equidistant time data calculate velocity and acceleration

References for Theory:

Essential Readings:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 2008, Wiley India .
2. An introduction to ordinary differential equations, E. A. Coddington, 2009, PHI learning.
3. Vector Analysis: Schaum Outline Series, M. R Spiegel, McGraw Hill Education (2017).
4. Statistical data Analysis for The Physical Sciences by Adrian Bevan, Cambridge University Press (2013).
5. Advanced Mathematics for Engineers and Scientists: Schaum Outline Series, M. R Spiegel, McGraw Hill Education (2009).

Additional Readings:

1. Advanced Engineering Mathematics, D. G. Zill and W. S. Wright, 5 Ed., 2012, Jones and Bartlett Learning.

2. Mathematical Physics (1995), A.K. Ghatak, IC Goyal and S.J. Chua, Macmillan India, New Delhi.
3. Essential Mathematical Methods, K.F.Riley & M.P.Hobson, 2011, Cambridge Univ. Press.
4. Differential Equations, George F. Simmons, 2007, McGraw Hill.
5. Introduction to Vector Analysis, H.F. Davis and A. D. Snider, Wm. C. Brown Publishers; 6th edition (1991).
6. Statistics – A Guide to the Use of Statistical Methods in the Physical Sciences, R.J. Barlow, Wiley (1993).

References for Laboratory Work:

1. Schaum's Outline of Programming with C++', J. Hubbard, 2000, McGraw-Hill Education.
2. C++ How to Program', Paul J. Deitel and Harvey Deitel, Pearson (2016).
3. Introduction to Numerical Analysis, S.S. Sastry, 5th Edn., 2012, PHI Learning Pvt. Ltd.
4. Computational Physics, Darren Walker, 1st Edn., Scientific International Pvt. Ltd (2015).
5. Elementary Numerical Analysis, K.E. Atkinson, 3rd Edn., 2007, Wiley India Edition.

CC-II: Mechanics (32221102)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course reviews the concepts of mechanics learnt at school from a more advanced perspective and goes on to build new concepts. It begins with Newton's Laws of Motion and ends with the Fictitious Forces and Special Theory of Relativity. Students will also appreciate the Collisions in CM Frame, Gravitation, Rotational Motion and Oscillations. The students will be able to apply the concepts learnt to several real world problems.

Course Learning Outcomes

Upon completion of this course, students are expected to

- Understand laws of motion and their application to various dynamical situations.

- Learn the concept of inertial reference frames and Galilean transformations. Also, the concept of conservation of energy, momentum, angular momentum and apply them to basic problems.
- Understand translational and rotational dynamics of a system of particles.
- Apply Kepler's laws to describe the motion of planets and satellite in circular orbit.
- Understand concept of Geosynchronous orbits
- Explain the phenomenon of simple harmonic motion.
- Understand special theory of relativity - special relativistic effects and their effects on the mass and energy of a moving object.
- In the laboratory course, the student shall perform experiments related to mechanics: compound pendulum, rotational dynamics (Flywheel), elastic properties (Young Modulus and Modulus of Rigidity), fluid dynamics, estimation of random errors in the observations etc.

Unit 1

Fundamentals of Dynamics: Reference frames, Inertial frames, Galilean transformations, Galilean invariance, Review of Newton's Laws of Motion. Momentum of variable mass system: motion of rocket. Dynamics of a system of particles. Principle of conservation of momentum. Impulse. Determination of Centre of Mass of discrete and continuous objects having cylindrical and spherical symmetry (1-D, 2-D & 3-D).

(5 Lectures)

Unit 2

Work and Energy: Work and Kinetic Energy Theorem. Conservative and non-conservative forces. Potential Energy. Energy diagram. Stable, unstable and neutral equilibrium. Force as gradient of potential energy. Work & Potential energy. Work done by non-conservative forces. Law of conservation of Energy.

(5 Lectures)

Collisions: Elastic (1-D and 2-D) and inelastic collisions. Centre of Mass and Laboratory frames.

(4 Lectures)

Unit 3

Rotational Dynamics: Angular momentum of a particle and system of particles. Torque. Principle of conservation of angular momentum. Rotation about a fixed axis. Moment of inertia, theorem of parallel and perpendicular axes. Determination of moment of inertia of discrete and continuous objects [1-D, 2-D & 3-D (rectangular, cylindrical and spherical)]. Kinetic energy of rotation. Motion involving both translation and rotation.

(10 Lectures)

Unit 4

Gravitation and Central Force Motion: Law of gravitation. Gravitational potential energy. Inertial and gravitational mass. Potential and field due to spherical shell and solid sphere.

(2 Lectures)

Motion of a particle under a central force field: Two-body problem, its reduction to one-body problem and its solution. Reduction of angular momentum, kinetic energy and total energy. The energy equation and energy diagram. Kepler's Laws. Satellite in circular orbit, Geosynchronous orbits.

(7 Lectures)

Unit 5

Oscillations: Idea of SHM. Differential equation of SHM and its solution. Kinetic energy, potential energy, total energy and their time-average values. Compound pendulum. Damped oscillation. Forced oscillations: Transient and steady states, sharpness of resonance and Quality Factor.

(5 Lectures)

Non-Inertial Systems: Non-inertial frames and fictitious forces. Uniformly rotating frame. Centrifugal force. Coriolis force and its applications.

(7 Lectures)

Unit 6

Special Theory of Relativity: Outcomes of Michelson-Morley Experiment. Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity, Length contraction, Time dilation. Relativistic transformation of velocity, acceleration, frequency and wave number. Mass of relativistic particle. Mass-less Particles. Mass-energy Equivalence. Relativistic Doppler effect (transverse and longitudinal). Relativistic Kinematics (decay problems, inelastic collisions and Compton effect). Transformation of Energy and Momentum.

(15 Lectures)

Practical : 60 Hours

Demonstration cum laboratory sessions on the construction and use of Vernier callipers, screw gauge and travelling microscope, and necessary precautions during their use.

Sessions and exercises on the least count errors, their propagation and recording in final result up to correct significant digits, linearization of data and the use of slope and intercept to determine unknown quantities.

Session on the writing of scientific laboratory reports, which may include theoretical and practical significance of the experiment performed, apparatus description, relevant theory, necessary precautions to be taken during the experiment, proper recording of observations, data analysis, estimation of the error and explanation of its sources, correct recording of the result of the experiment, and proper referencing of the material taken from other sources (books, websites, research papers, etc.)

At least 06 experiments from the following

1. Measurements of length (or diameter) using Vernier Calliper, screw gauge and travelling microscope.
2. To study the random error in observations.
3. To determine the height of a building using a Sextant.
4. To study the motion of the spring and calculate (a) Spring constant and, (b) g .
5. To determine the Moment of Inertia of a Flywheel.
6. To determine g and velocity for a freely falling body using Digital Timing Technique.
7. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
8. To determine the Young's Modulus of a Wire by Optical Lever Method.
9. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
10. To determine the elastic Constants of a wire by Searle's method.
11. To determine the value of g using Bar Pendulum.
12. To determine the value of g using Kater's Pendulum.

References for Theory:

Essential Readings:

1. An Introduction to Mechanics (2/e), Daniel Kleppner & Robert Kolenkow, 2014, Cambridge University Press.
2. Mechanics Berkeley Physics Course, Vol. 1, 2/e: Charles Kittel, et. al., 2017, McGraw Hill Education.
3. Theory and Problems of Theoretical Mechanics, Murray R. Spiegel, 1977, McGraw Hill Education.
4. Intermediate Dynamics, Patrick Hamill, 2010, Jones and Bartlett Publishers.
5. Analytical Mechanics, G. R. Fowles and G. L. Cassiday, 2005, Cengage Learning.

Additional Readings:

1. Feynman Lectures, Vol. 1, R. P. Feynman, R. B. Leighton, M. Sands, 2008, Pearson Education.
2. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
3. University Physics, H. D. Young, R. A. Freedman, 14/e, 2015, Pearson Education.
4. Fundamentals of Physics, Resnick, Halliday & Walker 10/e, 2013, Wiley.
5. Engineering Mechanics, Basudeb Bhattacharya, 2/e, 2015, Oxford University Press.
6. Physics for Scientists and Engineers, R. A. Serway, J. W. Jewett, Jr, 9/e, 2014, Cengage Learning.
7. Mechanics, D. S. Mathur, P. S. Hemne, 2012, S. Chand.

References for Laboratory Work:

1. Advanced Practical Physics for students, B. L. Flint and H. T. Worsnop, 1971, Asia Publishing House.
2. Engineering Practical Physics, S. Panigrahi & B. Mallick, 2015, Cengage Learning India Pvt. Ltd.

3. Practical Physics, G. L. Squires, 2015, 4/e, Cambridge University Press.
4. A Text Book of Practical Physics, I. Prakash & Ramakrishna, 11/e, 2011, Kitab Mahal.

CC-III: Electricity and Magnetism (32221201)

Credit: 06 (Theory-04, Practical-02)

Theory: 60 Hours

Practical: 60 Hours

Course Objective

This course reviews the concepts of electromagnetism learnt at school from a more advanced perspective and goes on to build new concepts. The course covers static and dynamic electric and magnetic fields, and the principles of electromagnetic induction. It also includes analysis of electrical circuits and introduction of network theorems. The students will be able to apply the concepts learnt to several real world problems.

Course Learning Outcomes

At the end of this course the student will be able to

- Demonstrate the application of Coulomb's law for the electric field, and also apply it to systems of point charges as well as line, surface, and volume distributions of charges.
- Demonstrate an understanding of the relation between electric field and potential, exploit the potential to solve a variety of problems, and relate it to the potential energy of a charge distribution.
- Apply Gauss's law of electrostatics to solve a variety of problems.
- Calculate the magnetic forces that act on moving charges and the magnetic fields due to currents (Biot- Savart and Ampere laws)
- Understand the concepts of induction and self-induction, to solve problems using Faraday's and Lenz's laws.
- Understand the basics of electrical circuits and analyze circuits using Network Theorems.
- In the laboratory course the student will get an opportunity to verify network theorems and study different circuits such as RC circuit, LCR circuit. Also, different methods to measure low and high resistance, capacitance, self-inductance, mutual inductance, strength of a magnetic field and its variation in space will be learnt.

Unit 1

Electric Field and Electric Potential: Electric field: Electric field lines. Electric flux. Gauss Law with applications to charge distributions with spherical, cylindrical and planar symmetry.

(6 Lectures)

Conservative nature of Electrostatic Field: Electrostatic Potential. Laplace's and Poisson equations. The Uniqueness Theorem. Potential and Electric Field of a dipole. Force and Torque on a dipole.

(6 Lectures)

Electrostatic energy of system of charge: Electrostatic energy of a charged sphere. Conductors in an electrostatic Field. Surface charge and force on a conductor. Capacitance of a system of charged conductors. Parallel-plate capacitor. Capacitance of an isolated conductor. Method of Images and its application to: (1) Plane Infinite Sheet and (2) Sphere.

(10 Lectures)

Dielectric Properties of Matter: Electric Field in matter. Polarization, Polarization Charges. Electrical Susceptibility and Dielectric Constant. Capacitor (parallel plate, spherical, cylindrical) filled with dielectric. Displacement vector **D**. Relations between **E**, **P** and **D**. Gauss' Law in dielectrics.

(8 Lectures)

Unit 2

Magnetic Field: Magnetic force between current elements and definition of Magnetic Field **B**. Biot-Savart's Law and its simple applications: straight wire and circular loop. Current Loop as a Magnetic Dipole and its Dipole Moment (Analogy with Electric Dipole). Ampere's Circuital Law and its application to (1) Solenoid and (2) Toroid. Properties of **B**: curl and divergence. Vector Potential. Magnetic Force on (1) point charge (2) current carrying wire (3) between current elements. Torque on a current loop in a uniform Magnetic Field.

(9 Lectures)

Magnetic Properties of Matter: Magnetization vector (**M**). Magnetic Intensity (**H**). Magnetic Susceptibility and permeability. Relation between **B**, **H**, **M**. Ferromagnetism. B-H curve and hysteresis.

(4 Lectures)

Electromagnetic Induction: Faraday's Law. Lenz's Law. Self Inductance and Mutual Inductance. Reciprocity Theorem. Energy stored in a Magnetic Field. Introduction to Maxwell's Equations. Charge Conservation and Displacement current.

(6 Lectures)

Unit 3

Electrical Circuits: AC Circuits: Kirchhoff's laws for AC circuits. Complex Reactance and Impedance. Series LCR Circuit: (1) Resonance, (2) Power Dissipation and (3) Quality Factor, and (4) Band Width. Parallel LCR Circuit.

(5 Lectures)

Network theorems: Ideal constant-voltage and constant-current Sources. Review of Kirchhoff's Current Law & Kirchhoff's Voltage Law. Mesh & Node Analysis. Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity Theorem, Maximum Power Transfer theorem. Applications to dc circuits.

(6 Lectures)

Practical : 60 Hours

Dedicated demonstration cum laboratory sessions on the construction, functioning and uses of different electrical bridge circuits, and electrical devices like the ballistic galvanometer.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors.

Sessions on least square fitting and computer programme to find slope and intercept of straight-line graphs of experimental data. Application to the specific experiments done in the lab.

At least 6 experiments from the following:

1. To study the characteristics of a series RC Circuit.
2. To determine an unknown Low Resistance using Potentiometer.
3. To determine an unknown Low Resistance using Carey Foster's Bridge.
4. To compare capacitances using De'Sauty's bridge.
5. Measurement of field strength B and its variation in a solenoid (determine dB/dx)
6. To verify the Thevenin and Norton theorems.
7. To verify the Superposition, and Maximum power transfer theorems.
8. To determine self inductance of a coil by Anderson's bridge.
9. To study response curve of a Series LCR circuit and determine its (a) Resonant frequency, (b) Impedance at resonance, (c) Quality factor Q, and (d) Band width.
10. To study the response curve of a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q.
11. Measurement of charge sensitivity, current sensitivity and CDR of Ballistic Galvanometer
12. Determine a high resistance by leakage method using Ballistic Galvanometer.
13. To determine self-inductance of a coil by Rayleigh's method.
14. To determine the mutual inductance of two coils by Absolute method.

References for Theory:

Essential Readings:

1. Fundamentals of Electricity and Magnetism, Arthur F. Kip, 2nd Edn. 1981, McGraw-Hill.
2. Electricity and Magnetism, Edward M. Purcell, 1986 McGraw-Hill Education
3. Introduction to Electrodynamics, D.J. Griffiths, 3rd Edn., 1998, Benjamin Cummings.
4. Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ. Press.
5. Network, Lines and Fields, John D. Ryder, 2nd Edn., 2015, Pearson.

Additional Readings:

1. Feynman Lectures Vol.2, R.P.Feynman, R.B.Leighton, M.Sands, 2008, Pearson Education
2. Electricity, Magnetism & Electromagnetic Theory, S.Mahajanand Choudhury, 2012, Tata McGraw
3. Electricity and Magnetism, J.H.Fewkes& J.Yarwood. Vol.I, 1991, Oxford Univ. Press.
4. Problems and Solutions in Electromagnetics (2015), Ajoy Ghatak, K Thyagarajan & Ravi Varshney.
5. Schaum's Outline of Electric Circuits, J. Edminister & M. Nahvi, 3rd Edn., 1995, McGraw Hill.

References for Laboratory Work:

1. Advanced Practical Physics for students, B.L. Flint and H.T.Worsnop, 1971, Asia Publishing House
2. A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Ed., 2011, Kitab Mahal
3. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
4. Engineering Practical Physics, S.Panigrahi and B.Mallick, 2015, Cengage Learning.
5. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press

CC-IV: Waves and Optics (32221202)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course reviews the concepts of waves and optics learnt at school from a more advanced perspective and goes on to build new concepts. It begins with explaining ideas of superposition of harmonic oscillations leading to physics of travelling and standing waves. The course also provides an in depth understanding of wave phenomena of light, namely, interference and diffraction with emphasis on practical applications of the same.

Course Learning Outcomes

On successfully completing the requirements of this course, the students will have the skill and knowledge to:

- Understand Simple harmonic oscillation and superposition principle.
- Understand different types of waves and their velocities: Plane, Spherical, Transverse, Longitudinal.
- Understand Concept of normal modes in transverse and longitudinal waves: their frequencies and configurations.
- Understand Interference as superposition of waves from coherent sources derived from same parent source.
- Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from aperture, understand Fraunhofer and Fresnel Diffraction.
- In the laboratory course, student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt first hand. The motion of coupled oscillators, study of Lissajous figures and behaviour of transverse, longitudinal waves can be learnt in this laboratory course.

Unit 1

Superposition of Collinear Harmonic oscillations: Simple harmonic motion (SHM). Linearity and Superposition Principle. Superposition of two collinear oscillations having (1) equal frequencies and (2) different frequencies (Beats). Superposition of N collinear Harmonic Oscillations with (1) equal phase differences and (2) equal frequency differences. (6 Lectures)

Superposition of two perpendicular Harmonic Oscillations: Graphical and Analytical Methods. Lissajous Figures with equal and unequal frequencies and their uses. (2 Lectures)

Wave Motion: Plane and Spherical Waves. Longitudinal and Transverse Waves. Plane Progressive (Travelling) Waves. Wave Equation. Particle and Wave Velocities. Pressure of a Longitudinal Wave. Energy Transport. Intensity of Wave. (4 Lectures)

Superposition of Two Harmonic Waves: Standing (Stationary) Waves in a String: Fixed and Free Ends. Analytical Treatment. Phase and Group Velocities. Changes with respect to Position and Time. Energy of Vibrating String. Transfer of Energy. Normal Modes of Stretched Strings. Longitudinal Standing Waves and Normal Modes. Open and Closed Pipes. Superposition of N Harmonic Waves. (8 Lectures)

Unit 2

Wave Optics: Electromagnetic nature of light. Definition and properties of wave front. Huygens Principle. Temporal and Spatial Coherence. (4 Lectures)

Interference: Division of amplitude and wavefront. Young's double slit experiment. Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stokes' treatment. Interference in Thin Films: parallel and wedge-shaped films. Fringes of equal inclination

(Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings: Measurement of wavelength and refractive index.

(10 Lectures)

Interferometer: Michelson Interferometer-(1) Idea of form of fringes (No theory required), (2) Determination of Wavelength, (3) Wavelength Difference, (4) Refractive Index, and (5) Visibility of Fringes. Fabry-Perot interferometer.

(6 Lectures)

Unit 3

Diffraction:

Fraunhofer diffraction: Single slit. Rectangular and Circular aperture, Resolving Power of a telescope. Double slit. Multiple slits. Diffraction grating. Resolving power of grating.

(10 Lectures)

Fresnel Diffraction: Fresnel's Assumptions. Fresnel's Half-Period Zones for Plane Wave. Explanation of Rectilinear Propagation of Light. Theory of a Zone Plate: Multiple Foci of a Zone Plate. Fresnel's Integral, Cornu's spiral and its applications. Straight edge, a slit and a wire.

(10 Lectures)

Practical: 60 Hours

Dedicated demonstration cum laboratory session on the construction, and use of spectrometer and lasers, and necessary precautions during their use.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least 06 experiments from the following:

1. To determine the frequency of an electric tuning fork by Melde's experiment and verify λ^2 -T law.
2. To investigate the motion of coupled oscillators.
3. To study Lissajous Figures.
4. Familiarization with: Schuster's focusing; determination of angle of prism.
5. To determine refractive index of the Material of a prism using sodium source.
6. To determine the dispersive power and Cauchy constants of the material of a prism using mercury source.
7. To determine the wavelength of sodium source using Michelson's interferometer.
8. To determine wavelength of sodium light using Fresnel Biprism.
9. To determine wavelength of sodium light using Newton's Rings.
10. To determine the thickness of a thin paper by measuring the width of the interference fringes produced by a wedge-shaped Film.

11. To determine wavelength of (1) Na source and (2) spectral lines of Hg source using plane diffraction grating.
12. To determine dispersive power and resolving power of a plane diffraction grating.

References for Theory:

Essential Readings:

1. Vibrations and Waves, A.P. French, 1stEdn., 2003, CRC press.
2. Fundamentals of Optics, F.A. Jenkins and H.E. White, 1981, McGraw-Hill
3. The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons.
4. The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill.
5. Optics, Eugene Hecht, 4thEdn., 2014, Pearson Education.

Additional Readings:

1. Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill.
2. Principles of Optics, Max Born and Emil Wolf, 7th Edn., 1999, Pergamon Press.
3. Optics, (2017), 6th Edition, Ajoy Ghatak, McGraw-Hill Education, New Delhi
4. Fundamental of Optics, A. Kumar, H.R. Gulati and D.R. Khanna, 2011, R. Chand Publications

References for Laboratory Work:

1. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House
2. A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Ed., 2011, Kitab Mahal
3. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
4. A Laboratory Manual of Physics for undergraduate classes, D.P.Khandelwal, 1985, Vani Pub.
5. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press

CC-V: Mathematical Physics-II (32221301)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

The emphasis of course is to equip students with the mathematical tools required in solving problems interest to physicists and expose them to fundamental computational physics skills thus enabling them to solve a wide range of physics problems. This course will aim at introducing the concepts of Fourier series, special functions, linear partial differential equations by separation of variable method.

Course Learning Outcomes

On successfully completing this course, the students will be able to

- Represent a periodic function by a sum of harmonics using Fourier series and their applications in physical problems such as vibrating strings etc.
- Obtain power series solution of differential equation of second order with variable coefficient using Frobenius method.
- Understand properties and applications of special functions like Legendre polynomials, Bessel functions and their differential equations and apply these to various physical problems such as in quantum mechanics.
- Learn about gamma and beta functions and their applications.
- Solve linear partial differential equations of second order with separation of variable method.
- In the laboratory course, the students will learn the basics of the Scilab software/Python interpreter and apply appropriate numerical method to solve selected physics problems both using user defined and inbuilt functions from Scilab/Python. They will also learn to generate and plot Legendre polynomials and Bessel functions and verify their recurrence relation.

Unit 1

Fourier Series: Periodic functions. Orthogonality of sine and cosine functions, Dirichlet Conditions (Statement only). Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients. Even and odd functions and their Fourier expansions (Fourier Cosine Series and Fourier Sine Series). Application. Summing of Infinite Series. Parseval's Identity and its application to summation of infinite series.

(17 Lectures)

Unit 2

Frobenius Method and Special Functions: Singular Points of Second Order Linear Differential Equations and their importance. Frobenius method and its applications to differential equations: Legendre, Bessel, Hermite and Laguerre Differential Equations. Properties of Legendre Polynomials: Rodrigues Formula, Generating Function, Orthogonality. Simple recurrence relations. Expansion of function in a series of Legendre Polynomials. Bessel Functions of the First Kind: Generating Function, simple recurrence relations. Zeros of Bessel Functions ($J_0(x)$ and $J_1(x)$) and Orthogonality.

(24 Lectures)

Unit 3

Some Special Integrals: Beta and Gamma Functions and Relation between them. Expression of Integrals in terms of Gamma Functions.

(4 Lectures)

Unit 4

Partial Differential Equations: Solutions to partial differential equations (2 or 3 independent variables) using separation of variables: Laplace's Equation in problems of rectangular geometry. Solution of wave equation for vibrational modes of a stretched string, rectangular and circular membranes. Solution of 1D heat flow equation. (Wave/Heat equation not to be derived).

(15 Lectures)

Practical : 60 Hours

The aim of this Lab is to use the computational methods to solve physical problems. The course will consist of practical sessions and lectures on the related theoretical aspects. The recommended group size for the lab is not more than 15 students. Evaluation done not only on the basis of programming but also on the basis of formulating the problem. Minimum 12 programs must be attempted taking at least one from each programming section. The instructor may choose to use Python in place of Scilab covering all features as mentioned.

Topics	Description with Applications
Introduction to Numerical computation software using Scilab or Python	Introduction to Scilab, Advantages and disadvantages, Scilab environment, Command window, Figure window, Edit window, Variables and arrays, Initializing variables in Scilab, Multidimensional arrays, Sub-array, Special values, Displaying output data, data file, Scalar and array operations, Hierarchy of operations, Built in Scilab functions, Introduction to plotting, 2D and 3D plotting, Branching Statements and program design, Relational and logical operators, the while loop, for loop, details of loop operations, break and continue statements, nested loops, logical arrays and vectorization. User defined functions, Introduction to Scilab functions, Variable passing in Scilab, optional arguments, preserving data between calls to a function, Complex and Character data, string function, Multidimensional arrays an introduction to Scilab file processing, file opening and closing, Binary I/o functions, comparing binary and formatted functions, Numerical methods and developing the skills of writing a program.
Interpolation by Newton Gregory Forward and Backward difference formula, Error estimation of linear interpolation. Lagrange Interpolation.	Evaluation of trigonometric functions e.g. $\sin(x)$, $\cos(x)$, $\tan(x)$ etc – Given the values at n points in a tabulated form, evaluate the value at an intermediate point.
Numerical Integration: Newton Cotes Integration methods (Trapezoidal and Simpson rules) for definite integrals	Given acceleration with equidistant time data calculate position and velocity and plot them. Application to other mathematical and physical problems
Solution of Linear system of equations: Solve system of linear equations using Gauss elimination method and Gauss Seidal method. Inverse of a matrix (by Gauss elimination)	Application to Solution of mesh equations of electric circuits (3 meshes) Solution of coupled spring mass systems (3 masses)

Generation of Special functions using user defined functions and compare with Scilab built in functions	<p>Generating and plotting Legendre Polynomials</p> <p>Generating and plotting Bessel functions</p> <p>Verification of recurrence relation</p> <p>Use the data obtained above for Legendre polynomials or Bessel's function at N points and find its value at an intermediate point using Lagrange interpolation.</p>
Solution of Ordinary Differential Equations (ODE) First order Differential equation Euler, modified Euler and Runge-Kutta (RK) second and fourth order methods	<p>First order differential equation (Initial value problems)</p> <p>Radioactive decay</p> <p>Current in RC, LC circuits with DC source</p> <p>Newton's law of cooling</p> <p>Classical equations of motion</p>
System of First order Differential Equations	<p>Attempt following problems using RK 4 order method:</p> <ul style="list-style-type: none"> Solve the coupled differential equations $\frac{dx}{dt} = y + x - x^3/3$; $\frac{dy}{dt} = -x$ for four initial conditions : $x(0) = 0$, $y(0) = -1, -2, -3, -4$. Plot x vs y for each of the four initial conditions on the same screen for $0 \leq t \leq 15$ Application to linear electric networks

Second order differential equation (Euler and RK Methods)	<p>Second Order Differential Equations: Harmonic oscillator (no friction) Damped Harmonic oscillator (Overdamped, Critically damped and Oscillatory behavior) Forced Harmonic oscillator (Transient and Steady state solution) Apply above to LCR circuits also</p> <p>The differential equation describing the motion of a pendulum is $\frac{d^2\theta}{dt^2} = -\sin\theta$. The pendulum is released from rest at an angular displacement α, i.e. $\theta(0) = \alpha$ and $\theta'(0) = 0$. Solve the equation for $\alpha = 0.1, 0.5$ and 1.0 and plot $\theta, \frac{d\theta}{dt}$ as a function of time in the range $0 \leq t \leq 8\pi$. Also plot the analytic solution valid for small θ ($\sin\theta \approx \theta$)</p> <p>Solve</p> $x^2 \frac{d^2y}{dx^2} - 4x(1+x) \frac{dy}{dx} + 2(1+x)y = x^3$ <p>with the initial conditions at $x = 1$ as</p> $y(1) = \frac{1}{2}e^2, \frac{dy}{dx}(x=1) = \frac{-3}{2}e^2 - 0.5,$ <p>in the range $1 \leq x \leq 3$. Plot y and $\frac{dy}{dx}$ against x in the given range on the same graph.</p>
Using Scicos/xcos	<p>Generating sine wave, square wave, sawtooth wave Solution of harmonic oscillator Phase space plots</p>

References for Theory:

Essential Readings :

1. Advanced Engineering Mathematics, Erwin Kreyszig, 2008, Wiley India .
2. Advanced Mathematics for Engineers and Scientists: Schaum Outline Series, M. R Spiegel, McGraw Hill Education (2009).
3. Differential Equations, George F. Simmons, 2006, Tata McGraw-Hill.
4. Mathematical Methods for Physicists, Arfken, Weber and Harris, Elsevier
5. Applied Mathematics for Engineers and Physicists, L.A. Pipes and L.R. Harvill, Dover Publications (2014).

Additional Readings:

1. Mathematical methods for Scientists & Engineers, D.A. Mc Quarrie, 2003, Viva Books
2. Mathematical Methods for Physics and Engineers, K.F. Riley, M.P. Hobson and S. J. Bence, 3rd ed., 2006, Cambridge University Press
3. Mathematical Physics, A.K. Ghatak, I.C. Goyal and S.J. Chua, Laxmi Publications Private Limited (2017)
4. Partial Differential Equations for Scientists and Engineers, S.J. Farlow, Dover Publications (1993).
5. Fourier Analysis with Applications to Boundary Value Problems: Schaum Outline Series, M. R Spiegel, McGraw Hill Education (1974).

References for Laboratory Work:

1. Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific and Engineering Applications: A. Vande Wouwer, P. Saucez, C. V. Fernández. 2014 Springer ISBN: 978-3319067896.
2. Documentation at the Scilab homepage: <https://www.scilab.org/> and the Python homepage <https://docs.python.org/3/>
3. Computational Physics, Darren Walker, Scientific International Pvt. Ltd (2015).
4. Applied numerical analysis, Cutis F. Gerald and P.O. Wheatley, Pearson Education, India (2007).
5. An Introduction to Computational Physics, T. Pang, Cambridge University Press (2010).

CC-VI: Thermal Physics (32221302)**Credit : 06 (Theory-04, Practical-02)****Theory : 60 Hours****Practical : 60 Hours****Course Objective**

This course deals with the relationship between the macroscopic properties of physical systems in equilibrium. It reviews the concepts of thermodynamics learnt at school from a more advanced perspective and develops them further. The primary goal is to understand the fundamental laws of thermodynamics and their applications to various systems and processes. In addition, it will also give exposure to students about the Kinetic theory of gases, transport phenomena involved in ideal gases, phase transitions and behavior of real gases.

Course Learning Outcomes

At the end of the course, students will be able to:

- Comprehend the basic concepts of thermodynamics, the first and the second law of thermodynamics.
- Understand the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.
- Know about reversible and Irreversible processes.
- Learn about Maxwell's relations and use them for solving many problems in Thermodynamics
- Understand the concept and behavior of ideal and real gases.
- Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equitation of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.
- In the laboratory course, the students are expected to do some basic experiments in thermal Physics, viz., determination of Mechanical Equivalent of Heat (J), coefficient of thermal conductivity of good and bad conductor, temperature coefficient of resistance, variation of thermo-emf of a thermocouple with temperature difference at its two junctions and calibration of a thermocouple.

Unit 1

Zeroth and First Law of Thermodynamics: Extensive and intensive Thermodynamic Variables, Thermodynamic Equilibrium, Zeroth Law of Thermodynamics & Concept of Temperature, Concept of Work & Heat, State Functions, First Law of Thermodynamics and its differential form, Internal Energy, First Law & various processes, Applications of First Law: General Relation between CP and CV, Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Co-efficient.

(8 Lectures)

Unit 2

Second Law of Thermodynamics: Reversible and Irreversible process with examples. Conversion of Work into Heat and Heat into Work. Heat Engines. Carnot's Cycle, Carnot engine & efficiency. Refrigerator & coefficient of performance, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence. Carnot's Theorem. Applications of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale.

(10 lectures)

Unit 3

Entropy: Concept of Entropy, Clausius Theorem. Clausius Inequality, Second Law of Thermodynamics in terms of Entropy. Entropy of a perfect gas. Principle of Increase of Entropy. Entropy Changes in Reversible and Irreversible processes with examples. Entropy of the Universe. Entropy Changes in Reversible and Irreversible Processes. Principle of Increase of Entropy. Temperature-Entropy diagrams for Carnot's Cycle. Third Law of Thermodynamics. Unattainability of Absolute Zero.

(7 lectures)

Unit 4

Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz Free Energy, Gibbs Free Energy. Their Definitions, Properties and Applications. Magnetic Work, Cooling due to adiabatic demagnetization, First and second order Phase Transitions with examples, Clausius Clapeyron Equation and Ehrenfest equations.

Maxwell's Thermodynamic Relations: Derivation of Maxwell's thermodynamic Relations and their applications, Maxwell's Relations: (1) Clausius Clapeyron equation, (2) Value of $C_p - C_v$, (3) Tds Equations, (4) Energy equations.

(14 lectures)

Unit 5

Kinetic Theory of Gases Distribution of Velocities: Maxwell-Boltzmann Law of Distribution of Velocities in an Ideal Gas and its Experimental Verification. Mean, RMS and Most Probable Speeds. Degrees of Freedom. Law of Equipartition of Energy (No proof required). Specific heats of Gases.

Molecular Collisions: Mean Free Path. Collision Probability. Estimation of Mean Free Path. Transport Phenomenon in Ideal Gases: (1) Viscosity, (2) Thermal Conductivity and (3) Diffusion. Brownian Motion and its Significance.

(11 lectures)

Unit 6

Real Gases: Behavior of Real Gases: Deviations from the Ideal Gas Equation. Andrews' Experiments on CO₂ Gas. Virial Equation. Critical Constants. Continuity of Liquid and Gaseous State. Vapour and Gas. Boyle Temperature. van der Waal's Equation of State for Real Gases. Values of Critical Constants. Law of Corresponding States. Comparison with Experimental Curves. p-V Diagrams. Free Adiabatic Expansion of a Perfect Gas. Joule-Thomson Porous Plug Experiment. Joule-Thomson Effect for Real and van der Waal Gases. Temperature of Inversion. Joule-Thomson Cooling.

(10 lectures)

Practical: 60 Hours

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the thermal physics lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least six experiments should be performed in the lab:

1. To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method.
2. To determine the Coefficient of Thermal Conductivity of Cu by Searle's Apparatus.
3. To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method.
4. To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.
5. To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).

6. To study the variation of Thermo-emf of a Thermocouple with Difference of Temperature of its Two Junctions using a null method. And also calibrate the Thermocouple in a specified temperature range.
7. To calibrate a thermocouple to measure temperature in a specified Range using Op-Amp difference amplifier and to determine Neutral Temperature.

References for Theory:

Essential Readings:

1. Heat and Thermodynamics: M.W. Zemansky and R.Dittman, (Tata McGraw-Hill.)
2. A Treatise on Heat :M.N.Saha and B.N.Srivastava, 1958 (Indian Press.)
3. Thermal Physics: S. C.Garg, R. M. Bansal and C. K. Ghosh (Tata McGraw-Hill.)
4. Thermodynamics, Kinetic Theory & Statistical Thermodynamics :Sears and Salinger (Narosa).
5. Concepts in Thermal Physics: Blundell and Blundell (Oxford Univ. press)

Additional Readings:

1. An Introduction to Thermal Physics: D. Schroeder (Pearson)
2. Thermal Physics :C. Kittel and H. Kroemer (W. H. Freeman)

References for Laboratory work:

1. Advanced Practical Physics for students: B. L. Flint and H.T.Worsnop (Little Hampton Book)
2. A Text Book of Practical Physics : InduPrakash& Ramakrishna(KitabMahal)
3. Advanced level Practical Physics: Nelkon and Ogborn (Heinemann Educational Publ.)
4. An Advanced Course in Practical Physics: D. Chattopadhyay& P. C. Rakshit, (New Central Book Agency)
5. Practical Physics: G.L. Squires (Cambridge University Press)

CC-VII: Digital Systems and Applications (32221303)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This is one of the core papers in physics curriculum which introduces the concept of Boolean algebra and the basic digital electronics. In this course, students will be able to understand the working principle of CRO, Data processing circuits, Arithmetic Circuits, sequential circuits like registers, counters etc. based on flip flops. In addition, students will get an overview of microprocessor architecture and programming.

Course Learning Outcomes

This course lays the foundation for understanding the digital logic circuits and their use in combinational and sequential logic circuit design. It also imparts information about the basic architecture, memory and input/output organization in a microprocessor system. The students also learn the working of CRO.

- Course learning begins with the basic understanding of active and passive components. It then builds the concept of Integrated Chips (IC): its classification and uses.
- Differentiating the Analog and Digital circuits, the concepts of number systems like Binary, BCD, Octal and hexadecimal are developed to elaborate and focus on the digital systems.
- Sequential Circuits: Basic memory elements Flips-Flops, shift registers and 4-bits counters leading to the concept of RAM, ROM and memory organization.
- Timer circuits using IC 555 providing clock pulses to sequential circuits and develop multivibrators.
- Introduces to basic architecture of processing in an Intel 8085 microprocessor and to Assembly Language.
- Also impart understanding of working of CRO and its usage in measurements of voltage, current, frequency and phase measurement.
- In the laboratory students will learn to construct both combinational and sequential circuits by employing NAND as building blocks and demonstrate Adders, Subtractors, Shift Registers, and multivibrators using 555 ICs. They are also expected to use μP 8085 to demonstrate the same simple programme using assembly language and execute the programme using a μP kit.

Unit 1

Introduction to CRO: Block Diagram of CRO. Electron Gun, Deflection System and Time Base. Deflection Sensitivity. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference.

(3 Lectures)

Digital Circuits: Difference between Analog and Digital Circuits, Examples of linear and digital ICs, Binary Numbers, Decimal to Binary and Binary to Decimal Conversion, BCD, Octal and Hexadecimal numbers, AND, OR and NOT Gates (realisation using Diodes and Transistor), NAND and NOR Gates as Universal Gates, XOR and XNOR Gates and application as Parity Checkers.

(6 Lectures)

Unit 2

Boolean algebra: De Morgan's Theorems, Boolean Laws, Simplification of Logic Circuit using Boolean Algebra, Fundamental Products, Idea of Minterms and Maxterms, Conversion of Truth table into Equivalent Logic Circuit by (1) Sum of Products Method and (2) Karnaugh Map.

(7 Lectures)

Data processing circuits: Multiplexers, De-multiplexers, Decoders, Encoders.

(4 Lectures)

Unit 3

Arithmetic Circuits: Binary Addition. Binary Subtraction using 2's Complement, Half and Full Adders, Half & Full Subtractors, 4-bit binary Adder/Subtractor.

(5 Lectures)

Sequential Circuits: SR, D, and JK Flip-Flops. Clocked (Level and Edge Triggered) Flip-Flops. Preset and Clear operations. Race-around conditions in JK Flip-Flop. M/S JK Flip-Flop.

(6 Lectures)

Unit 4

Timers: IC 555 block diagram and applications: Astable multivibrator and Monostable multivibrator.

(3 Lectures)

Shift registers: Serial-in-Serial-out, Serial-in-Parallel-out, Parallel-in-Serial-out and Parallel-in- Parallel-out Shift Registers (only up to 4 bits).

(2 Lectures)

Counters (4 bits): Ring Counter. Asynchronous counters, Decade Counter. Synchronous Counter.

(4 Lectures)

Unit 5

Computer Organization: Input/Output Devices. Data storage (idea of RAM and ROM). Computer memory. Memory organization and addressing. Memory Interfacing. Memory Map.

(6 Lectures)

Unit 6

Intel 8085 Microprocessor Architecture: Main features of 8085. Block diagram. Components. Pin-out diagram. Buses. Registers. ALU. Memory. Stack memory. Timing and Control circuitry. Timing states. Instruction cycle, Timing diagram of MOV and MVI.

(10 Lectures)

Introduction to Assembly Language: 1 byte, 2 byte and 3 byte instructions.

(4 Lectures)

Practical: 60 Hours

Session on the construction and use of CRO, and other experimental apparatuses used in the lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least 06 experiments each from section A and Section B

Section-A: Digital Circuits Hardware design/Verilog Design

1. To design a combinational logic system for a specified Truth Table.
 - (a) To convert Boolean expression into logic circuit & design it using logic gate ICs
 - (b) To minimize a given logic circuit.
2. Half Adder, Full Adder and 4-bit binary Adder.
3. Half Subtractor, Full Subtractor, Adder-Subtractor using Full Adder I.C.
4. To build Flip-Flop (RS, Clocked RS, D-type and JK) circuits using NAND gates.
5. To build JK Master-slave flip-flop using Flip-Flop ICs
6. To build a 4-bit Counter using D-type/JK Flip-Flop ICs and study timing diagram.
7. To make a 4-bit Shift Register (serial and parallel) using D-type/JK Flip-Flop ICs.
8. To measure (a) Voltage, and (b) Time period of a periodic waveform using CRO and to design an astable multivibrator of given specifications using 555 Timer.
9. To design a monostable multivibrator of given specifications using 555 Timer.

Section-B: Programs using 8085 Microprocessor:

1. Addition and subtraction of numbers using direct addressing mode
2. Addition and subtraction of numbers using indirect addressing mode
3. Multiplication by repeated addition.
4. Division by repeated subtraction.
5. Handling of 16-bit Numbers.
6. Use of CALL and RETURN Instruction.
7. Block data handling.
8. Parity Check
9. Other programs (e.g. using interrupts, etc.).

References for Theory :

Essential Readings :

1. Digital Principles and Applications, A.P.Malvino, D.P.Leach and G. Saha, 8th Ed., 2018, Tata McGraw Hill Education
2. Fundamentals of Digital Circuits, Anand Kumar, 4th Edn, 2018, PHI Learning Pvt. Ltd. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill
3. Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.
4. Digital Computer Electronics, A.P. Malvino, J.A. Brown, 3rd Edition, 2018, Tata McGraw Hill Education.

5. Digital Design, Morris Mano, 5th Ed. Pearson.

Additional Readings :

1. Digital Electronics G K Kharate ,2010, Oxford University Press
2. Logic circuit design, Shimon P. Vingron, 2012, Springer
3. Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning. Digital Electronics, S.K. Mandal, 2010, 1st edition, McGraw Hill

References for Laboratory Work :

1. Modern Digital Electronics, R.P. Jain, 4th Edition, 2010, Tata McGraw Hill
2. Basic Electronics: A text lab manual, P.B.Zbar, A.P.Malvino, M.A.Miller, 1994, McGraw Hill.
3. Microprocessor 8085: Architecture, Programming and interfacing, A.Wadhwa,2010, PHI Learning

CC-VIII: Mathematical Physics III (32221401)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

The emphasis of the course is on applications in solving problems of interest to physicists. Students will be examined on the basis of problems, seen and unseen. The course will develop understanding of the basic concepts underlying complex analysis and complex integration and enable student to use Fourier and Laplace Transform to solve real world problems.

Course Learning Outcomes

After completing this course, student will be able to

- Determine continuity, differentiability and analyticity of a complex function, find the derivative of a function and understand the properties of elementary complex functions.
- Work with multi-valued functions (logarithmic, complex power, inverse trigonometric function) and determine branches of these functions
- Evaluate a contour integral using parametrization, fundamental theorem of calculus and Cauchy's integral formula.

- Find the Taylor series of a function and determine its radius of convergence.
- Determine the Laurent series expansion of a function in different regions, find the residues and use the residue theory to evaluate a contour integral and real integral.
- Understand the properties of Fourier and Laplace transforms and use these to solve boundary value problems.
- In the laboratory course, the students will learn the basics of the Scilab software/Python interpreter and apply appropriate numerical method to solve selected physics problems both using user defined and inbuilt functions from Scilab/Python.

Unit 1

Complex Analysis

Complex Analysis: Brief Revision of Complex Numbers and their Graphical Representation. Euler's formula, De-Moivre's theorem, Roots of Complex Numbers. Functions of Complex Variables. Analyticity and Cauchy-Riemann Equations. Examples of analytic functions. Singularities: poles, removable singularity, essential singularity, branch points, branch cut. Integration of a function of a complex variable. Cauchy-Goursat Theorem, Cauchy's Inequality. Cauchy's Integral formula. Simply and multiply connected region. Laurent and Taylor's expansion. Residues and Residue Theorem. Application of Contour Integration in solving Definite Integrals.

(30 Lectures)

Unit 2

Integrals Transforms

Fourier Transforms: Fourier Integral theorem (Statement only). Fourier Transform (FT). Examples: FT of single pulse, trigonometric, exponential and Gaussian functions. FT of derivatives, Inverse FT, Convolution theorem. Properties of FT s (translation, change of scale, complex conjugation, etc.). Solution of one dimensional Wave Equation using FT. Fourier Sine Transform (FST) and Fourier Cosine Transform (FCT).

(12 Lectures)

Unit 3

Laplace Transforms: Laplace Transform (LT) of Elementary functions. Properties of LTs: Change of Scale Theorem, Shifting Theorem. LTs of 1st and 2nd order Derivatives and Integrals of Functions, Derivatives and Integrals of LTs. LT of Unit Step function, Periodic Functions. Convolution Theorem. Inverse LT. Application of Laplace Transforms to 2nd order Differential Equations, Coupled differential equations of 1st order. Solution of 1-D heat equation (semi-infinite bar) using LT.

(15 Lectures)

Unit 4

Dirac delta function: Definition and properties. Representation of Dirac delta function as a Fourier Integral. Laplace and Fourier Transform of Dirac delta function.

(3 Lectures)

Practical: 60 Hours

The aim of this Lab is to use the computational methods to solve physical problems. The course will consist of practical sessions and lectures on the related theoretical aspects of the Laboratory course. Evaluation done not only on the basis of programming but also on the basis of formulating the problem. **At least ten** programs must be attempted taking at least one from each programming section. The program list is only suggestive and students should be encouraged to do more problems.

C⁺⁺/C/Scilab/Python based simulations experiments on Mathematical Physics problems like

1. Boundary Value Problems :
 - A. Solution to Ordinary Differential equation (Boundary Value Problems using finite Difference and shooting methods) :
 - i. Solve $y''(x) + y(x) = 0$ with $y(0) = 1$, $y(\pi/2) = 1$ for $0 < x < \pi$.
 - ii. Solve for the steady state concentration profile $y(x)$ in the reaction-diffusion problem given by Solve $y''(x) - y(x) = 0$ with $y(0) = 1$, $y'(1) = 0$.
 - B. Solution to Partial Differential equation: Finite Difference and Crank-Nicholson methods to solve Laplace equation, wave equation, and Heat Equation.
2. Gauss Quadrature Integration Method : Gauss Legendre, Gauss Laguerre and Gauss Hermite. :
 - i. Verification of Orthogonality of Legendre Polynomials.
$$\int_{-1}^{+1} P_n(\mu) P_m(\mu) d\mu = \frac{2}{(2n+1)} \delta_{n,m}$$
 - ii. Complex analysis: Integrate $\int_0^{\infty} \frac{1}{(x^2+2)} dx$ numerically using Gauss Laguerre method and check with contour integration.
3. Dirac Delta Function: representations of Dirac delta function as a limiting sequence of functions. Verify the properties of Dirac Delta function. e.g. Evaluate $\frac{1}{\sqrt{2\pi\sigma^2}} \int \exp\left(\frac{-(x-2)^2}{2\sigma^2}\right) (x+3) dx$, for $\sigma = 1, 0.1, 0.01$ and show that it tends to 5. Use Hermite Gauss quadrature method and also Simpson method with appropriate limits.
4. Fourier Series:

Evaluate the Fourier coefficients of a given periodic function (e.g. square wave, triangle wave, half wave and full wave rectifier etc.)
5. Weighted Least square fitting of given data (x,y) with known error/uncertainty-values using user defined function.
6. Integral transform:
 - i. Discrete and Fast Fourier Transform of given function in tabulated or mathematical form e.g function $\exp(-x^2)$.
 - ii. Perform circuit analysis of a general LCR circuit using Laplace's transform.

References for Theory:

Essential Readings:

1. Mathematical Methods for Physics and Engineers, K.F Riley, M.P. Hobson and S. J. Bence, 3rd ed., 2006, Cambridge University Press
2. Complex Variables and Applications, J.W.Brown& R.V.Churchill, 7th Ed. 2003, Tata McGraw-Hill.
3. Laplace Transform: Schaum's Outline, M.R> Spiegel, McGraw Hill Education.
4. Complex Variables: Schaum's Outline, McGraw Hill Education (2009).
5. Fourier Analysis and Its Applications (Wadsworth and Brooks/Cole Mathematics Series), Gerald B. Folland, Thomson Brooks/Cole (1992).

Additional Readings:

1. Mathematics for Physicists, P.Dennery and A.Krzywicki, 1967, Dover Publications.
2. Complex Variables, A.S.Fokas & M.J.Ablowitz, 8th Ed., 2011, Cambridge Univ. Press.
3. Mathematical Physics with Applications, Problems and Solutions, V. Balakrishnan, Ane Books (2017).
4. Fourier Analysis with Applications to Boundary Value Problems: : Schaum Outline Series, M. R Spiegel, McGraw Hill Education (1974).
5. Fourier Transform and its Applications, 2nd Ed., Ronald New Bold Bracewell, McGraw Hill (1978).

References for Laboratory Work:

1. An introduction to computational Physics, T.Pang, 2nd Edn.,2006, Cambridge Univ. Press
2. Applied numerical analysis, Cutis F. Gerald and P.O. Wheatley, Pearson Education, India (2007).
3. Friendly Introduction to Numerical Analysis, Brian Bradie, Pearson Education (2007).
4. Introduction to Numerical Analysis, S.S. Sastry, 5th Edn., PHI Learning Pvt. Ltd. (2012).
5. Partial Differential Equations for Scientists and Engineers, S.J. Farlow, Dover Publications (1993).

CC-IX: Elements of Modern Physics (32221402)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

The objective of this course is to teach the physical and mathematical foundations necessary for learning various topics in modern physics which are crucial for understanding atoms, molecules, photons, nuclei and elementary particles. These concepts are also important to understand phenomena in laser physics, condensed matter physics and astrophysics.

Course Learning Outcomes

After getting exposure to this course, the following topics would be learnt:

- Main aspects of the inadequacies of classical mechanics as well as understanding of the historical development of quantum mechanics.
- Formulation of Schrodinger equation and the idea of probability interpretation associated with wave-functions.
- The spontaneous and stimulated emission of radiation, optical pumping and population inversion. Three level and four level lasers. Ruby laser and He-Ne laser in details. Basic lasing
- The properties of nuclei like density, size, binding energy, nuclear forces and structure of atomic nucleus, liquid drop model and nuclear shell model and mass formula.
- Decay rates and lifetime of radioactive decays like alpha, beta, gamma decay. Neutrino, its properties and its role in theory of beta decay.
- Fission and fusion: Nuclear processes to produce nuclear energy in nuclear reactor and stellar energy in stars.
- In the laboratory course, the students will get opportunity to measure Planck's constant, verify photoelectric effect, determine e/m of electron, Ionization potential of atoms, study emission and absorption line spectra. They will also find wavelength of Laser sources by single and Double slit experiment, wavelength and angular spread of He-Ne Laser using plane diffraction grating.

Unit 1

Planck's quantum, Planck's constant and light as a collection of photons; Blackbody Radiation: Quantum theory of Light; Photo-electric effect and Compton scattering. De Broglie wavelength and matter waves; Davisson-Germer experiment. Wave description of particles by wave packets. Group and Phase velocities and relation between them. Double-slit experiment with electrons. Probability. Wave amplitude and wave functions.

(12 Lectures)

Unit 2

Position measurement : gamma ray microscope thought experiment; Wave-particle duality leading to Heisenberg uncertainty principle; Uncertainty relations involving canonical pair

of variables: Derivation from Wave Packets; Impossibility of a particle following a trajectory; Estimating minimum energy of a confined particle using uncertainty principle; Energy-time uncertainty principle: origin of natural width of emission lines as well as estimation of the mass of the virtual particle that mediates a force from the observed range of the force

(7 Lectures)

Unit 3

Two-slit interference experiment with photons, atoms and particles; linear superposition principle as a consequence; Schrodinger equation for non-relativistic particles; Momentum and Energy operators; stationary states; physical interpretation of a wave function, probabilities and normalization; Probability and probability current densities in one dimension.

(10 Lectures)

Unit 4

One dimensional infinitely rigid box : energy eigenvalues, eigenfunctions and their normalization; Quantum dot as an example; Quantum mechanical scattering and tunneling in one dimension : across a step potential & across a rectangular potential barrier.

Lasers: Metastable states. Spontaneous and Stimulated emissions. Optical Pumping and Population Inversion.

(14 Lectures)

Unit 5

Size and structure of atomic nucleus and its relation with atomic weight; Impossibility of an electron being in the nucleus as a consequence of the uncertainty principle. Nature of nuclear force, N-Z graph, Liquid Drop model: semi-empirical mass formula and binding energy.

(6 Lectures)

Unit 6

Radioactivity: stability of the nucleus; Law of radioactive decay; Mean life and half-life; Alpha decay; Beta decay: energy released, spectrum and Pauli's prediction of neutrino; Gamma ray emission, energy-momentum conservation: electron-positron pair creation by gamma photons in the vicinity of a nucleus. Fission and fusion: mass deficit, relativity and generation of energy; Fission : nature of fragments and emission of neutrons. Fusion and thermonuclear reactions driving stellar evolution (brief qualitative discussions).

(11 Lectures)

Practical: 60 Hours

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the modern physics lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least 05 experiments from the following:

1. Measurement of Planck's constant using black body radiation and photo-detector
2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light.
3. To determine work function of material of filament of directly heated vacuum diode.
4. To determine the Planck's constant using LEDs of at least 4 different colours.
5. To determine the wavelength of H-alpha emission line of Hydrogen atom.
6. To determine the ionization potential of mercury.
7. To determine the absorption lines in the rotational spectrum of Iodine vapour.
8. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.
9. To setup the Millikan oil drop apparatus and determine the charge of an electron.
10. To show the tunneling effect in tunnel diode using I-V characteristics.
11. To determine the wavelength of laser source using diffraction of single slit.
12. To determine the wavelength of laser source using diffraction of double slits.
13. To determine angular spread of He-Ne laser using plane diffraction grating

Reference for Theory:

Essential Readings

1. Concepts of Modern Physics, Arthur Beiser, 2002, McGraw-Hill.
2. Modern Physics by R A Serway, C J Moses and C A Moyer, 3rd edition, Thomson Brooks Cole, 2012.
3. Modern Physics for Scientists and Engineers by S T Thornton and A Rex, 4th edition, Cengage Learning, 2013.
4. Concepts of Nuclear Physics by B L Cohen, Tata McGraw Hill Publication, 1974.
5. Quantum Mechanics, Robert Eisberg and Robert Resnick, 2nd Edn., 2002, Wiley.

Additional Readings:

1. Six Ideas that Shaped Physics: Particle Behave like Waves, T.A. Moore, 2003, McGraw Hill.
2. Thirty years that shook physics: the story of quantum theory, George Gamow, Garden City, NY: Doubleday, 1966.
3. New Physics, ed. Paul Davies, Cambridge University Press (1989).
4. Quantum Theory, David Bohm, Dover Publications, 1979.
5. Lectures on Quantum Mechanics: Fundamentals and Applications, eds. A. Pathak and Ajoy Ghatak, Viva Books Pvt. Ltd., 2019
6. Quantum Mechanics: Theory and Applications, (2019), (Extensively revised 6th Edition), Ajoy Ghatak and S. Lokanathan, Laxmi Publications, New Delhi
7. Basic ideas and concepts in Nuclear Physics: An introductory approach by K Heyde, third edition, IOP Publication, 1999.

Reference for Laboratory

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
4. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press.

CC-X: Analog Systems and Applications (32221403)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course introduces the concept of semiconductor devices and their applications. It also emphasizes on understanding of amplifiers, oscillators, operational amplifier and their applications.

Course Learning Outcomes

At the end of this course, the following concepts will be learnt

- Characteristics and working of pn junction.
- Two terminal devices: Rectifier diodes, Zener diode, photodiode etc
- NPN and PNP transistors: Characteristics of different configurations, biasing, stabilization and their applications.
- CE and two stage RC coupled transistor amplifier using h-parameter model of the transistor.
- Designing of different types of oscillators and their stabilities.
- Ideal and practical op-amps: Characteristics and applications.
- In the laboratory course, the students will be able to study characteristics of various diodes and BJT. They will be able to design amplifiers, oscillators and DACs. Also different applications using Op-Amp will be designed.

Unit 1

Semiconductor Diodes: P and N type semiconductors. Energy Level Diagram. Conductivity and Mobility, Concept of Drift velocity. PN Junction Fabrication (Simple Idea). Barrier Formation in PN Junction Diode. Derivation for Barrier Potential, Barrier

Width and Current for abrupt Junction. Equation of continuity, Current Flow Mechanism in Forward and Reverse Biased Diode.

(9 Lectures)

Unit 2

Two-terminal Devices and their Applications: (1) Rectifier Diode: Half-wave Rectifiers. Centre-tapped and Bridge Full-wave Rectifiers, Calculation of Ripple Factor and Rectification Efficiency, C-filter, (2) Zener Diode and Voltage Regulation. Principle, structure and characteristics of (1) LED, (2) Photodiode and (3) Solar Cell, Qualitative idea of Schottky diode and Tunnel diode.

(7 Lectures)

Unit 3

Bipolar Junction transistors: n-p-n and p-n-p Transistors. I-V characteristics of CB and CE Configurations. Active, Cutoff and Saturation Regions. Current gains α and β . Relations between α and β . Load Line analysis of Transistors. DC Load line and Q-point. Physical Mechanism of Current Flow.

(6 Lectures)

Unit 4

Amplifiers: Transistor Biasing and Stabilization Circuits. Fixed Bias and Voltage Divider Bias. Transistor as 2-port Network. h-parameter Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance. Current, Voltage and Power Gains. Classification of Class A, B & C Amplifiers.

(10 Lectures)

Coupled Amplifier: Two stage RC-coupled amplifier and its frequency response.

(4 Lectures)

Unit 5

Feedback in Amplifiers: Positive and Negative Feedback. Effect of negative feedback on Input Impedance, Output Impedance, Gain, Stability, Distortion and Noise.

(4 Lectures)

Sinusoidal Oscillators: Barkhausen's Criterion for self-sustained oscillations. RC Phase shift oscillator, determination of Frequency. Hartley & Colpitts oscillators.

(4 Lectures)

Unit 6

Operational Amplifiers (Black Box approach): Characteristics of an Ideal and Practical Op-Amp. (IC 741) Open-loop and Closed-loop Gain. Frequency Response. CMRR. Slew Rate and concept of Virtual ground.

(4 Lectures)

Applications of Op-Amps: (1) Inverting and non-inverting amplifiers, (2) Adder, (3) Subtractor, (4) Differentiator, (5) Integrator, (6) Log amplifier, (7) Comparator and Zero crossing detector (8) Wein bridge oscillator.

(9 Lectures)

Conversion: D/A Resistive networks (Weighted and R-2R Ladder). Accuracy and Resolution.

(3 Lectures)

Practical : 60 Hours

Session on the construction and use of specific analogue devices and experimental apparatuses used in the lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least 08 experiments from the following:

1. To study the V-I characteristics of a Zener diode and its use as voltage regulator.
2. Study of V-I & power curves of solar cells, and find maximum power point & efficiency.
3. To study the characteristics of a Bipolar Junction Transistor in CE configuration.
4. To study the various biasing configurations of BJT for normal class A operation.
5. To design a CE transistor amplifier of a given gain (mid-gain) using voltage divider bias.
6. To study the frequency response of voltage gain of a two stage RC-coupled transistor amplifier.
7. To design a Wien bridge oscillator for given frequency using an op-amp.
8. To design a phase shift oscillator of given specifications using BJT.
9. To design a digital to analog converter (DAC) of given specifications.
10. To design an inverting amplifier using Op-amp (741,351) for dc voltage of given gain
11. (a) To design inverting amplifier using Op-amp (741,351) & study its frequency response
 (b) To design non-inverting amplifier using Op-amp (741,351) and study frequency response
12. (a) To add two dc voltages using Op-amp in inverting and non-inverting mode
 (b) To study the zero-crossing detector and comparator.
13. To design a precision Differential amplifier of given I/O specification using Op-amp.
14. To investigate the use of an op-amp as an Integrator.
15. To investigate the use of an op-amp as a Differentiator.
16. To design a circuit to simulate the solution of simultaneous equation and 1st/2nd order differential equation.

References for Theory:

Essential Readings :

1. Integrated Electronics, J. Millman and C.C. Halkias, 1991, Tata Mc-Graw Hill.
2. Electronics: Fundamentals and Applications, J.D. Ryder, 2004, Prentice Hall.
3. Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall
4. Microelectronic circuits, A.S. Sedra, K.C. Smith, A.N. Chandorkar, 2014, 6th Edn., Oxford University Press.
5. Semiconductor Devices: Physics and Technology, S.M. Sze, 2nd Ed., 2002, Wiley India
6. Electronic Principles, A. Malvino, D.J. Bates, 7th Edition, 2018, Tata Mc-Graw Hill Education.
7. Electronic Devices & circuit Theory, R.L. Boylestad & L.D. Nashelsky, 2009, Pearson

Additional Readings:

1. Solid State Electronic Devices, B.G.Streetman & S.K.Banerjee, 6th Edn.,2009, PHI
2. Learning Electronic Devices & circuits, S.Salivahanan & N.S.Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill OP-Amps
3. Microelectronic Circuits, M.H. Rashid, 2nd Edition, Cengage Learning
4. Microelectronic Devices & Circuits, David A.Bell, 5th Edn.,2015, Oxford University Press
5. Basic Electronics: Principles and Applications, C.Saha, A.Halder, D.Ganguli, 1st Edition, 2018, Cambridge University Press

References for Laboratory Work:

1. Basic Electronics: A text lab manual, P.B.Zbar, A.P.Malvino, M.A.Miller, 1994, Mc-Graw Hill. OP-Amps

CC-XI: Quantum Mechanics & Applications (32221501)**Credit : 06 (Theory-04, Practical-02)****Theory : 60 Hours****Practical : 60 Hours****Course Objective**

After learning the elements of modern physics, in this course students would be exposed to more advanced concepts in quantum physics and their applications to problems of the sub atomic world.

Course Learning Outcomes

The Students will be able to learn the following from this course:

- Methods to solve time-dependent and time-independent Schrodinger equation.
- Quantum mechanics of simple harmonic oscillator.
- Non-relativistic hydrogen atom: spectrum and eigenfunctions.

- Angular momentum: Orbital angular momentum and spin angular momentum.
- Bosons and fermions - symmetric and anti-symmetric wave functions.
- Application to atomic systems
- In the laboratory course, with the exposure in computational programming in the computer lab, the student will be in a position to solve Schrodinger equation for ground state energy and wave functions of various simple quantum mechanical one-dimensional and three dimensional potentials.

Unit 1

Time dependent Schrodinger equation: Time dependent Schrodinger equation and dynamical evolution of a quantum state; Properties of Wave Function. Interpretation of Wave Function: Probability and probability current densities in three dimensions; Conditions for Physical Acceptability of Wave Functions. Normalization. Linearity and Superposition Principles. Eigenvalues and Eigenfunctions. Position, momentum and Energy operators; commutator of position and momentum operators; Expectation values of position and momentum. Wave Function of a Free Particle.

(12 Lectures)

Unit 2

Time independent Schrodinger equation: Hamiltonian, stationary states and energy eigenvalues; expansion of an arbitrary wavefunction as a linear combination of energy eigenfunctions; General solution of the time dependent Schrodinger equation in terms of linear combinations of stationary states; Application to spread of Gaussian wave-packet for a free particle in one dimension; wave packets, Fourier transforms and momentum space wavefunction; Position-momentum uncertainty principle.

(12 Lectures)

Unit 3

General discussion of bound states in an arbitrary potential: continuity of wave function, boundary condition and emergence of discrete energy levels; application to one-dimensional problem-square well potential; Quantum mechanics of simple harmonic oscillator: energy levels and energy eigenfunctions using Frobenius method; Hermite polynomials; ground state, zero point energy & uncertainty principle.

(10 Lectures)

Unit 4

Quantum theory of hydrogen-like atoms: time independent Schrodinger equation in spherical polar coordinates; separation of variables for second order partial differential equation; angular momentum operator & quantum numbers; Radial wavefunctions from Frobenius method; shapes of the probability densities for ground and first excited states; Orbital angular momentum quantum numbers l and m ; s, p, d shells.

(10 Lectures)

Unit 5

Atoms in Electric and Magnetic Fields: Electron angular momentum. Angular momentum quantization. Electron Spin and Spin Angular Momentum. Larmor's Theorem. Spin

Magnetic Moment. Stern-Gerlach Experiment. Normal Zeeman Effect: Electron Magnetic Moment and Magnetic Energy.

(8 Lectures)

Unit 6

Many electron atoms: Pauli's Exclusion Principle. Symmetric and Anti-symmetric Wave Functions. Spin orbit coupling. Spectral Notations for Atomic States. Total angular momentum. Spin-orbit coupling in atoms-L-S and J-J couplings.

(8 Lectures)

Practical : 60 Hours

Use C/C++/Scilab/Python for solving the following problems based on Quantum Mechanics like:

1. Solve the s-wave Schrodinger equation for the ground state and the first excited state of the hydrogen atom:

$$\frac{d^2 y}{dr^2} = A(r)u(r), A(r) = \frac{2m}{\hbar^2} [V(r) - E] \text{ where } V(r) = \frac{-e^2}{r}$$

where m is the reduced mass of the electron. Obtain the energy eigenvalues and plot the corresponding wavefunctions. Remember that the ground state energy of the hydrogen atom is ≈ -13.6 eV. Take $e = 3.795$ (eVÅ)^{1/2}, $\hbar c = 1973$ (eVÅ) and $m = 0.511 \times 10^6$ eV/c².

2. Solve the s-wave radial Schrodinger equation for an atom:

$$\frac{d^2 y}{dr^2} = A(r)u(r), A(r) = \frac{2m}{\hbar^2} [V(r) - E]$$

where m is the reduced mass of the system (which can be chosen to be the mass of an electron), for the screened coulomb potential

$$V(r) = \frac{-e^2}{r} e^{-r/a}$$

Find the energy (in eV) of the ground state of the atom to an accuracy of three significant digits. Also, plot the corresponding wavefunction. Take $e = 3.795$ (eVÅ)^{1/2}, $m = 0.511 \times 10^6$ eV/c², and $a = 3$ Å, 5 Å, 7 Å. In these units $\hbar c = 1973$ (eVÅ). The ground state energy is expected to be above -12 eV in all three cases.

3. Solve the s-wave radial Schrodinger equation for a particle of mass m:

$$\frac{d^2 y}{dr^2} = A(r)u(r), A(r) = \frac{2m}{\hbar^2} [V(r) - E]$$

For an harmonic oscillator potential

$$V(r) = \frac{1}{2}kr^2 + \frac{1}{3}br^3$$

for the ground state energy (in MeV) of particle to an accuracy of three significant digits. Also, plot the corresponding wave function. Choose $m = 940 \text{ MeV}/c^2$, $k = 100 \text{ MeV fm}^{-2}$, $b = 0, 10, 30 \text{ MeV fm}^{-3}$. In these units, $\hbar c = 197.3 \text{ MeV fm}$. The ground state energy is expected to lie between 90 and 110 MeV for all three cases.

4. Solve the s-wave radial Schrodinger equation for the vibrations of hydrogen molecule:

$$\frac{d^2 y}{dr^2} = A(r)u(r), A(r) = \frac{2\mu}{\hbar^2}[V(r) - E]$$

Where μ is the reduced mass of the two-atom system for the Morse potential

$$V(r) = D(e^{-2ar} - e^{-ar})^2, r' = \frac{r - r_0}{r_0}$$

Find the lowest vibrational energy (in MeV) of the molecule to an accuracy of three significant digits. Also plot the corresponding wave function.

Take: $m = 940 \times 10^6 \text{ eV}/c^2$, $D = 0.755501 \text{ eV}$, $\alpha = 1.44$, $r_0 = 0.131349 \text{ \AA}$

Where μ is the reduced mass of the two-atom system for the Morse potential

Find the lowest vibrational energy (in MeV) of the molecule to an accuracy of three significant digits. Also plot the corresponding wave function.

Take: $m = 940 \times 10^6 \text{ eV}/c^2$, $D = 0.755501 \text{ eV}$, $\alpha = 1.44$, $r_0 = 0.131349 \text{ \AA}$

Laboratory based experiments (Optional):

5. Study of Electron spin resonance- determine magnetic field as a function of the resonance frequency
6. Study of Zeeman effect: with external magnetic field; Hyperfine splitting
7. Quantum efficiency of CCD

References for Theory

Essential Readings

1. Quantum Mechanics, B. H. Bransden and C. J. Joachain; 2nd Ed., Prentice Hall, 2000.
2. A Text book of Quantum Mechanics, P.M. Mathews and K. Venkatesan, 2nd Ed., 2010, McGraw Hill.
3. Quantum Mechanics for Scientists & Engineers, D.A.B. Miller, 2008, Cambridge University Press.
4. Quantum Mechanics: Theory and Applications, (2019), (Extensively revised 6th Edition), Ajoy Ghatak and S. Lokanathan, Laxmi Publications, New Delhi.
5. Introduction to Quantum Mechanics, D.J. Griffith, 2nd Ed. 2005, Pearson Education.

Additional Readings

1. Introduction to Quantum Mechanics, R. H. Dicke and J. P. Wittke, Addison-Wesley Publications, 1966.
2. Quantum Mechanics, Leonard I. Schiff, 3rd Edn. 2010, Tata McGraw Hill.
3. Quantum Mechanics, Robert Eisberg and Robert Resnick, 2nd Edn., 2002, Wiley.

4. Quantum Mechanics, Bruce Cameron Reed, 2008, Jones and Bartlett Learning.
5. Quantum Mechanics, Walter Greiner, 4th Edn., 2001, Springer.
6. Introductory Quantum Mechanics, R. L. Liboff; 4th Ed., Addison Wesley, 2003.
7. Quantum Mechanics: Concepts and Applications, 2nd Edition, Nouredine Zettili, A John Wiley and Sons, Ltd., Publication

References for Laboratory Work:

1. Schaum's outline of Programming with C++. J. Hubbard, 2000, McGraw- Hill Publication
2. An introduction to computational Physics, T. Pang, 2nd Edn., 2006, Cambridge Univ. Press
3. Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific & Engineering Applications: A. Vande Wouwer, P. Saucez, C. V. Fernández. 2014 Springer.
4. Scilab (A Free Software to Matlab): H. Ramchandran, A.S. Nair. 2011 S. Chand & Co.
5. A Guide to MATLAB, B.R. Hunt, R.L. Lipsman, J.M. Rosenberg, 2014, 3rd Edn., Cambridge University Press.

CC-XII: Solid State Physics (32221502)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course introduces the basic concepts and principles required to understand the various properties exhibited by condensed matter, especially solids. It enables the students to appreciate how the interesting and wonderful properties exhibited by matter depend upon its atomic and molecular constituents. The gained knowledge helps to solve problems in solid state physics using relevant mathematical tools. It also communicates the importance of solid state physics in modern society.

Course Learning Outcomes

On successful completion of the module students should be able to

- Elucidate the concept of lattice, crystals and symmetry operations.
- Understand the elementary lattice dynamics and its influence on the properties of materials.

- Describe the main features of the physics of electrons in solids: origin of energy bands, and their influence electronic behavior.
- Explain the origin of dia-, para-, and ferro-magnetic properties of solids.
- Explain the origin of the dielectric properties exhibited by solids and the concept of polarizability.
- Understand the basics of phase transitions and the preliminary concept and experiments related to superconductivity in solid.
- In the laboratory students will carry out experiments based on the theory that they have learned to measure the magnetic susceptibility, dielectric constant, trace hysteresis loop. They will also employ to four probe methods to measure electrical conductivity and the hall set up to determine the hall coefficient of a semiconductor.

Unit 1

Crystal Structure: Solids: Amorphous and Crystalline Materials. Lattice Translation Vectors. Lattice with a Basis. Types of Lattices. Unit Cell, Symmetry and Symmetry Elements. Miller Indices. Reciprocal Lattice. Brillouin Zones. Diffraction of X-rays: single crystal and powder method. Bragg's Law, Laue Condition. Ewalds' construction. Atomic and Geometrical Factor. Simple numerical problem on SC, BCC, FCC.

(14 Lectures)

Unit 2

Elementary Lattice Dynamics: Lattice Vibrations and Phonons: Linear Monoatomic and Diatomic Chains. Acoustical and Optical Phonons. Qualitative Description of the Phonon Spectrum in Solids. Dulong and Petit's Law, Einstein and Debye theories of specific heat of solids. T^3 law.

(10 Lectures)

Unit 3

Electrons in Solids: Electrons in metals- Introduction to Drude Model, Density of states (1-D, 2-D, 3-D) (basic idea), Elementary band theory: Kronig Penney model. Band Gap, direct and indirect bandgap. Effective mass, mobility, Hall Effect (Metal and Semiconductor).

(10 Lectures)

Unit 4

Magnetic Properties of Matter: Dia-, Para-, Ferri- and Ferromagnetic Materials. Classical Langevin Theory of dia- and Para- magnetism. Hund's rule. Weiss's Theory of Ferromagnetism and Ferromagnetic Domains. Curie's law. B-H Curve. soft and hard material and Energy Loss Hysteresis.

(9 Lectures)

Unit 5

Dielectric Properties of Materials: Polarization. Local Electric Field in solids. Depolarization Field. Electric Susceptibility. Polarizability. Clausius Mossotti Equation. Classical Theory of Electric Polarizability. AC polarizability, Normal and Anomalous Dispersion. Complex Dielectric Constant. Langevin-Debye equation.

(9 Lectures)

Unit 6

Introduction to basics of phase transitions: Landau theory for ferromagnetic materials (No derivation).

(3 Lectures)

Superconductivity: Experimental Results. Critical Temperature. Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth. Isotope effect. Idea of BCS theory (No derivation).

(5 Lectures)

Practical : 60 Hours

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the solid state physics lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least 06 experiments from the following:

1. Measurement of susceptibility of paramagnetic solution (Quinck's Tube Method).
2. To measure the Magnetic susceptibility of solids.
3. To determine the Coupling Coefficient of a piezoelectric crystal.
4. To study the dielectric response of materials with frequency.
5. To determine the complex dielectric constant and plasma frequency of a metal using Surface Plasmon Resonance (SPR) technique.
6. To determine the refractive index of a dielectric material using SPR technique.
7. To study the PE Hysteresis loop of a Ferroelectric Crystal.
8. To draw the BH curve of Iron (Fe) using solenoid & determine the energy loss from Hysteresis loop.
9. To measure the resistivity of a semiconductor (Ge) with temperature (up to 150°C) by four-probe method and determine its band gap.
10. To determine the Hall coefficient of a semiconductor sample.
11. Analysis of X-Ray diffraction data in terms of unit cell parameters and estimation of particle size.
12. Measurement of change in resistance of a semiconductor with magnetic field.

References for Theory:

Essential Readings:

1. Introduction to Solid State Physics, Charles Kittel, 8th Ed., 2004, Wiley India Pvt. Ltd.
2. Elements of Solid State Physics, J.P. Srivastava, 2nd Ed., 2006, Prentice-Hall of India.
3. Introduction to Solids, Leonid V. Azaroff, 2004, Tata Mc-Graw Hill.
4. Solid State Physics, N.W. Ashcroft and N.D. Mermin, 1976, Cengage Learning.
5. Solid-state Physics, H. Ibach and H. Luth, 2009, Springer.

Additional Readings

1. Elementary Solid State Physics, M.Ali Omar, 2006, Pearson
2. Solid State Physics, Rita John, 2014, McGraw Hill

3. Solid State Physics, M.A. Wahab, 2011, Narosa Publications.

References for Practical:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
2. A Text Book of Practical Physics, I. Prakash & Ramakrishna, 11th Ed., 2011, Kitab Mahal
3. Elements of Solid State Physics, J.P. Srivastava, 2nd Ed., 2006, Prentice-Hall of India
4. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press
5. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.

CC-XIII: Electromagnetic Theory (32221601)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This core course develops further the concepts learnt in the electricity and magnetism course to understand the properties of electromagnetic waves in vacuum and different media.

Course Learning Outcomes

At the end of this course the student will be able to:

- Apply Maxwell's equations to deduce wave equation, electromagnetic field energy, momentum and angular momentum density.
- Understand electromagnetic wave propagation in unbounded media: Vacuum, dielectric medium, conducting medium, plasma.
- Understand electromagnetic wave propagation in bounded media: reflection and transmission coefficients at plane interface in bounded media.
- Understand polarization of Electromagnetic Waves: Linear, Circular and Elliptical Polarization. Production as well as detection of waves in laboratory.
- Learn the features of planar optical wave guide.
- Understand the fundamentals of propagation of electromagnetic waves through optical fibres.

- In the laboratory course, the student get an opportunity to perform experiments with Polarimeter, Babinet Compensator, Ultrasonic grating, simple dipole antenna. Also, to study phenomena of interference, refraction, diffraction and polarization.

Unit 1

Maxwell Equations: Review of Maxwell's equations. Displacement Current. Vector and Scalar Potentials. Gauge Transformations: Lorentz and Coulomb Gauge. Poynting's Theorem and Poynting's Vector. Electromagnetic (em) Energy Density. Physical Concept of Electromagnetic Field Energy Density. Momentum Density and Angular Momentum Density.

(12 Lectures)

Unit 2

EM Wave Propagation in Unbounded Media: Plane em waves through vacuum and isotropic dielectric medium: transverse nature, refractive index, dielectric constant, wave impedance. Plane em waves through conducting medium: relaxation time, skin depth, attenuation constant. Wave propagation through dilute plasma: electrical conductivity of ionized gases, plasma frequency, refractive index, skin depth.

(10 Lectures)

Unit 3

EM Waves in Bounded Media: Boundary conditions at a plane interface between two media. Reflection & Refraction of plane em waves at plane interface between two dielectric media-Laws of Reflection & Refraction. Fresnel's Formulae for perpendicular & parallel polarization, Brewster's law. Reflection & Transmission coefficients. Total internal reflection, evanescent waves. Metallic reflection (normal Incidence)

(10 Lectures)

Unit 4

Polarization of EM Waves: Propagation of em waves in an Anisotropic Media. Symmetric Nature of Dielectric Tensor. Fresnel's Formula. Uniaxial and Biaxial Crystals. Light Propagation in Uniaxial Crystal. Double Refraction. Polarization by Double Refraction. Description of Linear, Circular and Elliptical Polarization. Nicol Prism. Ordinary & extraordinary refractive indices. Production & detection of Plane, Circularly and Elliptically Polarized Light. Phase Retardation Plates: Quarter-Wave and Half-Wave Plates. Babinet Compensator and its Uses. Analysis of Polarized Light

(12 Lectures)

Rotatory Polarization: Optical Rotation. Biot's Laws for Rotatory Polarization. Fresnel's Theory of optical rotation. Calculation of angle of rotation. Experimental verification of Fresnel's theory. Specific rotation. Laurent's half-shade polarimeter.

(5 Lectures)

Unit 5

Wave Guides: Planar optical wave guides. Planar dielectric wave guide ($-d/2 < x < d/2$). Condition of continuity at interface. Phase shift on total reflection. Eigenvalue equations. Phase and group velocity of guided waves. Field energy and Power transmission.

(8 Lectures)

Optical Fibres: Acceptance Angle, Numerical Aperture. Step and Graded Index fibres (Definitions Only). Single and Multiple Mode Fibres.

(3 Lectures)

Practical: 60 Hours

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least 06 experiments from the following

1. To verify the law of Malus for plane polarized light.
2. To determine the specific rotation of sugar solution using Polarimeter.
3. To analyze elliptically polarized Light by using a Babinet's compensator.
4. To study dependence of radiation on angle for a simple Dipole antenna.
5. To determine the wavelength and velocity of ultrasonic waves in a liquid (Kerosene Oil, Xylene, etc.) by studying the diffraction through ultrasonic grating.
6. To study the reflection, refraction of microwaves
7. To study Polarization and double slit interference in microwaves.
8. To determine the refractive index of liquid by total internal reflection using Wollaston's air-film.
9. To determine the refractive Index of (1) glass and (2) a liquid by total internal reflection using a Gaussian eyepiece.
10. To study the polarization of light by reflection and determine the polarizing angle for air-glass interface.
11. To verify the Stefan's law of radiation and to determine Stefan's constant.
12. To determine Boltzmann constant using V-I characteristics of PN junction diode.
13. To find Numerical Aperture of an Optical Fibre.
14. To verify Brewster's Law and to find the Brewster's angle.

References for Theory:

Essential Readings:

1. Introduction to Electrodynamics, D.J. Griffiths, 3rd Ed., 1998, Benjamin Cummings.
2. Electromagnetic Field and Waves, P. Lorrain and D. Corson, 2nd Ed., 2003, CBS Publisher.
3. Classical Electrodynamics, J.D. Jackson, 3rd Edn., 2010, Wiley
4. Principle of Optics, M. Born and E. Wolf, 6th Edn., 1980, Pergamon Press
5. Optics, (2017), 6th Edition, Ajoy Ghatak, McGraw-Hill Education, New Delhi

Additional Readings:

1. Elements of Electromagnetics, M.N.O. Sadiku, 2001, Oxford University Press.
2. Fundamentals of Electromagnetics, M.A.W. Miah, 1982, Tata McGraw Hill

3. Problems and solution in Electromagnetism (2015), Ajoy Ghatak, K Thyagarajan & Ravi Varshney.
4. Electromagnetic field Theory, R.S. Kshetrimayun, 2012, Cengage Learning
5. Engineering Electromagnetic, William H. Hayt, 8th Edition, 2012, McGraw Hill.
6. Electromagnetism, J.A. Edminister, Schaum Series, 2006, Tata McGraw Hill.

References for Laboratory Work:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
2. Electromagnetic Field Theory for Engineers & Physicists, G. Lehner, 2010, Springer
3. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press.
4. Engineering Practical Physics, S. Panigrahi & B. Mallick, 2015, Cengage Learning India Pvt. Ltd.

CC-XIV: Statistical Mechanics

(32221602)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

Statistical Mechanics deals with the derivation of the macroscopic parameters (internal energy, pressure, specific heat etc.) of a physical system consisting of large number of particles (solid, liquid or gas) from knowledge of the underlying microscopic behavior of atoms and molecules that comprises it. The main objective of this course work is to introduce the techniques of Statistical Mechanics which has applications in various fields including Astrophysics, Semiconductors, Plasma Physics, Bio-Physics etc. and in many other directions.

Course Learning Outcomes

By the end of the course, students will be able to:

- Understand the concepts of microstate, macrostate, phase space, thermodynamic probability and partition function.
- Understand the use of Thermodynamic probability and Partition function for calculation of thermodynamic variables for physical system (Ideal gas, finite level system).

- Difference between the classical and quantum statistics
- Understand the properties and Laws associated with thermal radiation.
- Apply the Fermi-Dirac distribution to model problems such as electrons in solids and white dwarf stars
- Apply the Bose-Einstein distribution to model problems such as blackbody radiation and Helium gas.
- In the laboratory course, with the exposure in computer programming and computational techniques, the student will be in a position to perform numerical simulations for solving the problems based on Statistical Mechanics.

Unit 1

Classical

Statistics: Macrostates and Microstates, Phase Space, Entropy and Thermodynamic Probability, Maxwell-Boltzmann Distribution Law, Partition Function, Thermodynamic Functions of an Ideal Gas, Classical Entropy Expression, Gibbs Paradox, Sackur-Tetrode equation. Saha's Ionization Formula. Law of Equipartition of Energy (with proof)– Applications to Specific Heat of gas and solids and its Limitations, Thermodynamic Functions of a Finite Level System, Negative Temperature.

(24 Lectures)

Unit 2

Bose-Einstein Statistics: B-E Distribution law, Thermodynamic functions of a strongly degenerate Bose Gas, Bose Einstein condensation, properties of liquid He (qualitative description), Radiation as a photon gas and Thermodynamic functions of photon gas. Bose derivation of Planck's law.

(12 Lectures)

Unit 3

Fermi-Dirac Statistics: Fermi-Dirac Distribution Law, Thermodynamic functions of a Completely and strongly degenerate Fermi Gas, Fermi Energy Electron gas in a Metal, Specific Heat of Metals, Relativistic Fermi gas, White Dwarf Stars, Chandrasekhar Mass Limit.

(12 Lectures)

Unit 4

Theory of Radiation: Properties of Thermal Radiation and Radiation Pressure. Blackbody Radiation and its spectral distribution. Kirchhoff law. Stefan-Boltzmann law and its Thermodynamic proof. Wien's Displacement law. Wien's Distribution Law. Rayleigh-Jean's Law. Ultraviolet Catastrophe. Planck's Quantum Postulates. Planck's Law of Blackbody Radiation Deduction of Wien's Distribution Law, Rayleigh-Jeans Law, Stefan-Boltzmann Law and Wien's Displacement law from Planck's law.

(12 Lectures)

Practical: 60 Hours

Use C/C++/Scilab/Python/other numerical simulations for solving the problems based on Statistical Mechanics like:

1. Computational analysis of the behavior of a collection of particles in a box that satisfy Newtonian mechanics and interact via the Lennard-Jones potential, varying the total number of particles N and the initial conditions:
 - a) Study of local number density in the equilibrium state (i) average; (ii) fluctuations
 - b) Study of transient behavior of the system (approach to equilibrium)
 - c) Relationship of large N and the arrow of time
 - d) Computation of the velocity distribution of particles for the system and comparison with the Maxwell velocity distribution.
2. Plot the probability of various macrostates in coin-tossing experiment (two level system) versus number of heads with 4, 8, 16 coins etc.
3. Computation of the partition function $Z(b)$ for the systems with a finite number of single particle levels (e.g., 2 level, 3 level etc.) and finite number of non-interacting particles N under Maxwell-Boltzmann/ Fermi-Dirac/Bose Einstein statistics:
 - a) Study the behavior of $Z(b)$, average energy, C_v , and entropy and its dependence upon the temperature, total number of particles N and the spectrum of single particle energy states.
 - b) Plot the probability of occupancy of all the states w.r.t. temperature.
4. Plot the Maxwell speed distribution function at different temperatures in a 3-dimension system. Calculate the average speed, root mean square and most probable speed
5. Plot Specific Heat of Solids w.r.t temperature
 - a) Dulong-Petit law,
 - b) Einstein distribution function
 - c) Debye distribution function
6. Plot the following functions with energy at different temperatures
 - a) Maxwell-Boltzmann distribution
 - b) Fermi-Dirac distribution
 - c) Bose-Einstein distribution
7. Plot the distribution of particles w.r.t. energy (dN/de versus e) in 3 Dimensions for
 - a) Relativistic and non-relativistic bosons both at high and low temperature.
 - b) Relativistic and non-relativistic fermions both at high and low temperature.
8. Plot Planck's law of Black body radiation w.r.t. wavelength/frequency at different temperatures. Compare it with Rayleigh-Jeans Law and Wien's distribution law for a given temperature.

References for Theory:

Essential Readings:

1. Statistical Mechanics: R.K. Pathria and P. D. Beale(Academic Press)
2. Introductory Statistical Mechanics: R. Bowley and M. Sanchez (Oxford Univ.Press)
3. Statistical Physics: F. Mandl (Wiley)
4. A treatise on Heat : M.N. Saha and B.N. Srivastava (Indian Press)
5. Problems and Solutions on Thermodynamics andStatistical Mechanics : Lim Yung-Kou
(Sarat Book House)

Additional Readings:

- 1.Statistical Physics: Berkeley Physics Course, F. Reif, (McGraw-Hill)
- 2.An Introduction to Statistical Physics: W.G.V. Rosser(Wiley)
3. An Introduction to Thermal Physics: D. Schroeder (Pearson)
4. Concepts in Thermal Physics: Blundell and Blundell (Oxford Univ. press)
5. Statistical and Thermal Physics:Loknathan and Gambhir (PHI)

References for Laboratory work:

1. Elementary Numerical Analysis: K.E. Atkinson (Wiley)
2. Introduction to Modern Statistical Mechanics: D. Chandler (Oxford University Press)
3. Thermodynamics, Kinetic Theory and Statistical Thermodynamics : F . W. Sears
and G. L. Salinger (Narosa)
4. Modern Thermodynamics with Statistical Mechanics: Carl S. Helrich(Springer)
5. Statistical and Thermal Physics with Computer Applications : H. Gould and
J.Tobochnik(Princeton University Press)

9.2. DISCIPLINE SPECIFIC ELECTIVE (DSE)

DSE: Experimental Techniques (32227501)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This paper aims to describe the errors in measurement and statistical analysis of data required while performing an experiment. Also, students will learn the working principle, efficiency and applications of transducers & industrial instrument like digital multimeter, RTD, Thermistor, Thermocouples and Semiconductor type temperature sensors.

Course Learning Outcomes

Upon successful completion of the course, students will be able to:

- Learn the measurement systems, errors in measurements and statistical treatment of data.
- About Noise and signal, signal to noise ratio, different types of noises and their identification.
- Concept of electromagnetic interference and necessity of grounding.
- Understand principle of working and industrial applications of various transducers like Electrical, Thermal and Mechanical systems commonly used to measure Temperature and Position in industry.
- Develop an understanding of construction and working of different measuring instruments.
- Develop an understanding of construction, working and use of different AC and DC bridges and its applications.

Unit 1

Measurements: Accuracy and precision. Significant figures. Error and uncertainty analysis. Types of errors: Gross error, systematic error, random error. Statistical analysis of data (Arithmetic mean, deviation from mean, average deviation, standard deviation, chi-square) and curve fitting. Gaussian distribution.

(7 Lectures)

Signals and Systems: Fluctuations and Noise in measurement system. S/N ratio and Noise figure. Noise in frequency domain. Sources of Noise: Inherent fluctuations, Thermal noise, Shot noise, 1/f noise

(3 Lectures)

Shielding and Grounding: Methods of safety grounding. Energy coupling. Grounding. Shielding: Electrostatic shielding. Electromagnetic Interference.

(4 Lectures)

Unit 2

Transducers & industrial instrumentation (working principle, efficiency, applications): Static and dynamic characteristics of measurement Systems. Generalized performance of systems, Zero order first order, second order and higher order systems. Electrical, Thermal and Mechanical systems. Calibration. Qualitative difference between Transducers and sensors. Types of sensors (Physical, Chemical and Biological), Characteristics of Transducers. Transducers as electrical element and their signal conditioning. Temperature transducers: RTD, Thermistor, Thermocouples, Semiconductor type temperature sensors (AD590, LM35, LM75) and signal conditioning. Linear Position transducer: Strain gauge, Piezoelectric. Inductance change transducer: Linear variable differential transformer (LVDT), Capacitance change transducers. Radiation Sensors: Principle of Gas filled detector, ionization chamber, scintillation detector.

(21 Lectures)

Unit 3

Digital Multimeter: Comparison of analog and digital instruments. Block diagram of digital multimeter, principle of measurement of I, V, C. Accuracy and resolution of measurement.

(5 Lectures)

Impedance Bridges and Q-meter: Block diagram and working principles of RLC bridge. Q-meter and its working operation. Digital LCR bridge.

(4 Lectures)

Unit 4

Vacuum Systems: Characteristics of vacuum: Gas law, Mean free path. Application of vacuum. Vacuum system- Chamber with roughing and backing, Mechanical pumps (Rotary and root pumps), Diffusion pump & Turbo Molecular pump, Ion pumps, Pumping speed, throughput, Pressure gauges (Pirani, Penning, ionization, cold cathode).

(16 Lectures)

Practical: 60 Hours

PRACTICAL- DSE LAB: Experimental Techniques Lab

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the physics lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least 06 experiments each from the following

1. Determine output characteristics of a LVDT & measure displacement using LVDT

2. Measurement of Strain using Strain Gauge, level using capacitive transducer, distance using ultrasonic transducer
3. To study the characteristics of a Thermostat and determine its parameters.
4. Calibrate Semiconductor type temperature sensor (AD590, LM35, LM75) and Resistance Temperature Device (RTD).
5. Create vacuum in a small chamber using a mechanical (rotary) pump and measure the chamber pressure using a pressure gauge.
6. Comparison of pickup of noise in cables of different types (co-axial, single shielded, double shielded, without shielding) of 2m length, understanding of importance of grounding using function generator of mV level & an oscilloscope.
7. To design and study the Sample and Hold Circuit.
8. Design and analyze the Clippers and Clampers circuits using junction diode
9. To plot the frequency response of a microphone.
10. To measure Q of a coil and influence of frequency, using a Q-meter.

References for Theory :

Essential Readings :

1. Experimental Methods for Engineers, J.P. Holman, McGraw Hill
2. Introduction to Measurements and Instrumentation, A.K. Ghosh, 4th Edition, 2017, PHI Learning Pvt. Ltd.
3. Transducers and Instrumentation, D.V.S. Murty, 2nd Edition, PHI Learning Pvt. Ltd.
4. Instrumentation Devices and Systems, C.S.Rangan, G.R. Sarma, V.S.V. Mani, Tata McGraw Hill
5. Measurement, Instrumentation and Experiment Design in Physics & Engineering, M.Sayer and A. Mansingh, 2005, PHI Learning.

References for Laboratory Work :

1. Electronic circuits: Handbook of design & applications, U.Tietze, Ch.Schenk, Springer
2. Basic Electronics: A text lab manual, P.B.Zbar, A.P.Malvino, M.A.Miller, 1990, McGraw Hill

DSE: Advanced Mathematical Physics - I (32227502)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

The course is intended to impart the concept of generalized mathematical constructs in terms of Algebraic Structures (mainly Vector Spaces) and Tensors to have in-depth analysis of our physical system.

Course Learning Outcomes

At the end of this course, students will be able to

- Understand algebraic structures in n-dimension and basic properties of the linear vector spaces.
- Represent Linear Transformations as matrices and understand basic properties of matrices.
- Apply vector spaces and matrices in the quantum world.
- Learn basic properties of Cartesian and general tensors with physical examples such as moment of inertia tensor, energy momentum tensor, stress tensor, strain tensor etc.
- Learn how to express the mathematical equations for the Laws of Physics in their co-variant forms.
- In the laboratory course, the students are expected to solve the problems using the Scilab/C++/Python computer language: Eigenvalues and Eigenvectors of given matrix, determination of wave functions for stationary states as eigenfunctions, eigen energy values of Hermitian differential operators, Lagrangian formulation in classical dynamics etc.

Unit 1

Linear Vector Spaces Abstract Systems: Binary Operations and Relations. Introduction to Groups and Fields.

Vector Spaces and Subspaces. Linear Independence and Dependence of Vectors. Basis and Dimensions of a Vector Space. Change of basis. Homomorphism and Isomorphism of Vector Spaces. Linear Transformations. Algebra of Linear Transformations. Non-singular Transformations. Representation of Linear Transformations by Matrices.

(12 Lectures)

Unit 2

Matrices, Addition and Multiplication of Matrices: Null Matrices. Diagonal, Scalar and Unit Matrices. Upper- Triangular and Lower-Triangular Matrices. Transpose of a Matrix. Symmetric and Skew-Symmetric Matrices. Conjugate of a Matrix. Hermitian and Skew-Hermitian Matrices. Singular and Non-Singular matrices. Orthogonal and Unitary Matrices. Similar Matrices. Trace of a Matrix. Inner Product.

(8 Lectures)

Unit 3

Eigen-values and Eigenvectors: Finding Eigen – values and Eigen vectors of a Matrix. Diagonalization of Matrices. Properties of Eigen-values and Eigen Vectors of Orthogonal, Hermitian and Unitary Matrices. Cayley-Hamilton Theorem (Statement only). Finding inverse of a matrix using Cayley-Hamilton Theorem. Use of Matrices in Solving ordinary second order differential equations and Coupled Linear Ordinary Differential Equations of first order. Functions of a Matrix.

(10 Lectures)

Unit 4

Cartesian Tensors: Transformation of Co-ordinates and fundamentals of Tensors. Einstein's Summation Convention. Relation between Direction Cosines. Algebra of Tensors: Sum, Difference and Product of Two Tensors. Contraction. Quotient Law of Tensors. Symmetric and Anti-symmetric Tensors. Invariant Tensors: Kronecker and Alternating Tensors. Association of Anti-symmetric Tensor of Order Two and Vectors.

(8 lectures)

Unit 5

Applications of Cartesian Tensors: Vector Calculus using Cartesian Tensors: Scalar and Vector Products of 2, 3, 4 vectors. Gradient, Divergence and Curl of Tensor Fields. Tensor notation of Laplacian operator. Proof of Vector Identities involving scalar and vector products and vector identities involving Del operator using Tensor notation. Isotropic Tensors (Definition only). Tensorial Character of Physical Quantities. Moment of Inertia Tensor. Stress and Strain Tensors: Symmetric Nature. Elasticity Tensor. Generalized Hooke's Law.

(12 lectures)

Unit 6

General Tensors: Transformation of Co-ordinates. Contravariant & Covariant Vectors. Contravariant, Covariant and Mixed Tensors. Kronecker Delta and Permutation Tensors. Algebra of Tensors. Sum, Difference & Product of Two Tensors. Contraction. Quotient Law of Tensors. Symmetric and Anti- symmetric Tensors. Metric Tensor in cartesian, cylindrical, spherical coordinates.

(10 Lectures)

Practical: 60 Hours

PRACTICAL- DSE LAB: Advanced Mathematical Physics-I

Scilab/C++/Python based simulations experiments based on Mathematical Physics problems like (at least 06 experiments)

1. Linear algebra: Power and Inverse Power methods for finding largest and smallest Eigenvalue and eigenvectors of matrices. QR method e.g.

$$\begin{pmatrix} 2 & 1 & 1 \\ 1 & 3 & 2 \\ 3 & 1 & 4 \end{pmatrix}; \begin{pmatrix} 1 & -i & 3+4i \\ +i & 2 & 4 \\ 3-4i & 4 & 3 \end{pmatrix}; \begin{pmatrix} 2 & -i & 2i \\ +i & 4 & 3 \\ -2i & 3 & 5 \end{pmatrix}$$

2. Orthogonal polynomials as eigenfunctions of Hermitian differential operators.

3. Determination of the principal axes of moment of inertia through diagonalization (Matrix can be generated for a given distribution of discrete masses).
4. Study of geodesics in Euclidean and other spaces (surface of a sphere, etc): Using variational principle to find the shortest curve between two points. Suggested Physics problem: problem of refraction.
5. Application to solve differential equations for a bound system – Eigen value problem.
6. Application to computer graphics:
Write operators for shear, strain, two dimensional rotational problems, Reflection, Translation etc. Plot old and new coordinates.
7. Lagrangian formulation in classical mechanics with constraints.
8. Vector space of wave functions in Quantum Mechanics: Position and Momentum differential operators and their commutator, wave functions for stationary states as eigenfunction

Note: Students opting for Linear algebra and Tensor analysis as one option in DSE cannot opt Advanced mathematical physics-I course as second option.

References for Theory:

Essential Readings:

1. Mathematical Tools for Physics, James Nearing, 2010, Dover Publications
2. Theory and Problems of Linear Algebra, Seymour Lipschutz, 1987, McGraw-Hill Inc.
3. Theory and Problems of Vector Analysis and an introduction to Tensor Analysis, Murray R. Spiegel, 1974, McGraw Hill, Inc.
4. Introduction to Matrices & Linear Transformations, D.T.Finkbeiner, 1978, Dover Pub.
5. Matrices and tensors in Physics: A.W. Joshi, New Age International Pvt. Ltd (2017).

Additional Readings:

1. Mathematical Methods for Physicists, G.B. Arfken, H.J. Weber and F.E.Harris, 1970, Elsevier.
2. Elementary Linear Algebra, Applications Version, Howard Anton and Chris Rorres, Wiley Student edition.
3. Mathematics for Physicists, Susan M. Lea, 2004, Thomson Brooks/Cole
4. Introduction to Vectors and Tensors, Ray M Bowen, C -C Wang, Dover Publications (2009)
5. An Introduction to Linear Algebra and Tensors, M A Akivis, V V Goldberg, Richard and Silverman, Dover Publications (2012)
6. Vector Analysis and Cartesian Tensors, D.E. Bourne and P.C. Kendall, CRC Press (1992).
7. Cartesian Tensors, Harold Jeffreys, Cambridge University Press (1931).

References for Laboratory Work:

1. Scilab by example: M. Affouf, 2012, ISBN: 978-1479203444
2. Learning Scientific Programming with Python, Christian Hill, Cambridge University Press (2016)
3. Computational Problems for Physics: With Guided Solutions Using Python, Rubin H. Landau, Manuel José Páez, CRC Press (2018).
4. Numerical Recipes in C⁺⁺: The Art of Scientific Computing, W.H. Press et.al., 2nd Edn., Cambridge University Press (2013).
5. Elementary Numerical Analysis, K.E. Atkinson, 3rd Edn., 2007, Wiley India Edition.

DSE: Nuclear and Particle Physics (32227504)

Credit : 06 (Theory-05, Tutorial-01)

Theory : 75 Hours

Tutorial : 15 Hours

Course Objective

The objective of the course is to impart the understanding of the sub atomic particles and their properties. It will emphasize to gain knowledge about the different nuclear techniques and their applications in different branches Physics and societal application. The course will focus on the developments of problem based skills.

Course Learning Outcomes

- To be able to understand the basic properties of nuclei as well as knowledge of experimental determination of the same, the concept of binding energy, its various dependent parameters, N-Z curves and their significance
- To appreciate the formulations and contrasts between different nuclear models such as Liquid drop model, Fermi gas model and Shell Model and evidences in support.
- Knowledge of radioactivity and decay laws. A detailed analysis, comparison and energy kinematics of alpha, beta and gamma decays.
- Familiarization with different types of nuclear reactions, Q- values, compound and direct reactions.
- To know about energy losses due to ionizing radiations, energy losses of electrons, gamma ray interactions through matter and neutron interaction with matter. Through the section on accelerators students will acquire knowledge about Accelerator facilities in India along with a comparative study of a range of detectors and accelerators which are building blocks of modern day science.

- It will acquaint students with the nature and magnitude of different forces, particle interactions, families of sub-atomic particles with the different conservation laws, concept of quark model.
- The acquired knowledge can be applied in the areas of nuclear medicine, medical physics, archaeology, geology and other interdisciplinary fields of Physics and Chemistry. It will enhance the special skills required for these fields.

Unit 1

General Properties of Nuclei: Constituents of nucleus and their Intrinsic properties, quantitative facts about mass, radii, charge density, matter density (experimental determination of each), binding energy, average binding energy and its variation with mass number, main features of binding energy versus mass number curve, N/Z plot, angular momentum, parity, magnetic moment, electric moments.

(10 Lectures)

Unit 2

Nuclear Models: Liquid drop model approach, semi empirical mass formula and significance of its various terms, condition of nuclear stability, nucleon separation energies (up to two nucleons), Fermi gas model (degenerate fermion gas, nuclear symmetry potential in Fermi gas), evidence for nuclear shell structure and the basic assumptions of shell model.

(11 Lectures)

Unit 3

Radioactivity decay: Decay rate and equilibrium (Secular and Transient) (a) Alpha decay: basics of α -decay processes, theory of α -emission, Gamow factor, Geiger Nuttall law, α -decay spectroscopy, decay Chains. (b) β -decay: energy kinematics for β -decay, β -spectrum, positron emission, electron capture, neutrino hypothesis. (c) Gamma decay: Gamma rays emission from the excited state of the nucleus & kinematics, internal conversion.

(10 Lectures)

Unit 4

Nuclear Reactions: Types of Reactions, units of related physical quantities, Conservation Laws, kinematics of reactions, Q-value, reaction rate, reaction cross section, Concept of compound and direct reaction, resonance reaction, Coulomb scattering (Rutherford scattering).

(8 Lectures)

Unit 5

Interaction of Nuclear Radiation with matter: Energy loss due to ionization (Bethe-Block formula), energy loss of electrons, Cerenkov radiation. Gamma ray interaction through matter (photoelectric effect, Compton scattering, pair production), neutron interaction with matter.

(9 Lectures)

Detector for Nuclear Radiations: Gas detectors: estimation of electric field, mobility of particle for ionization chamber and GM Counter. Basic principle of Scintillation Detectors

and construction of photo-multiplier tube (PMT). Semiconductor Detectors (Si and Ge) for charge particle and photon detection (concept of charge carrier and mobility), neutron detector.

(9 Lectures)

Particle Accelerators: Accelerator facility available in India: Van-de Graaff generator (Tandem accelerator), Linear accelerator, Cyclotron, Synchrotrons (Principal, construction, working, advantages and disadvantages).

(7 Lectures)

Unit 6

Particle physics: Particle interactions (concept of different types of forces), basic features, Cosmic Rays, types of particles and its families, Conservation Laws (energy and momentum, angular momentum, parity, baryon number, Lepton number, Isospin, Strangeness) concept of quark model, color quantum number and gluons.

(11 Lectures)

References for Theory :

Essential Readings:

1. Basic ideas and concepts in Nuclear Physics: An introductory approach by K Heyde, third edition, IOP Publication, 1999.
2. Nuclear Physics by S N Ghoshal, First edition, S. Chand Publication, 2010.
3. Introductory Nuclear Physics by K S Krane, Wiley-India Publication, 2008.
4. Nuclear Physics: principles and applications by J Lilley, Wiley Publication, 2006.
5. Radiation detection and measurement, G F Knoll, John Wiley & Sons, 2010.
6. Introduction to elementary particles by D J Griffiths, Wiley, 2008.

Additional Readings:

1. Concepts of Nuclear Physics by B L Cohen, Tata McGraw Hill Publication, 1974.
2. Physics and Engineering of Radiation Detection by S N Ahmed, Academic Press Elsevier, 2007.
3. Techniques for Nuclear and Particle Physics experiments by WR Leo, Springer, 1994.
4. Modern Physics by R A Serway, C J Moses and C A Moyer, 3rd edition, Thomson Brooks Cole, 2012.
5. Modern Physics for Scientists and Engineers by S T Thornton and A Rex, 4th edition, Cengage Learning, 2013.
6. Modern Physics by R A Serway, C J Moses and C A Moyer, 3rd edition, Thomson Brooks Cole, 2012.
7. Concepts of Modern Physics by Arthur Beiser, McGraw Hill Education, 2009.

References for Tutorial:

1. Schaum's Outline of Modern Physics, McGraw-Hill, 1999.
2. Schaum's Outline of College Physics, by E. Hecht, 11th edition, McGraw Hill, 2009.
3. Modern Physics by K Sivaprasath and R Murugesan, S Chand Publication, 2010.
4. Nuclear Physics "Problem-based Approach" Including MATLAB by Hari M. Aggarwal, PHI Learning Pvt. Ltd. (2016).

DSE: Physics of Devices and Communication (32227505)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This paper is based on advanced electronics which covers the devices such as UJT, JFET, MOSFET, CMOS etc. Process of IC fabrication is discussed in detail. Digital Data serial and parallel Communication Standards are described along with the understanding of communication systems.

Course Learning Outcomes

At the end of this course, students will be able to

- Develop the basic knowledge of semiconductor device physics and electronic circuits along with the practical technological considerations and applications.
- Understand the operation of devices such as UJT, JFET, MOS, various bias circuits of MOSFET, Charge coupled Devices and Tunnel Diode.
- Learn to analyze MOSFET circuits and develop an understanding of MOSFET I-V characteristics and the allowed frequency limits.
- Learn the IC fabrication technology involving the process of diffusion, implantation, oxidation and etching with an emphasis on photolithography and electron-lithography.
- Apply concepts for the regulation of power supply by developing an understanding of various kinds of RC filters classified on the basis of allowed range of frequencies.
- Learn basic principles of phase locked loop (PLL) and understand its operation.
- Gain understanding of Digital Data serial and parallel Communication Standards. Knowledge of USB standards and GPIB.
- Understand different blocks in communication system, need of modulation, modulation processes and different modulation schemes.

Unit 1

Devices: Characteristic and small signal equivalent circuits of UJT and JFET. Metal-semiconductor Junction. Metal oxide semiconductor (MOS) device. Ideal MOS and Flat Band voltage. SiO₂-Si based MOS, C-V characteristics of MOS, MOSFET– their frequency limits. Enhancement and Depletion Mode MOSFETS, CMOS. Charge coupled devices.

(17 Lectures)

Unit 2

Processing of Devices: Basic process flow for IC fabrication. Crystal plane and orientation. Diffusion and implantation of dopants. Passivation. Oxidation Technique for Si. Contacts and metallization technique. Wet etching. Dry etching (RIE). Positive and Negative Masks. Photolithography. Electron-lithography, Basic idea of SSI, MSI, LSI, VLSI and USI.

(14 Lectures)

Unit 3

RC Filters: Passive-Low pass and High pass filters, Active (1st order butterworth) -Low Pass, High Pass, Band Pass and band Reject Filters.

(3 Lectures)

Phase Locked Loop (PLL): Basic Principles, Phase detector (XOR and edge triggered), Voltage Controlled Oscillator (Basics, varactor). Lock and capture. Basic idea of PLL IC (565 or 4046).

(6 Lectures)

Digital Data Communication Standards: Serial Communications: RS232, Handshaking, Implementation of RS232 on PC, Universal Serial Bus (USB), USB standards, Types and elements of USB transfers. Parallel communications: General Purpose Interface Bus (GPIB), GPIB signals and lines, Handshaking and interface management, Implementation of a GPIB on a PC. Basic idea of sending data through a COM port.

(5 Lectures)

Unit 4

Introduction to communication systems: Block diagram of electronic communication system, Need for modulation. Amplitude modulation. Modulation Index. Analysis of Amplitude Modulated wave. Sideband frequencies in AM wave. CE Amplitude Modulator. Demodulation of AM wave using Diode Detector. Frequency modulation and demodulation, basic idea of Frequency, Phase, Pulse and Digital Modulation including ASK, PSK, FSK.

(15 lectures)

Practical: 60 Hours

PRACTICAL- DSE LAB: Physics of Devices and Communication

Session on the construction and use of CRO, and other experimental apparatuses used in the lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least 06 experiments each from section-A and section-B:

Section-A:

1. To design a power supply using bridge rectifier and study effect of C-filter.
2. To design the active Low pass and High pass filters of given specification.
3. To design the active filter (wide band pass and band reject) of given specification.
4. To study the output and transfer characteristics of a JFET.
5. To design a common source JFET Amplifier and study its frequency response.
6. To study the output characteristics of a MOSFET.
7. To study the characteristics of a UJT and design a simple Relaxation Oscillator.
8. To design an Amplitude Modulator using Transistor.
9. To design PWM, PPM, PAM and Pulse code modulation using ICs.

10. To design an Astable multivibrator of given specifications using transistor.
11. To study a PLL IC (Lock and capture range).
12. To study envelope detector for demodulation of AM signal.
13. Study of ASK and FSK modulator.
14. Glow an LED via USB port of PC.
15. Sense the input voltage at a pin of USB port and subsequently glow the LED connected with another pin of USB port.

Section-B: SPICE/MULTISIM simulations for electronic circuits and devices

1. To verify the Thevenin and Norton Theorems.
2. Design and analyze the series and parallel LCR circuits
3. Design the inverting and non-inverting amplifier using an Op-Amp of given gain
4. Design and Verification of op-amp as integrator and differentiator
5. Design the 1st order active low pass and high pass filters of given cutoff frequency
 - (i) Design a Wein's Bridge oscillator of given frequency.
 - (ii) Design clocked SR and JK Flip-Flop's using NAND Gates
 - (iii) Design 4-bit asynchronous counter using Flip-Flop ICs
 - (iv) Design the CE amplifier of a given gain and its frequency response.
 - (v) 10. Design an Astable multivibrator using IC555 of given duty cycle.

References for Theory :

Essential Readings :

1. Physics of Semiconductor Devices, S.M.Sze and K.K.Ng, 3rd Edition 2008, John Wiley & Sons
2. Electronic Devices and Circuits, A. Mottershead, 1998, PHI Learning Pvt. Ltd.
3. Electronic Communication systems, G. Kennedy, 1999, Tata McGraw Hill.
4. Integrated Electronics, J. Millman and C.C. Halkias, 1991, Tata Mc-Graw Hill.
5. Electronics: Fundamentals and Applications, J.D. Ryder, 2004, Prentice Hall.

Additional Readings :

1. Op-Amps & Linear Integrated Circuits, R.A.Gayakwad, 4 Ed. 2000, PHI Learning Pvt. Ltd
2. Introduction to Measurements & Instrumentation, A.K.Ghosh, 4th Edition, 2017, PHI Learning
3. Semiconductor Physics and Devices, D.A. Neamen, 2011, 4th Edition, McGraw Hill

References for Laboratory Work:

1. PC based instrumentation; Concepts and Practice, N. Mathivanan, 2007, Prentice-Hall of India
2. Basic Electronics: A text lab manual, P.B.Zbar, A.P.Malvino, M.A.Miller, 1994, McGraw Hill
3. Introduction to PSPICE using ORCAD for circuits & Electronics, M.H.Rashid, 2003, PHI Learning.

DSE: Astronomy and Astrophysics (32227506)

Credit : 06 (Theory-05, Tutorial-01)

Theory : 75 Hours

Tutorial : 15 Hours

Course Objective

This course is designed to provide students with the basic knowledge about the theory and techniques of observational astronomy and physics of the astrophysical phenomenon. It applies theoretical concepts and mathematical techniques students have learnt in their earlier courses to astronomical and astrophysical phenomenon.

Course Learning Outcomes

Students completing this course will gain an understanding of

- Different types of telescopes, diurnal and yearly motion of astronomical objects, and astronomical coordinate systems and their transformations.
- Brightness scale for stars, types of stars, their structure and evolution on HR diagram.
- Components of Solar System and its evolution
- The large scale structure of the Universe and its history
- Distribution of chemical compounds in the interstellar medium and astrophysical conditions necessary for the emergence and existence of life.

Unit 1

Introduction to Astronomy and Astronomical Scales: Overview of the Night Sky, Diurnal and Yearly motions of the Sun, Stars and Constellations. Size, Mass, Density and Temperature of Astronomical Objects. Basic concepts of Positional Astronomy: Celestial Sphere, Geometry of a Sphere, Spherical Triangle, Astronomical Coordinate Systems, Horizon System, Equatorial System, Conversion of Coordinates. Rising and Setting Times, Measurement of Time, Side real Time, Apparent Solar Time, Mean Solar Time, Equation of Time, Astronomical Time Systems (LMT, UT, UTC).

(16 Lectures)

Unit 2

Basic Parameters of Stars: Determination of Distance by Parallax Method; Proper Motion, Brightness, Radiant Flux and Luminosity, Apparent and Absolute Magnitude Scales, Distance Modulus, Extinction, Determination of Temperature and Radius of a star; Stellar Spectra, Atomic Spectra Revisited, Introduction to Boltzman and Saha Equations, Balmer Lines of H, H and K lines of Ca, Spectral Types and Their Temperature Dependence, Black

Body Approximation, Luminosity Classification, H R Diagram and Relations Between Stellar Parameters.

(16 Lectures)

Unit 3

Observational Tools and Physical Principles: Observing through the atmosphere (Scintillation, Seeing, Atmospheric Windows and Extinction) Basic Optical Definitions for Telescopes: Magnification, Light Gathering Power, Limiting magnitude, Resolving Power, Diffraction Limit. Optical and Radio Telescopes, Current Indian Observatories. Virial theorem for N particle systems, applications in astrophysics. Systems in Thermodynamic Equilibrium, Equations for Hydrostatic equilibrium, Mean Molecular Weight of stellar gas, Stellar Energy Sources.

(16 Lectures)

Unit 4

Sun and the Milky Way: Solar Parameters, Sun's Internal Structure, Solar Photosphere, Solar Atmosphere, Chromosphere. Corona, Solar Activity, Solar Magneto-Hydrodynamics, Alfven's Theorem. Basic Structure and Properties of the Milky Way, Nature of rotation of the Milky Way (Differential rotation of the Galaxy and Oort Constants, Rotation Curve of the Galaxy and the Dark Matter, Nature of the Spiral Arms), Properties of and Around the Galactic Nucleus.

(15 Lectures)

Unit 5

Cosmology: Standard Candles (Cepheids and SNe Type Ia), Cosmic Distance Ladder, Olbers Paradox, Hubble Expansion, Cosmological Principle, Newtonian Cosmology and Friedmann Models

(12 Lectures)

References for Theory :

Essential Readings :

1. Fundamental of Astronomy (Fourth Edition), H. Karttunen et al. Springer
2. Astrophysics Stars and Galaxies K D Abhyankar, Universities Press
3. Modern Astrophysics, B.W. Carroll & D.A. Ostlie, Addison-Wesley Publishing Co.
4. Baidyanath Basu, An introduction to Astrophysics, Second printing, Prentice - Hall of India Private limited, New Delhi, 2001.
5. Introductory Astronomy and Astrophysics, M. Zeilik and S.A. Gregory, 4th Edition, Saunders College Publishing.

Additional Readings:

1. Explorations: Introduction to Astronomy, Thomas Arny and Stephen Schneider, 2014, 7th edition, McGraw Hill
2. Principles of Stellar Dynamics, S Chandrasekhar, Dover Books
3. The Physical Universe: An Introduction to Astronomy, F H Shu, University Science Books
4. Textbook of Astronomy and Astrophysics with elements of cosmology, V.B. Bhatia, Narosa Publication.

DSE: Atmospheric Physics (32227507)

Credit:06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical: 60 Hours

Course Objective

This paper aims to describe the characteristics of the Earth's atmospheric thermal structure and chemical composition. It enables to learn remote sensing techniques to explore atmospheric processes and helps to understand long term oscillations and fluid system dynamics which control climate change. Also, it delineates characteristics of pollutants and aerosols variability in the lower and middle atmosphere.

Course Learning Outcomes

At the end of this course, students will be able to

- Learn and understand structure of temperature profiles and fine scale features in the troposphere using observations.
- Understand Atmospheric waves: surface water waves, atmospheric gravity waves, acoustic waves etc
- Learn remote sensing techniques such as radar, lidar, and satellite to explore atmospheric processes.
- Understand properties of aerosols, their radiative and health effects.

Unit 1

General features of Earth's atmosphere: Thermal structure of the Earth's Atmosphere, Composition of atmosphere, Hydrostatic equation, Potential temperature, Atmospheric Thermodynamics, Greenhouse effect, Local winds, monsoons, fogs, clouds, precipitation, Atmospheric boundary layer, Sea breeze and land breeze. Instruments for meteorological observations including RS/RW, meteorological processes and convective systems, fronts, Cyclones and anticyclones, thunderstorms.

(12 Lectures)

Unit 2

Atmospheric Dynamics: Scale analysis, Fundamental forces, Basic conservation laws, The Vectorial form of the momentum equation in rotating coordinate system, scale analysis of equation of motion, Applications of the basic equations, Circulations and vorticity, Atmospheric oscillations, Quasi biennial oscillation, annual and semi-annual oscillations, Mesoscale circulations, The general circulations, Tropical dynamics.

(12 Lectures)

Unit 3

Atmospheric Waves: Surface water waves, wave dispersion, acoustic waves, buoyancy waves, propagation of atmospheric gravity waves (AGWs) in a nonhomogeneous medium, Lamb wave, Rossby waves and its propagation in three dimensions and in sheared flow, wave absorption, non-linear consideration.

(12 Lectures)

Unit 4

Atmospheric Radar and Lidar: Radar equation and return signal, Signal processing and detection, Various type of atmospheric radars, Applications of radars to study atmospheric phenomena, Lidar and its applications, Application of Lidar to study atmospheric phenomenon. Data analysis tools and techniques.

(12 Lectures)

Unit 5

Atmospheric Aerosols: Spectral distribution of the solar radiation, Classification and properties of aerosols, Production and removal mechanisms, Concentrations and size distribution, Radiative and health effects, Observational techniques for aerosols, Absorption and scattering of solar radiation, Rayleigh scattering and Mie scattering, Bouguert-Lambert law, Principles of radiometry, Optical phenomena in atmosphere, Aerosol studies using Lidars.

(12 Lectures)

Practical : 60 Hours

PRACTICAL- DSE LAB: Atmospheric Physics

Scilab/C ++ based simulations experiments based on Atmospheric Physics problems like
At least 05 Experiments from the following

1. Numerical Simulation for atmospheric waves using dispersion relations
 - a. Atmospheric gravity waves (AGW)
 - b. Kelvin waves
 - c. Rossby waves, and mountain waves
2. Offline and online processing of radar data
 - a. VHF radar,
 - b. X-band radar, and
 - c. UHF radar
3. Offline and online processing of LIDAR data
4. Radiosonde data and its interpretation in terms of atmospheric parameters using vertical profiles in different regions of the globe.
5. Handling of satellite data and plotting of atmospheric parameters using radio occultation technique
6. Time series analysis of temperature using long term data over metropolitan cities in India – an approach to understand the climate change
7. PM 2.5 measurement using compact instruments
8. Field visits to National center for medium range weather forecasting, India meteorological departments, and ARIES Nainital to see onsite radiosonde balloon launch, simulation on computers and radar operations on real time basis.

References for Theory :

Essential Readings :

1. Fundamental of Atmospheric Physics, M.L Salby; Academic Press, Vol 61, 1996
2. The Physics of Atmosphere – John T. Houghton; Cambridge University press; 3 rd edn. 2002.
3. An Introduction to dynamic meteorology – James R Holton; Academic Press, 2004
4. Radar for meteorological and atmospheric observations – S Fukao and K Hamazu, Springer Japan, 2014

Additional Readings :

1. Stratosphere Troposphere Interactions - K Mohanakumar, Springer Netherlands, 2008.
2. Climate change in the Himalayas , Springer publication, by GB Pant, P Pradeep Kumar, J V Revadekar, Narendra Singh, 2018.
3. 3.Gravity wave generation in the lower stratosphere due to passage of the typhoon 9426 (Orchid) observed by the MU radar at Shigaraki (34.85 N, 136.10 E), SK Dhaka, M Takahashi, Y. Shibagaki, MD Yamanaka, S Fukao, Journal of Geophysical Research: Atmosphere 108 (D19), 2003.
4. Indian MST radar observations of gravity wave activities associated with tropical convection, SK Dhaka, PK Devrajan, Y Shibagaki, RK Choudhary, S Fukao, Journal of Atmospheric and Solar-Terrestrial Physics 63 (15), 1631-1642.

References for Laboratory Work:

Data sources for radar, lidar, satellite and radiosondes

1. <https://www.narl.gov.in>
2. <http://www.imd.gov.in>
3. <https://www.ncmrwf.gov.in/>
4. <https://www.aries.res.in/>
5. <http://www.rish.kyoto-u.ac.jp/ear/index-e.html>

DSE: Biological Physics (32227508)
Credit : 06 (Theory-05, Tutorial-01)
Theory : 75 Hours
Tutorial : 15 Hours

Course Objective

This course familiarizes the students with the basic facts and ideas of biology from a quantitative perspective. It shows them how ideas and methods of physics enrich our understanding of biological systems at diverse length and time scales. The course also gives them a flavour of the interface between biology, chemistry, physics and mathematics.

Course Learning Outcomes

After completing this course, students will

- Know basic facts about biological systems, including single cells, multicellular organisms and ecosystems from a quantitative perspective.
- Gain familiarity with various biological processes at different length and time scales, including molecular processes, organism level processes and evolution.
- Be able to apply the principles of physics from areas such as mechanics, electricity and magnetism, thermodynamics, statistical mechanics, and dynamical systems to understand certain living processes.
- Gain a systems level perspective on organisms and appreciate how networks of interactions of many components give rise to complex behavior.
- Perform mathematical and computational modelling of certain aspects of living systems.

Unit 1

Overview: The boundary, interior and exterior environment of living cells. Processes: exchange of matter and energy with environment, metabolism, maintenance, reproduction, evolution. Self-replication as a distinct property of biological systems. Time scales and spatial scales. Allometric scaling laws.

(6 Lectures)

Unit 2

Molecules of life: Metabolites, proteins and nucleic acids. Their sizes, types and roles in structures and processes. Transport, energy storage, membrane formation, catalysis, replication, transcription, translation, signaling. Typical populations of molecules of various types present in cells, their rates of production and turnover. Energy required to make a bacterial cell. Simplified mathematical models of transcription and translation, small genetic circuits and signaling pathways to be studied analytically and computationally.

(18 Lectures)

Unit 3

Molecular motion in cells: Random walks and applications to biology: Diffusion; models of macromolecules. Entropic forces: Osmotic pressure; polymer elasticity.

Chemical forces: Self assembly of amphiphiles. Molecular motors: Transport along microtubules. Flagellar motion: bacterial chemotaxis.

(22 Lectures)

Unit 4

The complexity of life: At the level of a cell: The numbers of distinct metabolites, genes and proteins in a cell. Metabolic, regulatory and signaling networks in cells. Dynamics of metabolic networks; the stoichiometric matrix. The implausibility of life based on a simplified probability estimate, and the origin of life problem. At the level of a multicellular organism: Numbers and types of cells in multicellular organisms. Cellular differentiation and development. Brain structure: neurons and neural networks. Brain as an information processing system. At the level of an ecosystem and the biosphere: Foodwebs. Feedback cycles and self- sustaining ecosystems.

(20 Lectures)

Unit 5

Evolution: The mechanism of evolution: variation at the molecular level, selection at the level of the organism. Models of evolution. The concept of genotype-phenotype map. Examples.

(9 Lectures)

References for Theory :

Essential Readings :

1. Biological Physics: Energy, Information, Life; Philip Nelson (W H Freeman &Co, NY, 2004)
2. Physical Biology of the Cell (2nd Edition); Rob Phillips et al (Garland Science, Taylor & Francis Group, London & NY, 2013)
3. An Introduction to Systems Biology; Uri Alon (Chapman and Hall/CRC, Special Indian Edition, 2013)
4. Evolution; M. Ridley (Blackwell Publishers, 2009, 3rd edition).

DSE: Embedded systems - Introduction to Microcontroller (32227518)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course familiarizes students to the designing and development of embedded systems. This course gives a review of microprocessor and introduces microcontroller 8051.

Course Learning Outcomes

At the end of this course, students will be able to :

- Know the major components that constitute an embedded system.
- Understand what is a microcontroller, microcomputer embedded system.
- Describe the architecture of a 8051 microcontroller.
- Write simple programs for 8051 microcontroller in C language.
- Understand key concepts of 8051 microcontroller systems like I/O operations, interrupts, programming of timers and counters.
- Interface 8051 microcontroller with peripherals
- Understand and explain concepts and architecture of embedded systems
- Implement small programs to solve well-defined problems on an embedded platform.
- Develop familiarity with tools used to develop an embedded environment
- Learn to use the Arduino Uno (an open source microcontroller board) in simple applications.
- In the laboratory, students will program 8051 microcontroller and Arduino to perform various experiments.

Unit 1

Embedded system introduction: Introduction to embedded systems and general purpose computer systems, architecture of embedded system, classifications, applications and purpose of embedded systems.

(4 Lectures)

8051 microcontroller: Introduction and block diagram of 8051 microcontroller, architecture of 8051, 8051 assembly language programming, Program Counter and ROM memory map, Data types and directives, Flag bits and Program Status Word (PSW) register, Jump, loop and call instructions.

(12 Lectures)

Unit 2

8051 I/O port programming: Introduction of I/O port programming, pin out diagram of 8051 microcontroller, I/O port pins description & their functions, I/O port programming in 8051 (using assembly language), I/O programming: Bit manipulation.

(4 Lectures)

Programming: 8051 addressing modes and accessing memory using various addressing modes, assembly language instructions using each addressing mode, arithmetic and logic instructions, 8051 programming in C: for time delay & I/O operations and manipulation, for arithmetic and logic operations, for ASCII and BCD conversions.

(12 Lectures)

Unit 3

Timer and counter programming: Programming 8051 timers, counter programming.

(3 Lectures)

Serial port programming with and without interrupt: Introduction to 8051 interrupts, programming timer interrupts, programming external hardware interrupts and serial communication interrupt, interrupt priority in the 8051.

(6 Lectures)

Interfacing 8051 microcontroller to peripherals: Parallel and serial ADC, DAC interfacing, LCD interfacing.

(2 Lectures)

Unit 4

Programming Embedded Systems: Structure of embedded program, infinite loop, compiling, linking and locating, downloading and debugging.

(3 Lectures)

Embedded system design and development: Embedded system development environment, file types generated after cross compilation, disassembler/ decompiler, simulator, emulator and debugging, embedded product development life-cycle, trends in embedded industry.

(8 Lectures)

Unit 5

Introduction to Arduino: Pin diagram and description of Arduino UNO. Basic programming and applications.

(6 Lectures)

Practical : 60 Hours

PRACTICALS- DSE LAB: Embedded systems - Introduction to Microcontroller

8051 microcontroller-based Programs and experiments (at least 06 experiments):

1. To find that the given numbers is prime or not.
2. To find the factorial of a number.
3. Write a program to make the two numbers equal by increasing the smallest number and decreasing the largest number.
4. Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on LED's .
5. Program to glow the first four LEDs then next four using TIMER application.
6. Program to rotate the contents of the accumulator first right and then left.

7. Program to run a countdown from 9-0 in the seven segment LED display.
8. To interface seven segment LED display with 8051 microcontroller and display 'HELP' in the seven segment LED display.
9. To toggle '1234' as '1324' in the seven segment LED display.
10. Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clockwise direction.
11. Application of embedded systems: Temperature measurement, some information on LCD display, interfacing a keyboard.
12. Arduino based programs and experiments:
13. Make a LED flash at different time intervals.
14. To vary the intensity of LED connected to Arduino
15. To control speed of a stepper motor using a potential meter connected to Arduino
16. To display "PHYSICS" on LCD/CRO.

References for Theory :

Essential Readings :

1. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
2. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M.A. Mazidi, J.G. Mazidi, and R.D. McKinlay, 2nd Ed., 2007, Pearson Education India.
3. Introduction to embedded system, K.V. Shibu, 1st edition, 2009, McGraw Hill
4. Microprocessors and Microcontrollers, Krishna Kant, 2nd Edition, 2016. PHI learning Pvt. Ltd.

Additional Readings :

1. Embedded Systems & Robots, Subrata Ghoshal, 2009, Cengage Learning
2. Embedded System, B.K. Rao, 2011, PHI Learning Pvt. Ltd.

References for Laboratory Work :

1. Microcontrollers in practice, I.Susnea and M.Mitescu, 2005, Springer.
2. Embedded Microcomputer systems: Real time interfacing, J.W.Valvano 2011, Cengage Learning

DSE: Linear Algebra and Tensor Analysis (xxx3)

Credit : 06 (Theory-05, Tutorial-01)

Theory : 75 Hours

Tutorial : 15 Hours

Course Objective

The course is intended to impart the concept of generalized mathematical constructs in terms of Algebraic Structures (mainly Vector Spaces) and Tensors to have in-depth analysis of our physical system.

Course Learning Outcomes

At the end of this course, students will be able to

- Understand algebraic structures in n-dimension and basic properties of the linear vector spaces.
- Represent Linear Transformations as matrices and understand basic properties of matrices.
- Apply vector spaces and matrices in the quantum world.
- Learn basic properties of Cartesian and general tensors with physical examples such as moment of inertia tensor, energy momentum tensor, stress tensor, strain tensor, geometrical applications etc.
- Learn how to express the mathematical equations for the Laws of Physics in their co-variant forms.

Unit 1

Vector Space and Subspace: Binary Operations, Groups, Rings & Fields, Vector Space & Subspace, Examples of Vector Spaces, Euclidean Vector Spaces: Length and Distance in R_n , Matrix notation for vectors in R_n , Four Subspaces associated with a Matrix

(8 Lectures)

Basic and Dimension: Linear Dependence and Independence of vectors, Spanning a Space, Basis and Dimensions, Rank and Nullity of a Matrix, Examples from Real Function Space and Polynomial Space, Orthogonal Vectors and Subspaces, Orthogonal Basis, Gram-Schmidt process of generating an Orthonormal Basis

(4 Lectures)

Unit 2

Linear Transformation: Function and Mapping, General Linear Transformations and Examples, Kernel and Range of a Matrix Transformation, Homomorphism and Isomorphism of vector space, Singular and Non-singular Mapping/Transformations, Algebra of Linear operator.

(8 Lectures)

Invertible operators: Identity Transformation, Matrices and Linear Operators, Matrix Representation of a Linear transformation and change of basis, Similarity.

(5 Lectures)

Unit 3

Matrices and Matrix Operations: Addition and Multiplication of Matrices, Null Matrices, Diagonal, Scalar and Unit Matrices, Upper Triangular and Lower-Triangular Matrices, Transpose of a Matrix, Symmetric and Skew-Symmetric Matrices, Matrices for Networks, Matrix Multiplication and System of Linear Equations, Augmented Matrix, Echelon Matrices, Gauss Elimination and Gauss-Jordan Elimination, Inverse of a Matrix, Elementary Matrix, Conjugate of a Matrix. Hermitian and Skew-Hermitian Matrices, Determinants, Evaluating Determinants by Row Reduction, Properties of Determinants, Adjoint of a Matrix, Singular and Non-Singular matrices, Orthogonal Matrix, Unitary Matrices, Trace of a Matrix, Inner Product.

(12 Lectures)

Unit 4

Eigen-values and Eigenvectors: Finding Eigen-values and Eigen vectors of a Matrix. Diagonalization of Matrices. Properties of Eigen-values and Eigen Vectors of Orthogonal, Hermitian and Unitary Matrices. Cayley- Hamilton Theorem (Statement only). Finding inverse of a matrix using Cayley-Hamilton Theorem. Use of Matrices in Solving Coupled Linear Ordinary Differential Equations of first order. Functions of a Matrix.

(8 Lectures)

Unit 5

Cartesian Tensor: Transformation of co-ordinates, Einstein's summation convention, Relation between Direction Cosines, Tensors, Algebra of Tensors: Sum, Difference and Product of Two Tensors. Contraction, Quotient Law of Tensors, Symmetric and Anti-symmetric Tensors, Invariant Tensors: Kronecker and Alternating Tensors, Association of Antisymmetric Tensor of Order Two and Vectors. Vector Algebra and calculus using Cartesian Tensors: Scalar and Vector Products of 2, 3, 4 vectors. Gradient, Divergence and Curl of Tensor Fields. Vector Identities. Tensorial Character of Physical Quantities. Moment of Inertia Tensor. Stress and Strain Tensors: Symmetric Nature. Elasticity Tensor. Generalized Hooke's Law.

(16 Lectures)

Unit 6

Geometrical Applications: Equation of a line, Angle between lines. Projection of a line on another line. Condition for two lines to be coplanar. Foot of the Perpendicular from a Point on a Line, Rotation Tensor, Isotropic tensors (definition only), Moment of Inertia tensors.

(4 Lectures)

General Tensors: Transformation of Co-ordinates, Contravariant & Covariant Vectors, Contravariant, Covariant and Mixed Tensors, Kronecker Delta and Permutation Tensors, Algebra of Tensors, Sum, Difference & Product of Two Tensors, Contraction, Quotient Law of Tensors, Symmetric and Anti-symmetric Tensors, Metric Tensor.

(10 Lectures)

References

Essential Readings:

1. Mathematical Tools for Physics, James Nearing, 2010, Dover Publications
2. Theory and Problems of Linear Algebra, Seymour Lipschutz, 1987, McGraw-Hill Inc.
3. Theory and Problems of Vector Analysis and an introduction to Tensor Analysis, Murray R. Spiegel, 1974, McGraw Hill, Inc.
4. Introduction to Matrices & Linear Transformations, D.T.Finkbeiner, 1978, Dover Pub.
5. Matrices and tensors in Physics: A.W. Joshi, New Age International Pvt. Ltd (2017).

Additional Readings:

1. Mathematical Methods for Physicists, G.B. Arfken, H.J. Weber and F.E.Harris, 1970, Elsevier.
2. Elementary Linear Algebra, Applications Version, Howard Anton and Chris Rorres, Wiley Student edition.
3. Modern Mathematical Methods for Physicists and Engineers, C.D. Cantrell, 2011, Cambridge University Press.
4. Mathematics for Physicists, Susan M. Lea, 2004, Thomson Brooks/Cole
5. Introduction to Vectors and Tensors, Ray M Bowen, C -C Wang, Dover Publications (2009)
6. An Introduction to Linear Algebra and Tensors, M A Aklonis, V V Goldberg, Richard and Silverman, Dover Publications (2012)
7. Vector Analysis and Cartesian Tensors, D.E. Bourne and P.C. Kendall, CRC Press (1992).

DSE: Nano Materials and Applications (32227612)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

The syllabus introduces the basic concepts and principles to understand nanomaterial. Various nanomaterial synthesis/growth methods and characterizations techniques are discussed to explore the field in detail. The effect of dimensional confinement of charge carriers on the electrical, optical and structural properties are discussed. The concept of micro- and nano- electro mechanical systems (MEMS and NEMS) and important applications areas of nanomaterials are discussed.

Course Learning Outcomes

On successful completion of the module students should be able to

- Explain the difference between nanomaterials and bulk materials and their properties.
- Explain the role of confinement on the density of state function and so on the various properties exhibited by nanomaterials compared to bulk materials.
- Explain various methods for the synthesis/growth of nanomaterials including top down and bottom up approaches.
- Analyze the data obtained from the various characterization techniques
- Explain the concept of Quasi-particles such as excitons and how they influence the optical properties.
- Explain the Interger Quantum Hall Effect and the concept of Landau Levels, and edge states in conductance quantization.
- Explain the conductance quantization in 1D structure and its difference from the 2DEG system.
- Explain various applications of nano particles, quantum dots, nano wires etc
- Explain why nanomaterials exhibit properties which are sometimes very opposite, like magnetic, to their bulk counterparts.
- In the Lab course students will synthesize nanoparticles by different chemical routes and characterize them in the laboratory using the different techniques, learnt in the theory. They will also carry out thin film preparation and prepare capacitors and evaluate its performance. They will fabricate a PN diode and study its I-V characteristics.

Unit 1

NANOSCALE SYSTEMS: Density of states (3D, 2D, 1D,0D),Length scales in physics, Nanostructures: 1D, 2D and 3D confined nanostructures (thin films, nanowires, nanorods, nanodots), Schrodinger equation- Infinite potential well, potential step, potential box,Band structure and density of states of materials at nanoscale (Quantitative for 3D, 2D, 1D, 0D), Size Effects in nano systems, Applications of quantum confinement of carriers in 3D, 2D, 1D nanostructures and its consequences on electronic and optical properties. Numerical problems based on above topics.

(14 Lectures)

Unit 2

SYNTHESIS OF NANOSTRUCTURE MATERIALS (Qualitative): Top down and Bottom up approach, Photolithography. Ball milling. Spin coating, Vacuum deposition: Physical vapor deposition (PVD): Thermal evaporation, Sputtering, Pulsed Laser Deposition (PLD), electric arc deposition for CNT, C₆₀, grapheme, Chemical vapor deposition (CVD). Preparation through colloidal methods (Metals, Metal Oxide nanoparticles), Molecular Beam Epitaxy (MBE) growth of quantum dots.

(5 Lectures)

Unit 3

CHARACTERIZATION: Structure and Surface morphology: X-Ray Diffraction (XRD). Scanning Electron Microscopy (SEM). Transmission Electron Microscopy (TEM). Atomic Force Microscopy (AFM). Scanning Tunneling Microscopy (STM).

Spectroscopy: Working principle of UV-Vis spectroscopy, IR Spectroscopy, Raman and Photoluminescence Spectroscopy and study the size dependent properties using these techniques.

(11 Lectures)

Unit 4

OPTICAL PROPERTIES: Quasi-particles and collective excitations (Qualitative idea). Quantitative treatment of excitons, Radiative processes: General formalization- absorption, emission and luminescence. Optical properties of nanoparticles as a function of size, defects and impurities: deep level and surface defects. Numerical problems based on above topics.

(10 Lectures)

Unit 5

ELECTRON TRANSPORT: time and length scales of electrons in solids, Carrier transport in nanostructures: diffusive and ballistic transport, Charging effect, Coulomb blockade effect. Single electron transfer devices (no derivation). Conductance quantization: 2DEG in GaAs and integer quantum hall effect (Quantitative), conductance quantization in 1D structures using split gate in 2DEG (no derivation). Numerical problems based on above topics.

(14 Lectures)

Unit 6

APPLICATIONS (Qualitative): Applications of nanoparticles, quantum dots, nanowires and thinfilms for photonic devices (LED, solar cells). CNT based transistors. Nanomaterial Devices: Quantum dots heterostructure lasers, optical switching and optical data storage. Magnetic quantum well; magnetic dots-magnetic data storage. Micro Electromechanical Systems (MEMS), NanoElectromechanical Systems (NEMS).

(6 Lectures)

Practical : 60 Hours

PRACTICALS- DSE LAB: Nano Material and Applications Lab

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the nano physics lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to the specific experiments done in the lab.

At least 06 experiments from the following:

1. Synthesis of metal (Au/Ag) nanoparticles by chemical route and study its optical absorption properties.
2. Synthesis of semiconductor (CdS/ZnO/TiO₂/Fe₂O₃etc) nanoparticles and study its XRD and optical absorption properties as a function of time.
3. Surface Plasmon study of metal nanoparticles by UV-Visible spectrophotometer.

4. Analysis of XRD pattern of nanomaterials and estimation of particle size.
5. To study the effect of size on the color of nanomaterials.
 - (i) To prepare composite of CNTs with other materials.
 - (ii) Growth of quantum dots by thermal evaporation.
 - (iii) Prepare a disc of ceramic of a compound and study its XRD.
 - (iv) Fabricate a thin film of nanoparticles by spin coating (or chemical route) and study its XRD and transmittance spectra in UV-Visible region.
 - (v) Prepare a thin film capacitor and measure capacitance as a function of temperature or frequency.
 - (vi) Fabricate a PN junction diode by diffusing Al over the surface of N-type Si/Ge and study its V-I characteristic.
 - (vii) Fabricate thin films (polymer, metal oxide) using electro-deposition
 - (viii) To study variation of resistivity or sheet resistance with temperature of the fabricated thin films using four probe method.

References for Theory:

1. C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology 1st edition (2003) Wiley India Pvt.Ltd..
2. S.K. Kulkarni, Nanotechnology: Principles & Practices 2nd edition (2011) (Capital Publishing Company)
3. K.K. Chattopadhyay and A. N. Banerjee, Introduction to Nanoscience and Technology (2009) (PHI Learning Private Limited).
4. Introduction to Nanoelectronics, V.V. Mitin, V.A. Kochelap and M.A. Stroscio, 2011, Cambridge University Press.
5. Richard Booker, Earl Boysen, Nanotechnology for Dummies (2005) (Wiley Publishing Inc.).
6. Introductory Nanoscience by Masaru Kuno, (2012) Garland science Taylor and Francis Group
7. Solid State Physics by J. R. Hall and H. E. Hall, 2nd edition (2014) Wiley.
8. Electronic transport in mesoscopic systems by Supriyo Datta (1997) Cambridge University Press.
9. Fundamentals of molecular spectroscopy by C. N. Banwell and E. M. McCASH, 4th edition, McGrawHill. Reference Books for Practicals:
10. C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology 1st edition (2003) Wiley India Pvt.Ltd..
11. S.K. Kulkarni, Nanotechnology: Principles & Practices 2nd edition (2011) (Capital Publishing Company)
12. K.K. Chattopadhyay and A. N. Banerjee, Introduction to Nanoscience and Technology (2009) (PHI Learning Private Limited).

Additional Resources:

1. Quantum Transport in semiconductor nanostructures by Carla Beenakker and Henk Van Houten (1991) (available at arXiv: cond-mat/0412664) open source
2. Sara Cronewett Ph.D. thesis (2001).

DSE: Communication System (32227613)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This paper aims to describe the concepts of electronics in communication and communication techniques based on Analog Modulation, Analog and digital Pulse Modulation. Communication and Navigation systems such as GPS and mobile telephony system are also introduced. This paper will essentially connect the text book knowledge with the most popular communication technology in real world.

Course Learning Outcomes

At the end of this course, students will be able to

- Understand of fundamentals of electronic communication system and electromagnetic communication spectrum with an idea of frequency allocation for radio communication system in India.
- Gain an insight on the use of different modulation and demodulation techniques used in analog communication
- Learn the generation and detection of a signal through pulse and digital modulation techniques and multiplexing.
- Gain an in-depth understanding of different concepts used in a satellite communication system.
- Study the concept of Mobile radio propagation, cellular system design and understand mobile technologies like GSM and CDMA.
- Understand evolution of mobile communication generations 2G, 3G, and 4G with their characteristics and limitations.
- In the laboratory course, students will apply the theoretical concepts to gain hands on experience in building modulation and demodulation circuits; Transmitters and Receivers for AM and FM. Also to construct TDM, PAM, PWM, PPM and ASK, PSK and FSK modulator and verify their results.

Unit 1

Electronic communication: Introduction to communication – means and modes. Power measurements (units of power). Need for modulation. Block diagram of an electronic communication system. Brief idea of frequency allocation for radio communication system in India (TRAI). Electromagnetic communication spectrum, band designations and usage. Channels and base-band signals.

(4 Lectures)

Analog Modulation: Amplitude Modulation, modulation index and frequency spectrum. Generation of AM (Emitter Modulation), Amplitude Demodulation (diode detector), Single

Sideband (SSB) systems, advantages of SSB transmission, Concept of Single side band generation and detection. Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum, equivalence between FM and PM, Generation of FM using VCO, FM detector (slope detector), Qualitative idea of Super heterodyne receiver. (12 Lectures)

Unit 2

Analog Pulse Modulation: Channel capacity, Sampling theorem, Basic Principles-PAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing (time division multiplexing and frequency division multiplexing). (9 Lectures)

Unit 3

Digital Pulse Modulation: Need for digital transmission, Pulse Code Modulation, Digital Carrier Modulation Techniques, Sampling, Quantization and Encoding. Concept of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), and Binary Phase Shift Keying (BPSK). (10 Lectures)

Unit 4

Satellite Communication: Introduction, need, Geosynchronous satellite orbits, geostationary satellite advantages of geostationary satellites. Transponders (C - Band), Uplink and downlink, path loss, Satellite visibility, Ground and earth stations. Simplified block diagram of earth station. (10 Lectures)

Unit 5

Mobile Telephony System: Basic concept of mobile communication, frequency bands used in mobile communication, concept of cell sectoring and cell splitting, SIM number, IMEI number, need for data encryption, architecture (block diagram) of mobile communication network, idea of GSM, CDMA, TDMA and FDMA technologies, simplified block diagram of mobile phone handset, 2G, 3G and 4G concepts (qualitative only), GPS navigation system (qualitative idea only). (15 Lectures)

Practical: 60 Hours

PHYSICS LAB-DSE LAB: Communication System Lab

At Least 05 Experiments from the following

1. To design an Amplitude Modulator using Transistor
2. To study envelope detector for demodulation of AM signal
3. To study FM - Generator and Detector circuit
4. To study AM Transmitter and Receiver
5. To study FM Transmitter and Receiver
6. To study Time Division Multiplexing (TDM)
7. To study Pulse Amplitude Modulation (PAM)

8. To study Pulse Width Modulation (PWM)
9. To study Pulse Position Modulation (PPM)
10. To study ASK, PSK and FSK modulators

References for Theory :

Essential Readings :

1. Electronic Communications, D. Roddy and J. Coolen, Pearson Education India.
2. Advanced Electronics Communication Systems- Tomasi, 6th Edn. Prentice Hall.
3. Electronic Communication systems, G. Kennedy, 3rd Edn., 1999, Tata McGraw Hill.
4. Principles of Electronic communication systems – Frenzel, 3rd edition, McGraw Hill

Additional Readings :

1. Modern Digital and Analog Communication Systems, B.P. Lathi, 4th Edition, 2011, Oxford University Press.
2. Communication Systems, S. Haykin, 2006, Wiley India
3. Wireless communications, Andrea Goldsmith, 2015, Cambridge University Press

References for Laboratory Work:

1. Electronic Communication system, Blake, Cengage, 5th edition.
2. Introduction to Communication systems, U. Madhow, 1st Edition, 2018, Cambridge University Press

DSE: Medical Physics (32227615)
Credit : 06 (Theory-04, Practical-02)
Theory: 60 Hours
Practical : 60 Hours

Course Objective

This course introduces a student to the basics of Medical Physics.

Course Learning Outcomes

This course will enable the student to

- Focus on the application of Physics to clinical medicine.

- Gain a broad and fundamental understanding of Physics while developing particular expertise in medical applications.
- Learn about the human body, its anatomy, physiology and BioPhysics, exploring its performance as a physical machine.
- Learn diagnostic and therapeutic applications like the ECG, Radiation Physics, X-ray technology, ultrasound and magnetic resonance imaging.
- Gain knowledge with reference to working of various diagnostic tools, medical imaging techniques
- Understand interaction of ionizing radiation with matter - its effects on living organisms and its uses as a therapeutic technique and also radiation safety practices.
- Gain functional knowledge regarding need for radiological protection and the sources of an approximate level of radiation exposure for treatment purposes.
- In the laboratory course, the student will be exposed to the workings of various medical devices and getting familiarized with various detectors used in medical imaging, medical diagnostics. The hands-on experience will be very useful for the students from job perspective.

Unit 1

PHYSICS OF THE BODY-I: Basic Anatomical Terminology: Standard Anatomical Position, Planes. Familiarity with terms like- Superior, Inferior, Anterior, Posterior, Medial, Lateral, Proximal and Distal. Mechanics of the body: Skeleton, forces, and body stability. Muscles and dynamics of body movement. Physics of Locomotor Systems: joints and movements, Stability and Equilibrium. Energy house hold of the body: Energy balance in the body, Energy consumption of the body, Heat losses of the body, Thermal Regulation. Other Systems in the body: Pressure system of body. Physics of breathing, Physics of cardiovascular system.

(8 Lectures)

Unit 2

PHYSICS OF THE BODY-II: Acoustics of the body: Nature and characteristics of sound, Production of speech, Physics of the ear, Diagnostics with sound and ultrasound. Optical system of the body: Physics of the eye. Electrical system of the body: Physics of the nervous system, Electrical signals and information transfer.

(10 Lectures)

Unit 3

PHYSICS OF DIAGNOSTIC AND THERAPEUTIC SYSTEMS-I: X-Rays: Electromagnetic spectrum, production of x-rays, x-ray spectra, Bremsstrahlung, Characteristic x-ray. X-ray tubes & types: Coolidge tube, x-ray tube design, tube cooling stationary mode, Rotating anode x-ray tube, Tube rating, quality and intensity of x-ray. X-ray generator circuits, half wave and full wave rectification, filament circuit, kilo voltage circuit. Single and three phase electric supply. Power ratings. Types of X-Ray Generator, high frequency generator, exposure timers and switches, HT cables.

(7 Lectures)

Radiation Physics: Radiation units exposure, absorbed dose, units: rad, gray, relative biological effectiveness, effective dose- Rem & Sievert, inverse square law. Interaction of radiation with matter Compton & photoelectric effect, linear attenuation coefficient.

Radiation Detectors: ionization (Thimble chamber, condenser chamber), chamber. Geiger Muller counter, Scintillation counters and Solid-State detectors, TFT.

(7 Lectures)

Unit 4

MEDICAL IMAGING PHYSICS: Evolution of Medical Imaging, X-ray diagnostics and imaging, Physics of nuclear magnetic resonance (NMR), NMR imaging, MRI Radiological imaging, Ultrasound imaging, Physics of Doppler with applications and modes, Vascular Doppler. Radiography: Filters, grids, cassette, X-ray film, film processing, fluoroscopy. Computed tomography scanner- principle and function, display, generations, mammography. Thyroid uptake system and Gamma camera (Only Principle, function and display).

(9 Lectures)

RADIATION ONCOLOGY PHYSICS: External Beam Therapy (Basic Idea): Telecobalt, Conformal Radiation Therapy (CRT), 3DCRT, IMRT, Image Guided Radiotherapy, EPID, Rapid Arc, Proton Therapy, Gamma Knife, Cyber Knife. Contact Beam Therapy (Basic Idea): Brachytherapy- LDR and HDR, Intra Operative Brachytherapy. Radiotherapy, kilo voltage machines, deep therapy machines, Telecobalt machines, Medical linear accelerator. Basics of Teletherapy units, deep X-ray, Telecobalt units, Radiation protection, external beam characteristics, dose maximum and build up – bolus, percentage depth dose, tissue maximum ratio and tissue phantom ratio, Planned target Volume and Gross Tumour Volume.

(9 Lectures)

Unit 5

RADIATION AND RADIATION PROTECTION: Principles of radiation protection, protective materials-radiation effects, somatic, genetic stochastic and deterministic effect. Personal monitoring devices: TLD film badge, pocket dosimeter, OSL dosimeter. Radiation dosimeter. Natural radioactivity, Biological effects of radiation, Radiation monitors. Steps to reduce radiation to Patient, Staff and Public. Dose Limits for Occupational workers and Public. AERB: Existence and Purpose.

(5 Lectures)

Unit 6

PHYSICS OF DIAGNOSTIC AND THERAPEUTIC SYSTEMS-II: Diagnostic nuclear medicine: Radiopharmaceuticals for radioisotope imaging, Radioisotope imaging equipment, Single photon and positron emission tomography. Therapeutic nuclear medicine: Interaction between radiation and matter Dose and isodose in radiation treatment. Medical Instrumentation: Basic Ideas of Endoscope and Cautery, Sleep Apnea and Cpap Machines, Ventilator and its modes.

(5 Lectures)

Practical: 60 Hours

PHYSICS LAB-DSE LAB: Medical Physics Lab

1. Understanding the working of a manual Hg Blood Pressure monitor, Stethoscope and to measure the Blood Pressure.

2. Understanding the working of a manual optical eye-testing machine and to learn eye-testing procedure.
3. Correction of Myopia (short sightedness) using a combination of lenses on an optical bench/breadboard.
4. Correction of Hypermetropia/Hyperopia (long sightedness) using a combination of lenses on an optical bench/breadboard.
5. To learn working of Thermoluminescent dosimeter (TLD) badges and measure the background radiation.
 - (i) Familiarization with Geiger-Muller (GM) Counter & to measure background radiation
 - (ii) Familiarization with Radiation meter and to measure background radiation.
 - (iii) Familiarization with the Use of a Vascular Doppler.

References for Theory :

Essential Readings :

1. Medical Physics, J.R. Cameron and J.G.Skofronick, Wiley (1978)
2. Basic Radiological Physics Dr. K.Thayalan- Jayapee Brothers Medical Publishing Pvt. Ltd. New Delhi (2003)
3. Christensen's Physics of Diagnostic Radiology: Curry, Dowdey and Murry - Lippincot Williams and Wilkins (1990)
4. Physics of the human body, Irving P. Herman, Springer (2007).
5. Physics of Radiation Therapy: F M Khan - Williams and Wilkins, 3 rd edition (2003)

Additional Readings:

1. The essential physics of Medical Imaging: Bushberg, Seibert, Leidholdt and Boone Lippincot Williams and Wilkins, Second Edition (2002)
2. Handbook of Physics in Diagnostic Imaging: R.S.Livingstone: B.I. Publication Pvt Ltd.
3. The Physics of Radiology-H E Johns and Cunningham.
4. Physics of Radiation Therapy : F M Khan - Williams and Wilkins, 3rd edition (2003)

DSE: Applied Dynamics (32227616)
Credit : 06 (Theory-04, Practical-02)
Theory : 60 Hours
Practical : 60 Hours

Course Objective

This course introduces the main topics of low-dimensional nonlinear systems, with applications to a wide variety of disciplines, including physics, engineering, mathematics, chemistry, and biology. This course begins with the first order dynamical system and the idea of phase space, flows and trajectories and ends with the elementary fluid dynamics. Students will also appreciate the introduction to chaos and fractals.

Course Learning Outcomes

Upon successful course completion, a student will be able to:

- Demonstrate understanding of the concepts that underlay the study of dynamical systems.
- Understand fractals as self-similar structures.
- Learn various forms of dynamics and different routes to chaos.
- Understand basic Physics of fluids and its dynamics theoretically and experimentally and by computational simulations
- In the Lab course, students will be able to perform Simulations/Lab experiments on: coupled Oscillators, Simulation of Simple Population, Predator-Prey Dynamics, Simple genetic circuits, rate equations for some simple chemical reactions, Fractal Formation in Deterministic Fractals, Fluid Flow Models.

Unit 1

Introduction to Dynamical systems: Definition of a continuous first order dynamical system. The idea of phase space, flows and trajectories. Simple mechanical systems as first order dynamical systems: simple and damped harmonic oscillator. Sketching flows and trajectories in phase space. Fixed points, attractors, stability of fixed points, basin of attraction, notion of qualitative analysis of dynamical systems. Examples of dynamical systems – Population models e.g. exponential growth and decay, logistic growth, predator-prey dynamics. Rate equations for chemical reactions e.g. auto catalysis, bistability.

(22 Lectures)

Unit 2

Introduction to Chaos and Fractals: Chaos in nonlinear equations - Logistic map and Lorenz equations: Dynamics from time series. Parameter dependence- steady, periodic and chaotic states. Cobweb iteration. Fixed points. Defining chaos- a periodic, bounded, deterministic and sensitive dependence on initial conditions. Period- Doubling route to chaos.

Self-similarity and fractal geometry: Fractals in nature - trees, coastlines, earthquakes, etc. Need for fractal dimension to describe self-similar structure. Deterministic fractal vs. self-similar fractal structure.

(18 Lectures)

Unit 3

Elementary Fluid Dynamics: Importance of fluids: Fluids in the pure sciences, fluids in technology. Study of fluids: Theoretical approach, experimental fluid dynamics, computational fluid dynamics. Basic physics of fluids: The continuum hypothesis-concept of fluid element or fluid parcel; Definition of a fluid- shear stress; Fluid properties- viscosity, thermal conductivity, mass diffusivity, other fluid properties and equation of state; Flow phenomena- flow dimensionality, steady and unsteady flows, uniform and non-uniform flows, viscous and inviscid flows, incompressible and compressible flows, laminar and turbulent flows, rotational and irrotational flows, separated and unseparated flows. Flow visualization - streamlines, pathlines, Streaklines.

(20 Lectures)

Practical: 60 Hours

PHYSICS LAB-DSE LAB: Applied Dynamics Lab

Computing and visualizing trajectories using software such as Scilab, Maple, Octave, XPPAUT based on Applied Dynamics problems like (at least 06 experiments)

1. To determine the coupling coefficient of coupled pendulums.
2. To determine the coupling coefficient of coupled oscillators.
3. To determine the coupling and damping coefficient of damped coupled oscillator.
4. To study population models e.g. exponential growth and decay, logistic growth, predator-prey dynamics.
5. To study rate equations for chemical reactions e.g. auto catalysis, bistability.
 - (i) To study examples from game theory.
 - (ii) To study period doubling route to chaos in logistic map.
 - (iii) To study various attractors of Lorenz equations.
 - (iv) Computational visualization of fractal formations of Deterministic fractal.
 - (v) Computational visualization of fractal formations of self-similar fractal.
 - (vi) Computational visualization of fractal formations of Fractals in nature – trees, coastlines, earthquakes.
 - (vii) Computational Flow visualization - streamlines, pathlines, Streaklines.

References for Theory:

Essential Readings:

1. Nonlinear Dynamics and Chaos, S.H. Strogatz, Levant Books, Kolkata, 2007
2. Understanding Nonlinear Dynamics, Daniel Kaplan and Leon Glass, Springer.
3. Nonlinear Dynamics: Integrability, Chaos and Patterns, M. Lakshmanan and S. Rajasekar, Springer, 2003.
4. An Introduction to Fluid Dynamics, G.K. Batchelor, Cambridge Univ. Press, 2002
5. Fluid Mechanics, 2nd Edition, L. D. Landau and E. M. Lifshitz, Pergamon Press, Oxford, 1987.

References for Laboratory Work:

1. Nonlinear Dynamics and Chaos, Steven H. Strogatz, Levant Books, Kolkata, 2007
2. Understanding Nonlinear Dynamics, Daniel Kaplan and Leon Glass, Springer.
3. An Introduction to Fluid Dynamics, G.K.Batchelor, Cambridge Univ. Press, 2002
4. Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific and Engineering Applications: A. Vande Wouwer, P. Saucez, C. V. Fernández. 2014 Springer

DSE: Digital Signal Processing (32227621)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

The prime goal of this paper is to develop a thorough understanding of the central elements of discrete time signal processing theory and correlate this theory with the real-world signal processing applications.

Course Learning Outcomes

At the end of this course, students will be able to

- Learn basic discrete-time signal and system types, convolution sum, impulse and frequency response concepts for linear time-invariant (LTI) systems.
- Understand use of different transforms and analyze the discrete time signals and systems.
- Realize the use of LTI filters for filtering different real world signals. The concept of transfer
- Learn to solve Difference Equations.
- Develop an ability to analyze DSP systems like linear-phase, FIR, IIR, All-pass, averaging and notch Filter etc.
- Understand the discrete Fourier transform (DFT) and realize its implementation using FFT techniques.

- Design and understand different types of digital filters such as finite & infinite impulse response filters for various applications.
- In the Lab course, the students will realize various concepts using Scilab simulations like Digital Filters and their classifications based on the response, design and algorithm, Fluency in using Fast Fourier Transform, Signal generation, realization of systems and finding their transfer function, characterization using pole-zero plots and designing digital filters.

Unit 1

Discrete-Time Signals and Systems: Classification of Signals, Transformations of the Independent Variable, Periodic and Aperiodic Signals, Energy and Power Signals, Even and Odd Signals, Discrete-Time Systems, System Properties. Impulse Response, Convolution Sum; Graphical Method; Analytical Method, Properties of Convolution; Commutative; Associative; Distributive; Shift; Sum Property System Response to Periodic Inputs, Relationship Between LTI System Properties and the Impulse Response; Causality; Stability; Invertibility, Unit Step Response.

(10 Lectures)

Unit 2

Discrete-Time Fourier Transform: Fourier Transform Representation of Aperiodic Discrete-Time Signals, Periodicity of DTFT, Properties; Linearity; Time Shifting; **Frequency Shifting;** Differencing in Time Domain; Differentiation in Frequency Domain; Convolution Property. The z-Transform: Bilateral (Two-Sided) z-Transform, Inverse z-Transform, Relationship Between z-Transform and Discrete-Time Fourier Transform, z-plane, Region-of- Convergence; Properties of ROC, Properties; Time Reversal; Differentiation in the z-Domain; Power Series Expansion Method (or Long Division Method); Analysis and Characterization of LTI Systems; Transfer Function and Difference-Equation System. Solving Difference Equations.

(15 Lectures)

Unit 3

Filter Concepts: Phase Delay and Group delay, Zero-Phase Filter, Linear-Phase Filter, Simple FIR Digital Filters, Simple IIR Digital Filters, All pass Filters, Averaging Filters, Notch Filters.

(5 Lectures)

Discrete Fourier Transform: Frequency Domain Sampling (Sampling of DTFT), The Discrete Fourier Transform (DFT) and its Inverse, DFT as a Linear transformation, Properties; Periodicity; Linearity; Circular Time Shifting; Circular Frequency Shifting; Circular Time Reversal; Multiplication Property; Parseval's Relation, Linear Convolution Using the DFT (Linear Convolution Using Circular Convolution), Circular Convolution as Linear Convolution with aliasing.

(10 Lectures)

Unit 4

Fast Fourier Transform: Direct Computation of the DFT, Symmetry and Periodicity Properties of the Twiddle factor (W_N), Radix-2 FFT Algorithms; Decimation-In-Time

(DIT) FFT Algorithm; Decimation-In-Frequency (DIF) FFT Algorithm, Inverse DFT Using FFT Algorithms.

(5 Lectures)

Unit 5

Realization of Digital Filters: Non Recursive and Recursive Structures, Canonic and Non Canonic Structures, Equivalent Structures (Transposed Structure), FIR Filter structures; Direct-Form; Cascade-Form; Basic structures for IIR systems; Direct-Form I. Finite Impulse Response Digital Filter: Advantages and Disadvantages of Digital Filters, Types of Digital Filters: FIR and IIR Filters; Difference Between FIR and IIR Filters, Desirability of Linear-Phase Filters, Frequency Response of Linear-Phase FIR Filters, Impulse Responses of Ideal Filters, Windowing Method; Rectangular; Triangular; Kaiser Window, FIR Digital Differentiators. Infinite Impulse Response Digital Filter: Design of IIR Filters from Analog Filters, IIR Filter Design by Approximation of Derivatives, Backward Difference Algorithm, Impulse Invariance Method.

(15 Lectures)

Practical: 60 Hours

PRACTICAL-DSE LAB: Digital Signal Processing Lab

At least 06 experiments from the following using Scilab/Matlab. Introduction to Numerical computation software Scilab/Matlab be introduced in the lab.

1. Write a program to generate and plot the following sequences: (a) Unit sample sequence $\delta(n)$, (b) unit step sequence $u(n)$, (c) ramp sequence $r(n)$, (d) real valued exponential sequence $x(n) = (0.8)^n u(n)$ for $0 \leq n \leq 50$.
2. Write a program to compute the convolution sum of a rectangle signal (or gate function) with itself for $N = 5$

$$x(n) = \text{rect}\left(\frac{n}{2N}\right) = \Pi\left(\frac{n}{2N}\right) = \begin{cases} 1 & -N \leq n \leq N \\ 0 & \text{otherwise} \end{cases}$$

3. An LTI system is specified by the difference equation

$$y(n) = 0.8y(n-1) + x(n)$$

- (a) Determine $H(e^{j\omega})$

- (b) Calculate and plot the steady state response $y_{ss}(n)$ to

$$x(n) = \cos(0.5\pi n)u(n)$$

4. Given a casual system

$$y(n] = 0.9y(n-1) + x(n)$$

- (a) Find $H(z)$ and sketch its pole-zero plot

- (b) Plot the frequency response $|H(e^{j\omega})|$ and $\angle H(e^{j\omega})$

5. Design a digital filter to eliminate the lower frequency sinusoid of

$x(t) = \sin 7t + \sin 200t$. The sampling frequency is $f_s = 500 \text{ Hz}$. Plot its pole zero diagram, magnitude response, input and output of the filter.

6. Let $x(n]$ be a 4-point sequence:

$$x(n) = \begin{matrix} 1, 1, 1, 1 \\ \uparrow \end{matrix} = \begin{cases} 1 & 0 \leq n \leq 3 \\ 0 & \text{otherwise} \end{cases}$$

Compute the DTFT $X(e^{j\omega})$ and plot its magnitude

- Compute and plot the 4 point DFT of $x(n)$
- Compute and plot the 8 point DFT of $x(n)$ (by appending 4 zeros)
- Compute and plot the 16 point DFT of $x(n)$ (by appending 12 zeros)

7. Let $x(n)$ and $h(n)$ be the two 4-point sequences,

$$\begin{array}{c} x(n) = \{1, 2, 2, 1\} \\ \quad \quad \quad \uparrow \\ h(n) = \{1, -1, -1, 1\} \\ \quad \quad \quad \uparrow \end{array}$$

Write a program to compute their linear convolution using circular convolution.

8. Using a rectangular window, design a FIR low-pass filter with a pass-band gain of unity, cut off frequency of 1000 Hz and working at a sampling frequency of 5 KHz. Take the length of the impulse response as 17.

9. Design an FIR filter to meet the following specifications:

passband edge $F_p = 2 \text{ KHz}$

stopband edge $F_s = 5 \text{ KHz}$

Passband attenuation $A_p = 2 \text{ dB}$

Stopband attenuation $A_s = 42 \text{ dB}$

Sampling frequency $F_s = 20 \text{ KHz}$

10. The frequency response of a linear phase digital differentiator is given by

$$H_d(e^{j\omega}) = j\omega e^{-j\tau\omega} \quad |\omega| \leq \pi$$

Using a Hamming window of length $M = 21$, design a digital FIR differentiator. Plot the amplitude response.

References for Theory:

Essential Readings:

- Digital Signal Processing, Tarun Kumar Rawat, Oxford University Press, India.
- Digital Signal Processing, S. K. Mitra, McGraw Hill, India.
- Fundamentals of signals and systems, P.D. Cha and J.I. Molinder, 2007, Cambridge University Press.
- Digital Signal Processing: Principles, Algorithms and Applications, Dimitris G, Manolakis and John G. Proakis, 2007, Pearson Prentice Hall.

References for Laboratory Work:

- A Guide to MATLAB, B.R. Hunt, R.L. Lipsman, J.M. Rosenberg, 2014, 3rd Edn., Cambridge University Press
- Fundamentals of Digital Signal processing using MATLAB, R.J. Schilling and S.L. Harris, 2005, Cengage Learning.
- Getting started with MATLAB, Rudra Pratap, 2010, Oxford University Press.

DSE: Physics of Earth (32227624)
Credit : 06 (Theory-05, Tutorial-01)
Theory : 75 Hours
Tutorial : 15 Hours

Course Objective

This course familiarizes the students with the origin of universe and role of earth in the solar system.

Course Learning Outcomes

At the end of this course student will be able to

- Have an overview of structure of the earth as well as various dynamical processes occurring on it.
- Develop an understanding of evolution of the earth.
- Apply physical principles of elasticity and elastic wave propagation to understand modern global seismology as a probe of the Earth's internal structure.
- Understand the origin of magnetic field, Geodynamics of earthquakes and the description of seismic sources; a simple but fundamental theory of thermal convection; the distinctive rheological behaviour of the upper mantle and its top.
- Explore various roles played by water cycle, carbon cycle, nitrogen cycles in maintaining steady state of earth leading to better understanding of the contemporary dilemmas (climate change, bio diversity loss, population growth, etc.) disturbing the Earth
- In the tutorial section, through literature survey on the various aspects of health of Earth, project work / seminar presentation, the students will be able to appreciate need to 'save' Earth.

Unit 1

The Earth and the Universe:

(a) Origin of universe, creation of elements and earth. A Holistic understanding of our dynamic planet through Astronomy, Geology, Meteorology and Oceanography . Introduction to various branches of Earth Sciences.

(b) General characteristics and origin of the Universe. The Big Bang Theory. Age of the universe and Hubble constant. Formation of Galaxies. The Milky Way galaxy, Nebular Theory, solar system, Earth's orbit and spin, the Moon's orbit and spin. The terrestrial and Jovian planets. Titius-Bode law. Asteroid belt. Asteroids: origin types and examples. Meteorites & Asteroids. Earth in the Solar system ,origin, size, shape, mass, density, rotational and revolution parameters and its age.

(c) Energy and particle fluxes incident on the Earth. (d) The Cosmic Microwave Background.

(17 Lectures)

Unit 2

Structure:

- (a) The Solid Earth: Mass, dimensions, shape and topography, internal structure, magnetic field, geothermal energy. How do we learn about Earth's interior?
- (b) The Hydrosphere: The oceans, their extent, depth, volume, chemical composition. River systems.
- (c) The Atmosphere: layers, variation of temperature with altitude, adiabatic lapse rate, variation of density and pressure with altitude, cloud formation.
- (d) The Cryosphere: Polar caps and ice sheets. Mountain glaciers, permafrost.

(18 Lectures)

Unit 3

Dynamical Processes:

- (a) The Solid Earth: Origin of the magnetic field. Source of geothermal energy. Convection in Earth's core and production of its magnetic field. Mechanical layering of the Earth. Introduction to geophysical methods of earth investigations. Concept of plate tectonics; types of plate movements, hotspots; sea-floor spreading and continental drift. Geodynamic elements of Earth: Mid Oceanic Ridges, trenches, transform faults and island arcs. Origin of oceans, continents, mountains and rift valleys. Earthquake and earthquake belts. Seismic waves, Richter scale, geophones. Volcanoes: types products and distribution.
- (b) The Hydrosphere: Ocean circulations. Oceanic current system and effect of coriolis forces. Concepts of eustasy, wind – air-sea interaction; wave erosion and beach processes. Tides. Tsunamis.
- (c) The Atmosphere: Atmospheric circulation. Weather and climatic changes. Earth's heat budget. Cyclones and anti-cyclones.
Climate: i. Earth's temperature and greenhouse effect. ii. Paleoclimate and recent climate changes. iii. The Indian monsoon system.
- (d) Biosphere: Water cycle, Carbon cycle. The role of cycles in maintaining a steady state.

(18 Lectures)

Unit 4

Evolution:

Stratigraphy: Introduction and types, Standard stratigraphic time scale and introduction to the concept of time in geological studies. Time line of major geological and biological events. Introduction to geochronological methods and their application in geological studies. Radiometric dating: Advantages & disadvantages of various isotopes. History of development of concepts of uniformitarianism, catastrophism and neptunism. Various laws of stratigraphy. Introduction to the geology and geomorphology of Indian subcontinent. Origin of life on Earth, Role of the biosphere in shaping the environment. Future of evolution of the, Earth and solar system: Death of the Earth (Probable causes).

(18 Lectures)

Unit 5

Disturbing the Earth – Contemporary dilemmas (a) Human population growth. (b) Atmosphere: Green house gas emissions, climate change, air pollution. (c) Hydrosphere: Fresh water depletion. (d) Geosphere: Chemical effluents, nuclear waste. (e) Biosphere: Biodiversity loss. Deforestation. Robustness and fragility of ecosystems.

(4 Lectures)

References :**Essential Readings :**

1. Planetary Surface Processes, H. Jay Melosh, 2011, Cambridge University Press.
2. Holme's Principles of Physical Geology, 1992, Chapman & Hall.
3. Planet Earth, Cosmology, Geology and the Evolution of Life and Environment, C. Emiliani, 1992, Cambridge University Press.
4. Physics of the Earth, Frank D. Stacey, Paul M. Davis, 2008, Cambridge University Press.

Additional Readings:

1. The Blue Planet: An Introduction to Earth System Science, Brian J. Skinner, Stephen C. Portere, 1994, John Wiley & Sons.
2. Consider a Spherical Cow: A course in environmental problem solving, John Harte, University Science Books.
3. Fundamentals of Geophysics, William Lowrie, 1997, Cambridge University Press.
4. The Solid Earth: An Introduction to Global Geophysics, C. M. R. Fowler, 1990, Cambridge University Press.
5. Climate Change: A Very Short Introduction, Mark Maslin, 3rd Edition, 2014, Oxford University Press.
6. The Atmosphere: A Very Short Introduction, Paul I. Palmer, 2017, Oxford University Press.
7. IGNOU Study material: PHE 15 Astronomy and Astrophysics Block 2

DSE: Advanced Mathematical Physics-II (32227625)

Credit : 06 (Theory-05, Tutorial-01)

Theory : 75 Hours

Tutorial : 15 Hours

Course Objective

The course is intended to develop new mathematical tools in terms of Calculus of Variation, Group Theory and Theory of Probability in the repertoire of the students to apply in Theoretical and Experimental Physics.

Course Learning Outcomes

After the successful completion of the course, the students shall be able to

- Understand variational principle and its applications: Geodesics in two and three dimensions, Euler Lagrange Equation and simple problems in one and two dimensions.
- Acquire basic concept of Hamiltonian, Hamilton's principle and Hamiltonian equation of motion, Poisson and Lagrange brackets.
- Learn elementary group theory: definition and properties of groups, subgroups, Homomorphism, isomorphism, normal and conjugate groups, representation of groups, Reducible and Irreducible groups.
- Learn the theory of probability: Random variables and probability distributions, Expectation values and variance.

Unit 1

Variable Calculus: Variational Principle, Euler's Equation and its Application to Simple Problems. Geodesics. Calculus of Variations. Concept of Lagrangian: Generalized co-ordinates. Definition of canonical moment, Euler-Lagrange's Equations of Motion and its Applications to Simple Problems (e.g., Simple Pendulum and One dimensional harmonic oscillator). Definition of Canonical Momenta. Canonical Pair of Variables. Definition of Generalized Force: Definition of Hamiltonian (Legendre Transformation). Hamilton's Principle. Poisson Brackets and their properties. Lagrange Brackets and their properties.

(25 Lectures)

Unit 2

Group Theory: Review of sets, Mapping and Binary Operations, Relation, Types of Relations. Groups: Elementary properties of groups, uniqueness of solution, Subgroup, Centre of a group, Co-sets of a subgroup, cyclic group, Permutation/Transformation. Homomorphism and Isomorphism of group. Normal and conjugate subgroups, Completeness and Kernel. Some special groups : $SO(2)$, $SO(3)$, $SU(2)$, $SU(3)$.

(25 Lectures)

Unit 3

Advanced Probability Theory: Fundamental Probability Theorems. Conditional Probability, Bayes' Theorem, Repeated Trials, Binomial and Multinomial expansions. Random Variables and probability distributions, Expectation and Variance, Special Probability distributions: The binomial distribution, The poisson distribution, Continuous distribution: The Gaussian (or normal) distribution, The principle of least squares.

(25 Lectures)

References for Theory :

Essential Readings :

1. Mathematical Methods for Physicists: Weber and Arfken, 2005, Academic Press.
2. Mathematical Methods for Physicists: A Concise Introduction: Tai L. Chow, 2000, Cambridge Univ. Press.
3. Elements of Group Theory for Physicists by A. W. Joshi, 1997, John Wiley.
4. Group Theory and its Applications to Physical Problems by Morton Hamermesh, 1989, Dover
5. Introduction to Mathematical Probability, J. V. Uspensky, 1937, Mc Graw-Hill.

Additional Readings :

1. Introduction to Mathematical Physics: Methods & Concepts: Chun Wa Wong, 2012, Oxford University Press

DSE: Classical Dynamics (32227626)

Credit : 06 (Theory-05, Tutorial-01)

Theory : 75 Hours

Tutorial : 15 Hours

Course Objective

This course on classical dynamics trains the student in problem solving ability and develops understanding of physical problems. The emphasis of this course is to enhance the understanding of Classical Mechanics (Lagrangian and Hamiltonian Approach).

Course Learning Outcomes

At the end of this course, students will be able to:

- Understand the physical principle behind the derivation of Lagrange and Hamilton equations, and the advantages of these formulations.
- Understand small amplitude oscillations.
- Understand the intricacies of motion of particle in central force field. Critical thinking and problem-solving skills
- Recapitulate and learn the special theory of relativity extending to Four – vectors.
- Learn the basics of fluid dynamics, streamline and turbulent flow, Reynolds's number, coefficient of viscosity and Poiseuille's equation.

Unit 1

Classical Mechanics of Point Particles: Review of Newtonian Mechanics; Application to the motion of a charge particle in external electric and magnetic fields- motion in uniform electric field, magnetic field- gyroradius and gyro-frequency, motion in crossed electric and magnetic fields. Degrees of freedom of a system, Generalized coordinates and velocities. Hamilton's Principle, Lagrangian and Lagrange's equations of motion of one- dimensional simple harmonic oscillators, falling body in uniform gravity. Cyclic coordinates. Canonical momenta & Hamiltonian. Hamilton's equations of motion. Comparison of Newtonian, Lagrangian and Hamiltonian mechanics. Applications of Hamiltonian mechanics: Hamiltonian for a simple harmonic oscillator, solution of Hamilton's equations for simple harmonic oscillations (1-D), particle in a Central Force Field – conservation of angular momentum and energy.

(25 Lectures)

Unit 2

Small Amplitude Oscillations: Minima of potential energy and points of stable equilibrium, small amplitude oscillations about the minimum, normal modes of longitudinal simple harmonic oscillations (maximum 3 masses connected by 4 springs). Kinetic energy (T) and potential energy (V) in terms of normal co-ordinates. T and V matrices: finding eigen-frequencies and eigen-vectors using these matrices.

(15 Lectures)

Unit 3

Special Theory of Relativity: Postulates of Special Theory of Relativity. Lorentz Transformations. Minkowski space. The invariant interval, light cone and world lines. Space-time diagrams: Time-dilation, Length contraction, Simultaneity.

Four -vectors: space-like, time-like and light-like. Four-displacement four velocity, four-acceleration four-space. Four-momentum and energy-momentum relation. Doppler effect from a 4-vector perspective. Application to two-body decay of an unstable particle. Metric tensor and alternating tensors and their properties.

(25 Lectures)

Unit 4

Fluid Dynamics: Density ρ and pressure P in a fluid, an element of fluid and its velocity, continuity equation and mass conservation, stream-lined motion, laminar flow, Poiseuille's

equation for flow of a liquid through a pipe. Analogy between liquid flow and current flow, rate of liquid flow through capillaries in series and in parallel combination. Navier Stoke's equation, Reynolds number.

(10 Lectures)

References for Theory :

Essential Readings:

1. Classical Mechanics, H. Goldstein, C. P. Poole, J. L. Safko, 3/e, 2002, Pearson Education.
2. Classical Mechanics, John R. Taylor, 2005, University Science Books.
3. Classical Mechanics, Tai L. Chow, 2013, CRC Press.
4. Classical Mechanics, R. Douglas Gregory, 2015, Cambridge University Press.
5. An Introduction to Fluid Dynamics, G. K. Batchelor, Cambridge University Press, 2002.

Additional Readings:

1. Analytical Mechanics: Solutions to Problems in Classical Physics, I. Merches, D. Radu, 2015, CRC Press.
2. Mechanics, L. D. Landau and E. M. Lifshitz, 1976, Pergamon.
3. Classical Mechanics, P. S. Joag, N. C. Rana, 2017, McGraw Hall Education.
4. Solved Problems in Classical Mechanics, O. L. Delange and J. Pierrus, 2010, Oxford University Press.
5. Classical Dynamics of particles and system, S. T. Thornton, J. B. Marion, 2012, Cengage Learning.
6. Problems and Solutions on Mechanics, Y. K. Lim, Sarat Book House, 2001.
7. Theory and Problems of Theoretical Mechanics, Murray R. Spiegel, 1977, McGraw Hill Education.

DSE: Dissertation (32227627)

Credit:08

Course Objective

Dissertation involves project work with the intention of exposing the student to research /development. It involves open ended learning based on student ability and initiative, exposure to scientific writing and inculcation of ethical practices in research and communication.

Course Learning Outcomes

- Exposure to research methodology

- Picking up skills relevant to dissertation project, such as experimental skills in the subject, computational skills, etc.
- Development of creative ability and intellectual initiative
- Developing the ability for scientific writing
- Becoming conversant with ethical practices in acknowledging other sources, avoiding plagiarism, etc.

Guidelines for dissertation:

1. The dissertation work should not be a routine experiment or project at the under graduate level. It should involve more than text book knowledge. Referring text books for preparation and understanding concepts is allowed; however one component of the dissertation must include study of research papers or equivalent research material and/or open ended project.
2. The total number of dissertations allowed should be limited to 5% of the total strength of the students in the programme. However, students having national scholarships like NTSE, KVPY, INSPIRE, etc. can be considered above this quota. The selection criterion is at the discretion of the college. The student should not have any academic backlog (Essential Repeat). The sole/single supervisor must have a Ph.D. degree. Not more than two candidates would be enrolled under same supervisor.
3. At the time of submission of teaching work-load of the teachers by the college to the Department (Department of Physics and Astrophysics, Delhi University), the supervisor shall submit the proposal (200-300 words; not more than one full A4 page) of the proposed dissertation. Along with that four names of the external examiners from any college of Delhi University (other than the own college of the supervisor) or any department of Delhi University can be suggested. The committee of courses of the department may appoint any one teacher as an external examiner from the proposed list of external examiners.
4. No topic would be repeated from the topics allotted by the supervisor in the previous years, so that the work or dissertation could be distinct every time. The ‘proposal’ should include the topic, plan of work, and clearly state the expected deliverables. The topic must be well defined. The abstract should clearly explain the significance of the suggested problem. It must emphasize the specific skills which the student shall be learning during the course of dissertation, for example, some computational skill or literature survey, etc. Both internal (supervisor) and external examiners will assess the student at the end of the semester and award marks jointly, according to the attached scheme.
5. Other than the time for pursuing dissertation work, there must be at least 2 hours of interaction per week, of the student with the supervisor. The student has to maintain a “Log Book” to summarize his/ her weekly progress which shall be duly signed by the supervisor. Experimental work should be carried out in the parent college or any other college or the Department in Delhi University with the consent of a faculty member there. Unsupervised work carried out at research institutions / laboratories is to be discouraged.
6. The dissertation report should be of around 30 pages. It must have minimum three chapters namely (1) Introduction, (2) the main work including derivations / experimentation and Results, and (3) Discussion and Conclusion. At the end, adequate references must be included. Plagiarism should be avoided by the student and this should be checked by the supervisor.

7. It is left to the discretion of the college if it can allow relaxation of two teaching periods (at the most two periods per week to the supervisor, irrespective of the number of students enrolled under him / her for dissertation). The evaluation/presentation of the dissertation must be done within two weeks after the exams are over. For the interest of the students it is advised that college may organize a workshop for creating awareness amongst students. Any teacher who is not Ph.D. holder can be Co-supervisor with the main supervisor.

Assessment of dissertation

MARKING SCHEME for Dissertation:

- 30 marks: Internal assessment based on performance like sincerity, regularity, etc. Awarded by: Supervisor
- 40 marks: Written Report (including content and quality of work done). Awarded by: Supervisor and External Examiner.
- 30 marks: Presentation*. Awarded by: Supervisor and External Examiner.

*All Dissertation presentations should be open. Other students / faculty should be encouraged to attend.

DSE: Verilog and FPGA based system design (32227628)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This paper provides a review of combinational and sequential circuits such as multiplexers, demultiplexers, decoders, encoders and adder circuits. It discusses the fundamental Verilog concepts in-lieu of today's most advanced digital design techniques.

Course Learning Outcomes

At the end of this course, students will be able to

- Understand the steps and processes for design of logic circuits and systems.

- Differentiate between combinational and sequential circuits.
- Design various types of state machines.
- Understand various types of programmable logic building blocks such as CPLDs and FPGAs and their tradeoffs.
- Write synthesizable Verilog code.
- Write a Verilog test bench to test various Verilog code modules.
- Design, program and test logic systems on a programmable logic device (CPLD or FPGA) using Verilog.

Unit 1

Digital logic design flow. Review of combinational circuits. Combinational building blocks: multiplexors, demultiplexers, decoders, encoders and adder circuits. Review of sequential circuit elements: flip-flop, latch and register. Finite state machines: Mealy and Moore. Other sequential circuits: shift registers and counters. FSMD (Finite State Machine with Datapath): design and analysis. Microprogrammed control. Memory basics and timing. Programmable Logic devices.

(20 lectures)

Unit 2

Evolution of Programmable logic devices. PAL, PLA and GAL. CPLD and FPGA architectures. Placement and routing. Logic cell structure, Programmable interconnects, Logic blocks and I/O Ports. Clock distribution in FPGA. Timing issues in FPGA design. Boundary scan.

(20 lectures)

Unit 3

Verilog HDL: Introduction to HDL. Verilog primitive operators and structural Verilog Behavioral Verilog. Design verification. Modeling of combinational and sequential circuits (including FSM and FSMD) with Verilog Design examples in Verilog.

(20 lectures)

Practical : 60 Hours

PRACTICALS-DSE LAB: Verilog and FPGA based system design Lab

Session on the construction and use of CRO, and other experimental apparatuses used in the lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to specific experiments done in the lab.

At least 06 Experiments from the following

1. Write code to realize basic and derived logic gates.
2. Half adder, Full Adder using basic and derived gates.
3. Half subtractor and Full Subtractor using basic and derived gates.
4. Design and simulation of a 4 bit Adder.
5. Multiplexer (4x1) and Demultiplexer using logic gates.
6. Decoder and Encoder using logic gates.

7. Clocked D, JK and T Flip flops (with Reset inputs)
8. 3-bit Ripple counter
9. To design and study switching circuits (LED blink shift)
10. To design traffic light controller.
11. To interface a keyboard
12. To interface a LCD using FPGA
13. To interface multiplexed seven segment display.
14. To interface a stepper motor and DC motor.
15. To interface ADC 0804.

References for Theory :

Essential Readings :

1. Principles of Digital Systems Design and VHDL. Lizy Kurien and Charles Roth. Cengage Publishing. ISBN-13:978-8131505748
2. Verilog HDL. Pearson Education; Samir Palnitkar,, Second edition (2003).
3. FPGA Based System Design. Wayne Wolf, Pearson Education. S. K. Mitra, Digital Signal processing, McGraw Hill, 1998
4. VLSI design, Deba prasad Das, 2nd Edition, 2015, Oxford University Press.
5. Digital Signal Processing with FPGAs, U. Meyer Baese, Springer, 2004

References for Laboratory Work:

1. Digital System Designs and Practices: Using Verilog HDL and FPGAs, Ming-Bo Lin. Wiley India Pvt Ltd. ISBN-13: 978-8126536948
2. Verilog Digital System Design. Zainalabedin Navabi. TMH; 2nd edition. ISBN-13: 978-0070252219
3. Designing Digital Computer Systems with Verilog, D.J. Laja and S. Sapatnekar Cambridge University Press, 2015.
4. Verilog HDL primer- J. Bhasker. BSP, 2003 II edition

DSE: Advanced Quantum Mechanics (xxx4)
Credit : 06 (Theory-05, Tutorial-01)
Theory : 75 Hours
Tutorial : 15 Hours

Course Objective

This course aims to describe quantum phenomena in terms of linear vector space formalism. The course will equip the students with modern analytical techniques so that they can easily apply them to research areas involving lasers interacting with atoms/molecules, manipulate entangled quantum states like qubits, so necessary in the field of quantum information theory and quantum computation, deal effectively with superconductors and superfluidity, etc.

Course Learning Outcomes

At the end of this course, students will be able to

- Learn to represent quantum states by ket vectors, physical observables as operators and their time evolution.
- Understand commutator brackets between observables and their properties.
- Learn concept of system of identical non- interacting particles: dynamics of two level systems, qubits.
- Understand the addition of orbital and spin angular momenta.
- Gain the basic idea of variational method.

Unit 1

Motivation for developing a linear vector space formulation to describe quantum phenomena.

Brief review of linear vector spaces with ket notation: Inner product, norm, Schwarz inequality, linear operators, eigenvalue and eigenvector, adjoint of a linear operator, Hermitian or self-adjoint operators and their properties. Orthonormal basis – discrete and continuous. Unitary operators and change of basis. Completeness, closure relation. The position and momentum representations, Relation between wave functions and kets, given an orthonormal basis. Bra vectors.

(17 lectures)

Unit 2

Representation of quantum states by ket vectors and physical observables by Hermitian operators. Unitary time-evolution and Schrodinger equation in ket notation. Measurement of an observable. Expectation value of an observable. Canonical commutation relations - commutators of position and momentum, commutators for orbital and spin angular momentum.

(14 lectures)

Unit 3

Compatible and incompatible observables: Commutator brackets and their properties, the uncertainty principle. Ehrenfest's theorem and the classical limit. Correspondence of unitary evolution of ket vectors with Schrodinger wave mechanics.

(6 lectures)

Unit 4

Identical particles: direct product of kets, symmetric and antisymmetric states. Systems of identical non-interacting particles. Bosons and Fermions; Pauli's exclusion principle.

Dynamics of two-level systems (e.g. electron in an external magnetic field). Entangled states, Qubits; One dimensional Harmonic oscillator, its energy eigen values and eigen states using ladder operators.

(15 lectures)

Unit 5

Addition of orbital and spin angular momenta, $J = L + S$. Commutators of J_x , J_y and J_z ; Ladder operators, recursion relations, eigenvalues and eigenstates of total angular momentum operators. Composite system of two spin-half particles – singlet and triplet states. Clebsch-Gordan coefficients: formalism, computation (up to $1 \oplus 1/2$)

(13 lectures)

Unit 6

Variational Method: Basic idea, application to some simple systems like rigid box problem and one dimensional simple harmonic oscillator; Estimation of Hydrogen atom ground state energy using variational method. Helium atom ground state energy.

(10 lectures)

References for Theory :

Essential Readings :

1. Modern Quantum Mechanics, J.J Sakurai, Revised Edition, 1994, Addison-Wesley.
2. Introduction to Quantum Mechanics, Volume-I, C. Cohen-Tannoudji, B. Diu, F. Laloe, 1977, Wiley-VCH. Quantum Theory, David Bohm, Dover Publications, 1979.
3. Quantum Mechanics: Theory and Applications, (2019), (Extensively revised 6th Edition), Ajoy Ghatak and S. Lokanathan, Laxmi Publications, New Delhi.
4. Quantum Mechanics, Eugene Merzbacher, 2004, John Wiley and Sons, Inc.
5. A Text book of Quantum Mechanics, P.M.Mathews & K.Venkatesan, 2nd Ed., 2010, McGraw Hill.

Additional Reading:

1. The Principles of Quantum Mechanics, P. A. M. Dirac, Clarendon Press, 2004
2. Introduction to Quantum Mechanics, David J. Griffiths, Second Edition, 2006, Pearson Education.
3. Quantum Mechanics Concepts and Applications, Nouredine Zettili, Second Edition, 2001, John Wiley & Sons, Ltd.
4. Quantum Mechanics, Brian H. Bransden and C. Charles Jean Joachain, 2000, Prentice Hall.

5. Lectures on Quantum Mechanics: Fundamentals and Applications, eds. A. Pathak and Ajoy Ghatak, Viva Books Pvt. Ltd., 2019
6. Introduction to Quantum Mechanics, R. H. Dicke and J. P. Wittke, Addison-Wesley Publications, 1966
7. Quantum Mechanics, Leonard I. Schiff, 3rd Edn. 2010, Tata McGraw Hill.

9.3. SKILL-ENHANCEMENT COURSES (SEC)

SEC: Physics Workshop Skills (32223901)

Credit:04 (Theory-02, Practical-02)

Theory: 30 Hours

Practical : 60 Hours

Course Objective

The aim of this course is to enable the students to familiar and experience with various mechanical and electrical tools through hands-on mode. This course enable students to understand working of various measuring devices and different type of errors student can encounter in the measurement process. This course also develop the mechanical skills of the students by direct exposure to different machines and tools by demonstration and experimental technique.

Course Learning Outcomes

After completing this course, student will be able to :

- Learning measuring devices like Vernier callipers, Screw gauge, travelling microscope and Sextant for measuring various length scales.
- Acquire skills in the usage of multimeters, soldering iron, oscilloscopes, power supplies and relays.
- Developing mechanical skill such as casting, foundry, machining, forming and welding and will become familiar with common machine tools like lathe, shaper, drilling, milling, surface machines and Cutting tools.
- Getting acquaintance with prime movers: Mechanism, gear system, wheel, Fixing of gears with motor axle. Lever mechanism. Lifting of heavy weight using lever. braking systems, pulleys.

Unit 1

Introduction: Measuring devices: Vernier calliper, Screw gauge and travelling microscope. Measure the dimension of a solid block, volume of cylindrical beaker/glass, diameter of a thin wire, thickness of metal sheet, etc. Use of Sextant to measure height of buildings, mountains, etc.

(6 lectures)

Unit 2

Mechanical Skill: Overview of manufacturing methods: casting, foundry, machining, forming and welding. Types of welding joints and welding defects. Concept of machine processing, introduction to common machine tools like lathe, shaper, drilling, milling and surface machines. Cutting tools, lubricating oils. Cutting of a metal sheet using blade. Smoothing of cutting edge of sheet using file. Drilling of holes of

different diameter in metal sheet and wooden block. Use of bench vice and tools for fitting. Make funnel using metal sheet.

(14 Lectures)

Unit 3

Introduction to prime movers: Mechanism, gear system, wheel, Fixing of gears with motor axel. Lever mechanism, Lifting of heavy weight using lever. braking systems, pulleys, working principle of power generation systems. Demonstration of pulley experiment.

(10 Lectures)

Practical: 60 Hours

PRACTICALS-SEC LAB: Physics Workshop Skills Lab

Teacher may give long duration project based on this paper.

Sessions on the use of equipment used in the workshop, including necessary precautions.

Sessions on the review of experimental data analysis and its application to the specific experiments done in the lab.

Main emphasis is on taking observations, calculations, graph and result. Perform at least three practicals from the following.

1. Comparison of diameter of a thin wire using screw gauge and travelling microscope.
2. Drilling of Hole in metal, wood and plastic.
3. Cutting of metal sheet.
4. Cutting of glass sheet
5. Lifting of heavy weights using simple pulley/lever arrangement.

References

1. A text book in Electrical Technology - B L Theraja – S. Chand and Company.
2. Performance and design of AC machines – M.G. Say, ELBS Edn.
3. Mechanical workshop practice, K.C. John, 2010, PHI Learning Pvt. Ltd.
4. Workshop Processes, Practices and Materials, Bruce J Black 2005, 3rd Edn., Editor Newnes [ISBN: 0750660732] New Engineering Technology, Lawrence Smyth/Liam Hennessy, The Educational Company of Ireland [ISBN0861674480].

SEC: Computational Physics Skills (32223902)

Credit:04 (Theory-02, Practical-02)

Theory: 30 Hours

Practical : 60 Hours

Course Objectives

This course is intended to give an insight to computer hardware and computer applications. Students will familiarize with use of computer to solve physics problems. They will learn a programming language namely fortran and data visualization using GNU plot. Further they will also learn to prepare long formatted document using latex.

Course Learning Outcomes

Students will be able to

- Use computers for solving problems in Physics.
- Prepare algorithms and flowcharts for solving a problem.
- Use Linux commands on terminal
- Use an unformatted editor to write sources codes.
- Learn “Scientific Word Processing”, in particular, using LaTeX for preparing articles, papers etc. which include mathematical equations, picture and tables.
- Learn the basic commands of Gnuplot.

Unit 1

Introduction: Importance of computers in Physics, paradigm for solving physics problems for solution. Usage of linux as an Editor.

Algorithms and Flowcharts: Algorithm: Definition, properties and development. Flowchart: Concept of flowchart, symbols, guidelines, types. Examples: Cartesian to Spherical Polar Coordinates, Roots of Quadratic Equation, Sum of two matrices, Sum and Product of a finite series, calculation of $\sin(x)$ as a series, algorithm for plotting (1) lissajous figures and (2) trajectory of a projectile thrown at an angle with the horizontal.

(4 Lectures)

Scientific Programming: Some fundamental Linux Commands (Internal and External commands). Development of FORTRAN, Basic elements of FORTRAN: Character Set, Constants and their types, Variables and their types, Keywords, Variable Declaration and concept of instruction and program. Operators: Arithmetic, Relational, Logical and Assignment Operators. Expressions: Arithmetic, Relational, Logical, Character and Assignment Expressions. Fortran Statements: I/O Statements (unformatted/formatted), Executable and Non-Executable Statements, Layout of Fortran Program, Format of writing Program and concept of coding, Initialization and Replacement Logic. Examples from physics problems.

(5 Lectures)

Unit 2

Control Statements: Types of Logic(Sequential, Selection, Repetition), Branching Statements (Logical IF, Arithmetic IF, Block IF, Nested Block IF, SELECT CASE and ELSE IF Ladder statements), Looping Statements (DO- CONTINUE, DO-ENDDO, DO-WHILE, Implied and Nested DO Loops), Jumping Statements (Unconditional GOTO, Computed GOTO, Assigned GOTO) Subscripted Variables (Arrays: Types of Arrays, DIMENSION Statement, Reading and Writing Arrays), Functions and Subroutines (Arithmetic Statement Function, Function Subprogram and Subroutine), RETURN, CALL, COMMON and EQUIVALENCE Statements), Structure, Disk I/O Statements, open a file, writing in a file, reading from a file. Examples from physics problems Programming:

1. Exercises on syntax on usage of FORTRAN
2. Usage of GUI Windows, Linux Commands, familiarity with DOS commands and working in an editor to write sources codes in FORTRAN.
3. To print out all natural even/ odd numbers between given limits.
4. To find maximum, minimum and range of a given set of numbers.
5. Calculating Euler number using $\exp(x)$ series evaluated at $x=1$

(6 Lectures)

Unit 3

Scientific word processing: Introduction to LaTeX: TeX/LaTeX word processor, preparing a basic LaTeX file, Document classes, Preparing an input file for LaTeX, Compiling LaTeX File, LaTeX tags for creating different environments, Defining LaTeX commands and environments, Changing the type style, Symbols from other languages. Equation representation: Formulae and equations, Figures and other floating bodies, Lining in columns- Tabbing and tabular environment, Generating table of contents, bibliography and citation, Making an index and glossary, List making environments, Fonts, Picture environment and colors, errors.

(6 Lectures)

Unit 4

Visualization: Introduction to graphical analysis and its limitations. Introduction to Gnuplot. importance of visualization of computational and computational data, basic Gnuplot commands: simple plots, plotting data from a file, saving and exporting, multiple data sets per file, physics with Gnuplot (equations, building functions, user defined variables and functions), Understanding data with Gnuplot

(9 Lectures)

Practicals/Hands on exercises:

PRACTICALS-SEC LAB: Computational Physics Skills Lab

Teacher may give long duration project based on this paper.

1. To compile a frequency distribution and evaluate mean, standard deviation etc.
2. To evaluate sum of finite series and the area under a curve.
3. To find the product of two matrices
4. To find a set of prime numbers and Fibonacci series.
5. To write program to open a file and generate data for plotting using Gnuplot.
6. Plotting trajectory of a projectile projected horizontally.
7. Plotting trajectory of a projectile projected making an angle with the horizontally.
8. Creating an input Gnuplot file for plotting a data and saving the output for seeing on the screen. Saving it as an eps file and as a pdf file.
9. To find the roots of a quadratic equation.
10. Motion of a projectile using simulation and plot the output for visualization.
11. Numerical solution of equation of motion of simple harmonic oscillator and plot the outputs for visualization.
12. Motion of particle in a central force field and plot the output for visualization.

References

1. Computer Programming in Fortran 77". V. Rajaraman (Publisher:PHI).
2. LaTeX–A Document Preparation System", Leslie Lamport (Second Edition, Addison-Wesley, 1994).
3. Gnuplot in action: understanding data with graphs, Philip K Janert, (Manning 2010).
4. Schaum's Outline of Theory and Problems of Programming with Fortran, S Lipsdutz and A Poe, 1986Mc-Graw Hill Book Co.
5. Elementary Numerical Analysis, K.E.Atkinson, 3rd Edn., 2007, Wiley India Edition.

SEC: Electrical circuits and Network Skills (32223903)

Credit:04 (Theory-02, Practical-02)

Theory: 30 Hours

Practical : 60 Hours

Course Objectives

To develop an understanding of basic principles of electricity and its household applications. To impart basic knowledge of solid state devices and their applications, understanding of electrical wiring and installation.

Course Learning Outcomes

At the end of this course, students will be able to

- Demonstrate good comprehension of basic principles of electricity including ideas about voltage, current and resistance.
- Develop the capacity to analyze and evaluate schematics of power efficient electrical circuits while demonstrating insight into tracking of interconnections within elements while identifying current flow and voltage drop.
- Gain knowledge about generators, transformers and electric motors. The knowledge would include interfacing aspects and consumer defined control of speed and power.
- Acquire capacity to work theoretically and practically with solid-state devices.
- Delve into practical aspects related to electrical wiring like various types of conductors and cables, wiring-Star and delta connections, voltage drop and losses.
- Measure current, voltage, power in DC and AC circuits, acquire proficiency in fabrication of regulated power supply.
- Develop capacity to identify and suggest types and sizes of solid and stranded cables, conduit lengths, cable trays, splices, crimps, terminal blocks and solder.

Unit 1

Basic Electricity Principles: Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series-parallel combinations. AC and DC Electricity. Familiarization with multimeter, voltmeter and ammeter.

(3 Lectures)

Electrical Circuits: Basic electric circuit elements and their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuit elements. Single-phase and three-phase alternating current sources. Rules to analyze AC sourced electrical circuits. Real, imaginary and complex power components of AC source. Power factor. Saving energy and money.

(4 Lectures)

Electrical Drawing and Symbols: Drawing symbols. Blueprints. Reading Schematics. Ladder diagrams. Electrical Schematics. Power circuits. Control circuits. Reading of circuit schematics. Tracking the connections of elements and identify current flow and voltage drop.

(4 Lectures)

Generators and Transformers: DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers.

(2 Lectures)

Electric Motors: Single-phase, three-phase & DC motors. Basic design. Interfacing DC or AC sources to control heaters and motors. Speed & power of ac motor.

(3 Lectures)

Unit 2

Solid-State Devices: Resistors, inductors and capacitors. Diode and rectifiers. Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources.

(3 Lectures)

Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection. Grounding and isolating. Phase reversal. Surge protection. Relay protection device.

(3 Lectures)

Electrical Wiring: Different types of conductors and cables. Basics of wiring-Star and delta connection. Voltage drop and losses across cables and conductors. Instruments to measure current, voltage, power in DC and AC circuits. Insulation. Solid and stranded cable. Conduit. Cable trays. Splices: wirenuts, crimps, terminal blocks, and solder. Preparation of extension board.

(5 Lectures)

Network Theorems:(1) Thevenin theorem (2) Norton theorem (3) Superposition theorem (4) Maximum Power Transfer theorem.

(3 Lectures)

Practical : 60 Hours

PRACTICALS-SEC LAB: Electrical circuits and Network Skills Lab

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the physics lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to the specific experiments done in the lab.

At least 08 Experiments from the following

1. Series and Parallel combinations: Verification of Kirchhoff's law.
2. To verify network theorems: (I) Thevenin (II) Norton (III) Superposition theorem (IV) Maximum power transfer theorem
3. To study frequency response curve of a Series LCR circuit.
4. To verify (1) Faraday's law and (2) Lenz's law.
5. Programming with Pspice/NG spice.
6. Demonstration of AC and DC generator.
7. Speed of motor
8. To study the characteristics of a diode.
9. To study rectifiers (I) Half wave (II) Full wave rectifier (III) Bridge rectifier
10. Power supply (I) C-filter, (II) π - filter
11. Transformer – Step up and Step down
12. Preparation of extension board with MCB/fuse, switch, socket-plug, Indicator.
13. Fabrication of Regulated power supply.

It is further suggested that students may be motivated to pursue semester long dissertation wherein he/she may do a hands-on extensive project based on the extension of the practicals enumerated above.

References

Essential Readings :

1. Electrical Circuits, K.A. Smith and R.E. Alley, 2014, Cambridge University Press
2. A text book in Electrical Technology - B L Theraja - S Chand & Co.
3. Performance and design of AC machines - M G Say ELBS Edn.
4. Electronic Devices and Circuits, A. Mottershead, 1998, PHI Learning Pvt. Ltd.
5. Network, Lines and Fields, John D. Ryder, Pearson Ed. II, 2015.

Additional Readings:

1. Electrical Circuit Analysis, K. Mahadevan and C. Chitran, 2nd Edition, 2018, PHI learning Pvt. Ltd.

SEC: Basic Instrumentation Skills (32223904)

Credit:04 (Theory-02, Practical-02)

Theory : 30 Hours

Practical : 60 Hours

Course Objective

To expose the students to various aspects of instruments and their usage through hands-on mode. To provide them a thorough understanding of basics of measurement, measurement devices such as electronic voltmeter, Oscilloscope, signal and pulse generators, Impedance bridges, digital instruments etc.

Course Learning Outcomes

At the end of this course the students will learn the following:

- The student is expected to have the necessary working knowledge on accuracy, precision, resolution, range and errors/uncertainty in measurements.

- Course learning begins with the basic understanding of the measurement and errors in measurement. It then familiarizes about each and every specification of a multimeter, multimeters, multivibrators, rectifiers, amplifiers, oscillators and high voltage probes and their significance with hands on mode.
- Explanation of the specifications of CRO and their significance. Complete explanation of CRT.
- Students learn the use of CRO for the measurement of voltage (DC and AC), frequency and time period. Covers the Digital Storage Oscilloscope and its principle of working.
- Students learn principles of voltage measurement. Students should be able to understand the advantages of electronic voltmeter over conventional multimeter in terms of sensitivity etc. Types of AC millivoltmeter should be covered.
- Covers the explanation and specifications of Signal and pulse Generators: low frequency signal generator and pulse generator. Students should be familiarized with testing and specifications.
- Students learn about the working principles and specifications of basic LCR bridge.
- Hands on ability to use analog and digital instruments like digital multimeter and frequency counter.

Unit 1

Basic of Measurement: Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects. Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance.

(4 Lectures)

Electronic Voltmeter: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance. AC millivoltmeter: Type of AC millivolts. Block diagram ac millivoltmeter, specifications and their significance.

(4 Lectures)

Unit 2

Oscilloscope: Block diagram of basic CRO. CRT, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence. Time base operation, synchronization. Front panel controls. Specifications of CRO and their significance.

(6 Lectures)

Use of CRO: for the measurement of voltage (dc and ac), frequency and time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: principle of working.

(3 Lectures)

Unit 3

Signal and pulse Generators: Block diagram, explanation and specifications of low frequency signal generator and pulse generator. Brief idea for testing, specifications. Distortion factor meter, wave analysis.

(4 Lectures)

Impedance Bridges: Block diagram of bridge. working principles of basic (balancing type) RLC bridge. Specifications of RLC bridge. Block diagram and working principles of a Q- Meter. Digital LCR bridges.

(3 Lectures)

Unit 4

Digital Instruments: Comparison of analog & digital instruments. Characteristics of a digital meter. Working principles of digital voltmeter.

(3 Lectures)

Digital Multimeter: Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/frequency counter, time- base stability, accuracy and resolution.

(3 Lectures)

Practical : 60 Hours

PRACTICALS-SEC LAB: Basic Instrumentation Skills Lab

Session on the construction and use of CRO, and other experimental apparatuses used in the lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to specific experiments done in the lab.

The test of lab skills will be of the following test items:

1. Use of an oscilloscope.
2. Oscilloscope as a versatile measuring device.
3. Circuit tracing of Laboratory electronic equipment,
4. Use of Digital multimeter/VTVM for measuring voltages
5. Circuit tracing of Laboratory electronic equipment,
6. Winding a coil / transformer.
7. Study the layout of receiver circuit.
8. Trouble shooting a circuit
9. Balancing of bridges

Practicals:

1. To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance.
2. To observe the limitations of a multimeter for measuring high frequency voltage and currents.
3. To measure Q of a coil and its dependence on frequency, using a Q- meter.
4. Measurement of voltage, frequency, time period and phase using Oscilloscope.
5. Measurement of time period, frequency, average period using universal counter/frequency counter.

6. Measurement of rise, fall and delay times using a Oscilloscope.
7. Measurement of distortion of a RF signal generator using distortion factor meter.
8. Measurement of R,L and C using a LCR bridge/ universal bridge.

Open Ended Experiments:

1. Using a Dual Trace Oscilloscope
2. Converting the range of a given measuring instrument (voltmeter, ammeter).

It is further suggested that students may be motivated to pursue semester long dissertation wherein he/she may do a hands-on extensive project based on the extension of the practicals enumerated above.

References

Essential Readings :

1. Logic circuit design, Shimon P. Vingron, 2012, Springer.
2. Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning.
3. Electronic Devices and circuits, S. Salivahanan & N. S.Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill
4. Digital Circuits and Systems, Venugopal, 2011, Tata McGraw Hill.
5. Electronic Instruementation, H.S. Kalsi, 3rd Ed. Tata McGraw Hill.

Additional Readings:

1. A text book in Electrical Technology - B L Theraja - S Chand and Co.
2. Performance and design of AC machines - M G Say ELBS Edn.

SEC: Renewable Energy and Energy harvesting (32223905)
Credit:04 (Theory-02, Practical-02)
Theory : 30 Hours
Practical : 60 Hours

Course Objective

To impart knowledge and hands on learning about various alternate energy sources to teach the ways of harvesting energy using wind, solar, mechanical, ocean, geothermal energy etc. To review the working of various energy harvesting systems which are installed worldwide.

Course Learning Outcomes

At the end of this course, students will be able to achieve the following learning outcomes:

- Knowledge of various sources of energy for harvesting
- Understand the need of energy conversion and the various methods of energy storage
- A good understanding of various renewable energy systems, and its components.
- Knowledge about renewable energy technologies, different storage technologies, distribution grid, smart grid including sensors, regulation and their control.
- Design the model for sending the wind energy or solar energy plant.
- The students will gain hand on experience of:
 - (i) different kinds of alternative energy sources,
 - (ii) conversion of vibration into voltage using piezoelectric materials,
 - (iii) conversion of thermal energy into voltage using thermoelectric modules.

Unit 1

Fossil fuels and Alternate Sources of energy: Fossil fuels and nuclear energy, their limitation, need of renewable energy, non-conventional energy sources. An overview of developments in Offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, bio-gas generation, geothermal energy tidal energy, Hydroelectricity.

(3 Lectures)

Unit 2

Solar energy: Solar energy, its importance, storage of solar energy, solar pond, non-convective solar pond, applications of solar pond and solar energy, solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photo-voltaic (PV) systems, PV models and equivalent circuits, and sun tracking systems.

(6 Lectures)

Unit 3

Wind Energy harvesting: Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies.

(3 Lectures)

Unit 4

Ocean Energy: Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave Energy Devices. Tide characteristics and Statistics, Tide Energy Technologies, Ocean Thermal Energy, Osmotic Power, Ocean Bio-mass.

Geothermal Energy: Geothermal Resources, Geothermal Technologies.

Hydro Energy: Hydropower resources, hydropower technologies, environmental impact of hydro power sources. Rain water harvesting.

(9 Lectures)

Unit 5

Piezoelectric Energy harvesting: Introduction, Physics and characteristics of piezoelectric effect, materials and mathematical description of piezo-electricity, Piezoelectric parameters and modeling piezoelectric generators, Piezoelectric energy harvesting applications, Human power

Electromagnetic Energy Harvesting: Linear generators, physical/mathematical models, recent applications Carbon captured technologies, cell, batteries, power consumption Environmental issues and Renewable sources of energy, sustainability. Merits of Rain Water harvesting

(9 Lectures)

Practical : 60 Hours

PRACTICALS-SEC LAB: Renewable Energy and Energy Harvesting Lab

Teacher may give long duration project based on this paper.

Sessions on the use of equipment used in the workshop, including necessary precautions.

Sessions on the review of experimental data analysis and its application to the specific experiments done in the lab.

Demonstrations and Experiments:

1. Demonstration of Training modules on Solar energy, wind energy, etc.
2. Conversion of vibration to voltage using piezoelectric materials
3. Conversion of thermal energy into voltage-driven thermo-electric modules.

References

1. Non-conventional energy sources, B.H. Khan, McGraw Hill 60
2. Solar energy, Suhas P Sukhative, Tata McGraw - Hill Publishing Company Ltd.
3. Renewable Energy, Power for a sustainable future, Godfrey Boyle, 3rd Edn., 2012, Oxford University Press.
4. Solar Energy: Resource Assessment Handbook, P Jayakumar, 2009
5. J.Balfour, M.Shaw and S. Jarosek, Photo-voltaics, Lawrence J Goodrich (USA).

**SEC: Engineering Design and Prototyping/Technical
Drawing(32223906)
Credit:04 (Theory-02, Practical-02)
Theory: 30 Hours
Practical : 60 Hours**

Course Objective

To introduce the students to modern visualization techniques and their applications in diverse areas including computer aided design. To offer hands-on experience of engineering drawing based on knowledge gained using computer aided designing software.

Course Learning Outcomes

This course will enable the student to be proficient in:

- Understanding the concept of a sectional view – visualizing a space after being cut by a plane. How The student will be able to draw and learn proper techniques for drawing an aligned section.
- Understanding the use of spatial visualization by constructing an orthographic multi view drawing.
- Drawing simple curves like ellipse, cycloid and spiral, Orthographic projections of points, lines and of solids like cylinders, cones, prisms and pyramids etc.
- Using Computer Aided Design (CAD) software and AutoCAD techniques.

Unit 1

Introduction: Fundamentals of Engineering design, design process and sketching: Scales and dimensioning, Designing to Standards (ISO Norm Elements/ISI), Engineering Curves: Parabola, hyperbola, ellipse and spiral.

(4 Lectures)

Unit 2

Projections: Principles of projections, Orthographic projections: straight lines, planes and solids. Development of surfaces of right and oblique solids. Section of solids. Intersection and Interpenetration of solids. Isometric and Oblique parallel projections of solids.

(10 Lectures)

Unit 3

CAD Drawing: Introduction to CAD and Auto CAD, precision drawing and drawing aids, Geometric shapes, Demonstrating CAD specific skills (graphical user interface, create, retrieve, edit, and use symbol libraries). Use of Inquiry commands to extract drawing data. Control entity properties. Demonstrating basic skills to produce 2-D drawings. Annotating in Auto CAD with text and hatching, layers, templates and design centre, advanced plotting

(layouts, viewports), office standards, dimensioning, internet and collaboration, Blocks, Drafting symbols, attributes, extracting data. Basic printing and editing tools, plot/print drawing to appropriate scale.

(10 Lectures)

Unit 4

Computer Aided Design and Prototyping: 3D modeling with AutoCAD (surfaces and solids), 3D modeling with Sketchup, 3D designs, Assembly: Model Editing; Lattice and surface optimization; 2D and 3D packing algorithms, Additive Manufacturing Ready Model Creation (3D printing), Technical drafting and Documentation.

(6 Lectures)

Practicals : 60 Hours

PRACTICALS-SEC LAB: Engineering Design and Prototyping/Technical Lab

Teacher may give long duration project based on this paper.

Five experiments based on the above theory.

Teacher may design at least five experiments based on the above syllabus.

References

1. Engineering Graphic, K. Venugopal and V. Raja Prabhu, New Age International
2. Engineering Drawing, Dhananjay A Jolhe, McGraw-Hill
3. Don S. Lemons, Drawing Physics, MIT Press, M A Boston, 2018, ISBN:9780262535199
4. AutoCAD 2010 Tutor for Engineering Graphics, Alan J KalaMeja, Delmar Cengage Learning
5. James A. Leach, AutoCAD 2017 Instructor, SDC publication, Mission, KS 2016. ISBN:978163057029.

SEC: Radiation Safety (32223907)
Credit:04 (Theory-02, Practical-02)
Theory : 30 Hours
Practical : 60 Hours

Course Objective

This course focusses on the applications of nuclear techniques and radiation protection. It will not only enhance the skills towards the basic understanding of the radiation but will also provide the knowledge about the protective measures against the radiation exposure. It imparts all the skills required by a radiation safety officer or any job dealing with radiation such as X-ray operators, nuclear medicine dealing jobs: chemotherapists, PET MRI CT scan, gamma camera etc. operators etc.

Course Learning Outcomes

This course will help students in the following ways:

- Awareness and understanding the hazards of radiation and the safety measures to guard against these hazards.
- Learning the basic aspects of the atomic and nuclear Physics, specially the radiations that originate from the atom and the nucleus.
- Having a comprehensive knowledge about the nature of interaction of matter with radiations like gamma, beta, alpha rays, neutrons etc. and radiation shielding by appropriate materials.
- Knowing about the units of radiations and their safety limits, the devices to detect and measure radiation.
- Learning radiation safety management, biological effects of ionizing radiation, operational limits and basics of radiation hazards evaluation and control, radiation protection standards, 'International Commission on Radiological Protection' (ICRP) its principles, justification, optimization, limitation, introduction of safety and risk management of radiation. nuclear waste and disposal management, brief idea about Accelerator driven Sub-Critical System' (ADS) for waste management.
- Learning about the devices which apply radiations in medical sciences, such as MRI, PET.
- Understanding and performing experiments like Study the background radiation levels using Radiation detectors, Determination of gamma ray linear and mass absorption coefficient of a given material for radiation shielding application.

Unit 1

Basics of Atomic and Nuclear Physics: Basic concept of atomic structure; X rays characteristic and production; concept of bremsstrahlung and auger electron, The composition of nucleus and its properties, mass number, isotopes of element, spin, binding energy, stable and unstable isotopes, law of radioactive decay, Mean life and

half-life, basic concept of alpha, beta and gamma decay, concept of cross section and kinematics of nuclear reactions, types of nuclear reaction, Fusion, fission.

(6 Lectures)

Unit 2

Interaction of Radiation with matter: Types of Radiation: Alpha, Beta, Gamma and Neutron and their sources, sealed and unsealed sources, Interaction of Photons - Photo-electric effect, Compton Scattering, Pair Production, Linear and Mass Attenuation Coefficients, Interaction of Charged Particles: Heavy charged particles - Beth-Bloch Formula, Scaling laws, Mass Stopping Power, Range, Straggling, Channelling and Cherenkov radiation. Beta Particles- Collision and Radiation loss (Bremsstrahlung), Interaction of Neutrons- Collision, slowing down and Moderation.

(7 Lectures)

Unit 3

Radiation detection and monitoring devices: Radiation Quantities and Units: Basic idea of different units of activity, KERMA, exposure, absorbed dose equivalent dose, effective dose, collective equivalent dose, Annual Limit of Intake (ALI) and derived Air Concentration (DAC). Radiation detection: Basic concept and working principle of gas detectors (Ionization Chambers, Proportional Counter, Multi-Wire Proportional Counters (MWPC) and Geiger Muller Counter), Scintillation Detectors (Inorganic and Organic Scintillators), Solid States Detectors and Neutron Detectors, Thermo luminescent Dosimetry.

Radiation detection: Basic concept and working principle of gas detectors (Ionization Chambers, Proportional Counter and Geiger Muller Counter), Scintillation Detectors (Inorganic and Organic Scintillators), Solid States Detectors and Neutron Detectors, Thermoluminescent Dosimetry.

(7 Lectures)

Unit 4

Radiation safety management: Biological effects of ionizing radiation, Operational limits and basics of radiation hazards evaluation and control: radiation protection standards, International Commission on Radiological Protection (ICRP) principles, justification, optimization, limitations, introduction of safety and risk management of radiation. Nuclear waste and disposal management. Brief idea about Accelerator driven Sub-critical system (ADS) for waste management.

(5 Lectures)

Unit 5

Application of nuclear techniques: Application in medical science (e.g., MRI, PET, Projection Imaging Gamma Camera, radiation therapy), Archaeology, Art, Crime detection, Mining and oil. Industrial Uses: Tracing, Gauging, Material Modification, Sterilization, Food preservation.

(5 Lectures)

Practical : 60 Hours

PRACTICALS-SEC LAB: Radiation Safety Lab

Teacher may give long duration project based on this paper.

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the physics lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to the specific experiments done in the lab.

Experiments:

Minimum five experiments need to be performed from the following,

1. Estimate the energy loss of different projectiles/ions in Water and carbon, using SRIM/TRIM etc. simulation software.
2. Simulation study (using SRIM/TRIM or any other software) of radiation depth in materials (Carbon, Silver, Gold, Lead) using H as projectile/ion.
3. Comparison of interaction of projectiles with $Z_P = 1$ to 92 (where Z_P is atomic number of projectile/ion) in a given medium (Mylar, Carbon, Water) using simulation software (SRIM etc).
4. SRIM/TRIM based experiments to study ion-matter interaction of heavy projectiles on heavy atoms. The range of investigations will be $Z_P = 6$ to 92 on $Z_A = 16$ to 92 (where Z_P and Z_A are atomic numbers of projectile and atoms respectively). Draw and infer appropriate Bragg Curves.
5. Calculation of absorption/transmission of X-rays, γ -rays through Mylar, Be, C, Al, Fe and $Z_A = 47$ to 92 (where Z_A is atomic number of atoms to be investigated as targets) using XCOM, NIST (<https://physics.nist.gov/PhysRefData/Xcom/html/xcom1.html>).
6. Study the background radiation in different places and identify the source material from gamma ray energy spectrum. (Data may be taken from the Department of Physics & Astrophysics, University of Delhi and gamma ray energies are available in the website <http://www.nndc.bnl.gov/nudat2/>).
7. Study the background radiation levels using Radiation meter .
8. Study of characteristics of GM tube and determination of operating voltage and plateau length using background radiation as source (without commercial source).
9. Study of counting statistics using background radiation using GM counter.
10. Study of radiation in various materials (e.g. KSO_4 etc.). Investigation of possible radiation in different routine materials by operating GM counter at operating voltage.
11. Study of absorption of beta particles in Aluminum using GM counter.
12. Detection of α particles using reference source & determining its half life using spark counter.
13. Gamma spectrum of Gas Light mantle (Source of Thorium).

References for Theory :

Essential reading:

1. Basic ideas and concepts in Nuclear Physics: An introductory approach by K Heyde, third edition, IOP Publication, 1999.
2. Nuclear Physics by S N Ghoshal, First edition, S. Chand Publication, 2010.
3. Nuclear Physics: Principles and Applications by J Lilley, Wiley Publication, 2006.
4. Fundamental Physics of Radiology by W J Meredith and B Massey John Wright and Sons, UK, 1989.
5. An Introduction to Radiation Protection by A Martin and S A Harbisor, John Willey & Sons, Inc. New York, 1981.

Additional reading:

1. Radiation detection and measurement by G F Knoll, 4th Edition, Wiley Publications, 2010.
2. Techniques for Nuclear and Particle Physics experiments by W R Leo, Springer, 1994.
3. Thermoluminescence dosimetry by A F Mcknlly, Bristol, Adam Hilger (Medical Physics Hand book 5.
4. Medical Radiation Physics by W R Hendee, Year book Medical Publishers, Inc., London, 1981.
5. Physics and Engineering of Radiation Detection by S N Ahmed, Academic Press Elsevier, 2007.
6. Nuclear and Particle Physics by W E Burcham and M Jobes, Harlow Longman Group, 1995.
7. IAEA Publications: (a) General safety requirements Part 1, No. GSR Part 1 (2010), Part 3 No. GSR Part 3 (Interium) (2010); (b) Safety Standards Series No. RS-G-1.5 (2002), Rs-G-1.9 (2005), Safety Series No. 120 (1996); (c) Safety Guide GS-G-2.1 (2007).

References for Laboratory Work:

1. Schaum's Outline of Modern Physics, McGraw-Hill, 1999.
2. Schaum's Outline of College Physics, by E. Hecht, 11th edition, McGraw Hill, 2009.
3. Modern Physics by K Sivaprasath and R Murugesan, S Chand Publication, 2010.
4. AERB Safety Guide (Guide No. AERB/RF-RS/SG-1), Security of radioactive sources in radiation facilities, 2011
5. AERB Safety Standard No. AERB/SS/3 (Rev. 1), Testing and Classification of sealed Radioactivity Sources., 2007.

SEC: Applied Optics (32223908)
Credit:04 (Theory-02, Practical-02)
Theory: 30 Hours
Practical : 60 Hours

Course Objective

This paper provides the conceptual understanding of various branches of modern optics to the students. This course introduces basic principles of LASER, Holography and signal transmission via optical fiber.

Course Learning Outcomes

Students will be able to :

- Understand basic lasing mechanism qualitatively, types of lasers, characteristics of laser light and its application in developing LED, Holography.
- Gain concepts of Fourier optics and Fourier transform spectroscopy.
- Understand basic principle and theory of Holography.
- Grasp the idea of total internal reflection and learn the characteristics of optical fibers.

Unit 1

Photo-sources and Detectors

Lasers: an introduction, Planck's radiation law (qualitative idea), Energy levels, Absorption process, Spontaneous and stimulated emission processes, Theory of laser action, Population of energy levels, Einstein's coefficients and optical amplification, properties of laser beam, Ruby laser, He-Ne laser, and semiconductor lasers; Light Emitting Diode (LED) and photo-detectors.

(9 lectures)

Unit 2

Fourier Optics and Fourier Transform Spectroscopy (Qualitative explanation) Concept of Spatial frequency filtering, Fourier transforming property of a thin lens, Fourier Transform Spectroscopy (FTS): measuring emission and absorption spectra, with wide application in atmospheric remote sensing, NMR spectrometry, and forensic science.

(6 lectures)

Unit 3

Holography

Introduction: Basic principle and theory: recording and reconstruction processes, Requirements of holography- coherence, etc. Types of holograms: The thick or volume hologram, Multiplex hologram, white light reflection hologram; application of holography in microscopy, interferometry, and character recognition.

(6 lectures)

Unit 4

Photonics: Fibre Optics

Optical fibres: Introduction and historical remarks, Total Internal Reflection, Basic characteristics of the optical fibre: Principle of light propagation through a fibre, the coherent bundle, The numerical aperture, Attenuation in optical fibre and attenuation limit; Single mode and multimode fibres, Fibre optic sensors: Fibre Bragg Grating.

(9 lectures)

Practical : 60 Hours

PRACTICALS-SEC LAB: Applied Optics Lab

Teacher may give long duration project based on this paper

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the physics lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

Experiments on Lasers:

- a. To determine the grating radial spacing of the Compact Disc (CD) by reflection using He-Ne or solid state laser.
- b. To find the width of the wire or width of the slit using diffraction pattern obtained by a He-Ne or solid state laser.
- c. To find the polarization angle of laser light using polarizer and analyzer
- d. Thermal expansion of quartz using laser
- e. To determine the wavelength and angular spread of laser light by using plane diffraction grating.

Experiments on Semiconductor Sources and Detectors:

- a. V-I characteristics of LED
- b. Study the characteristics of solid state laser
- c. Study the characteristics of LDR
- d. Characteristics of Photovoltaic Cell/ Photodiode.
- e. Characteristics of IR sensor

Experiments on Fourier Optics:

- a. Optical image addition/subtraction
- b. Optical image differentiation
- c. Fourier optical filtering
- d. Construction of an optical 4f system

Experiments on Fourier Transform Spectroscopy

To study the interference pattern from a Michelson interferometer as a function of mirror separation in the interferometer. The resulting interferogram is the Fourier transform of the power spectrum of the source. Analysis of experimental interferograms allows one to determine the transmission characteristics of several interference filters. Computer simulation can also be done.

Experiments on Holography and interferometry:

- a. Recording and reconstruction of holograms (Computer simulation can also be done).
- b. To construct a Michelson interferometer or a Fabry Perot interferometer.
- c. To determine the wavelength of sodium light by using Michelson's interferometer.
- d. To measure the refractive index of air.

Experiments on Fibre Optics

- a. To measure the numerical aperture of an optical fibre
- b. To measure the near field intensity profile of a fibre and study its refractive index profile
- c. To study the variation of the bending loss in a multimode fibre
- d. To determine the power loss at a splice between two multimode fibre
- e. To determine the mode field diameter (MFD) of fundamental mode in a single-mode fibre by measurements of its far field Gaussian pattern

References

1. Introduction to Fourier Optics, Joseph W. Goodman, The McGraw- Hill, 1996.

2. Introduction to Fiber Optics, A. Ghatak & K. Thyagarajan, Cambridge University Press.
3. Fibre optics through experiments, M.R.Shenoy, S.K.Khijwania, et.al. 2009, Viva Books
4. Optical Electronics, Ajoy Ghatak and K. Thyagarajan, 2011, Cambridge University Press
5. Optics, Karl Dieter Moller, Learning by computing with model examples, 2007, Springer.

SEC: Weather Forecasting (32223909)
Credit:04 (Theory-02, Practical-02)
Theory: 30 Hours
Practical : 60 Hours

Course Objective

The aim of this course is to impart theoretical knowledge to the students and also to enable them to develop an awareness and understanding of the causes and effects of different weather phenomena and basic forecasting techniques.

Course Learning Outcomes

The student will gain the following:

- Acquire basic knowledge of the elements of the atmosphere, its composition at various heights, variation of pressure and temperature with height.
- Learn basic techniques to measure temperature and its relation with cyclones and anti-cyclones.
- Knowledge of simple techniques to measure wind speed and its directions, humidity and rainfall.
- Understanding of absorption, emission and scattering of radiations in atmosphere; Radiation laws.
- Knowledge of global wind systems, jet streams, local thunderstorms, tropical cyclones, tornadoes and hurricanes.
- Knowledge of climate and its classification. Understanding various causes of climate change like global warming, air pollution, aerosols, ozone depletion, acid rain.

- Develop skills needed for weather forecasting, mathematical simulations, weather forecasting methods, types of weather forecasting, role of satellite observations in weather forecasting, weather maps etc. Uncertainties in predicting weather based on statistical analysis.
- Develop ability to do weather forecasts using input data.
- In the laboratory course, students should be able to learn: Principle of the working of a weather Station, Study of Synoptic charts and weather reports, Processing and analysis of weather data, Reading of Pressure charts, Surface charts, Wind charts and their analysis.

Unit 1

Introduction to atmosphere: Elementary idea of atmosphere: physical structure and composition; compositional layering of the atmosphere; variation of pressure and temperature with height; air temperature; requirements to measure air temperature; temperature sensors: types; atmospheric pressure: its measurement

(9 Periods)

Unit 2

Measuring the weather: Wind; forces acting to produce wind; wind speed direction: units, its direction; measuring wind speed and direction; humidity, clouds and rainfall, radiation: absorption, emission and scattering in atmosphere; radiation laws.

(4 Periods)

Unit 3

Weather systems: Global wind systems; air masses and fronts: classifications; jet streams; local thunderstorms; tropical cyclones: classification; tornadoes; hurricanes.

(3 Periods)

Unit 4

Climate and Climate Change: Climate: its classification; causes of climate change; global warming and its outcomes; air pollution and its measurement, particulate matters PM 2.5, PM 10. Health hazards due to high concentration of PM2.5; aerosols, ozone depletion

(6 Periods)

Unit 5

Basics of weather forecasting: Weather forecasting: analysis and its historical background; need of measuring weather; types of weather forecasting; weather forecasting methods; criteria of choosing weather station; basics of choosing site and exposure; satellites observations in weather forecasting; weather maps; uncertainty and predictability; probability forecasts.

(8 Periods)

Practical : 60 Hours

PRACTICALS-SEC LAB: Weather Forecasting Lab

Teacher may give long duration project based on this paper.

Real time demonstration of clouds location and their movements based on short-time animation. Satellite, for instance INSAT-3D products, can be displayed. Water vapour, cloud imagery and 3D overview of wind pattern can be demonstrated. Different wavelength channels (infra-red and visible) operations can be shown to distinguish the features. Profiles of different atmospheric parameters (temperature, humidity, wind component, etc.) can be demonstrated based on radiosonde daily launch.

Demonstrations and Experiments:

1. Study of synoptic charts & weather reports, working principle of weather station.
2. Processing and analysis of weather data:
 - (a) To calculate the sunniest time of the year.
 - (b) To study the variation of rainfall amount and intensity.
 - (c) To observe the sunniest/driest day of the week.
 - (d) To examine the maximum and minimum temperature throughout the year.
 - (e) To evaluate the relative humidity of the day.
 - (f) To examine the rainfall amount month wise.
3. Exercises in chart reading: Plotting of constant pressure charts, surfaces charts, upper wind charts and its analysis.
4. Formats and elements in different types of weather forecasts/ warning (both aviation and non-aviation).
5. Simulation of weather system
6. Field visits to India Meteorological department and National center for medium range weather forecasting

References

1. Aviation Meteorology, I.C. Joshi, 3rd edition 2014, Himalayan Books
2. The weather Observers Hand book, Stephen Burt, 2012, Cambridge University Press.
3. Meteorology, S.R. Ghadekar, 2001, Agromet Publishers, Nagpur.
4. Text Book of Agrometeorology, S.R. Ghadekar, 2005, Agromet Publishers, Nagpur.
5. Atmosphere and Ocean, John G. Harvey, 1995, The Artemis Press.

SEC: Introduction to Physical Computing (xxx1)

Credit:04 (Theory-02, Practical-02)

Theory: 30 Hours

Practical : 60 Hours

Course Objective

Exposure to the elements of physical computing using embedded computers to enable the student to implement experimental setups in physics. To offer an opportunity to learn automation and to design an appropriate system for laboratory experiments using computer software in a project based learning environment.

Course Learning Outcomes

The student will be able to

- Understand the evolution of the CPU from microprocessor to microcontroller and embedded computers from a historical perspective.
- Operate basic electronic components and analog and digital electronics building blocks including power supply and batteries.
- Use basic laboratory equipment for measurement and instrumentation.
- Understand the Arduino ecosystem and write simple Arduino programs (sketches)
- Understand sensor characteristics and select a suitable sensor for various applications.
- Read digital and analog data and produce digital and analog outputs from an embedded computer.
- Understand how to interface an embedded computer to the physical environment.
- Visualize the needs of a standalone embedded computer and implement a simple system using Arduino.

Unit 1

Brief overview of a computer. Evolution from CPU to Microprocessor to microcontroller. Introduction to Arduino. Overview of basic electronic components (R, L, C, diode, BJT, Mosfet etc.) and circuits, 555 timer, logic gates, logic function ICs, power supply and batteries.

(4 Lectures)

Unit 2

Capturing schematic diagrams.

- (i) Using free software such as Eagle CAD.
- (ii) Using basic lab instruments – DMM, oscilloscope, signal generator etc.

(6 Lectures)

Unit 3

Understanding Arduino programming. Downloading and installing Arduino IDE.
Writing an Arduino sketch.

Programming fundamentals: program initialization, conditional statements, loops, functions, global variables.

(5 Lectures)

Unit 4

- a) Digital Input and Output
- b) Measuring time and events. Pulse Width Modulation.

(6 Lectures)

Unit 5

- a) Analog Input and Output.
- b) Physical Interface: sensors and actuators.

(6 Lectures)

Unit 6

- a) Communication with the outside world.
- b) System Integration and debugging.

(3 Lectures)

Practical : 60 Hours

PRACTICALS-SEC LAB: Introduction to Physical Computing Lab

Teacher may give long duration project based on this paper.

Sessions on the construction and use of specific equipment and experimental apparatuses used in the physics lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to the specific experiments done in the lab.

1. Hello LED: Connect a LED to a digital output pin and turn it on and off.
2. Hello Switch: Read a switch a toggle an LED when the switch is pressed and released.
3. Hello ADC: Connect a potentiometer to an ADC input and print the analog voltage on the serial monitor.
4. Hello Blink: Read a switch and changing the LED blink rate every time the switch is pressed and released.
5. Hello PWM: Write a Pulse Width Modulation code in software and vary the LED intensity.
6. Hello Random: Read a switch and every time the switch is pressed and released, generate and print a random number on the serial monitor.
7. Hello Random2: Connect a Seven Segment Display (SSD) and print the random number on this display each time a switch is pressed and released. Collect large data sample and plot relative frequency of occurrence of each 'random' number

8. Hello LCD: Connect a (16X2) LCD to an Arduino and print 'Hello World'.
9. Hello LCD2: Connect a temperature sensor to an ADC input and print the temperature on the LCD
10. Hello PWM2: Connect a RGB LED and 3 switches. Use hardware PWM feature of the Arduino and change the relative intensity of each of the LEDs of the RGB LED and generate large number of colors.

Mini Projects:

1. Connect 2 SSDs and every time a switch is pressed and released, print 2 random numbers on the two SSDs
2. Connect a switch and 4 RGB LEDs in a 'Y' configuration. Change the LED lighting patterns each time a
 - (i) switch is pressed and released (total 4095 patterns possible). Arrange acrylic mirrors in a triangle and make a LED kaleidoscope using the RGB LEDs as the light source.
 - (ii) Connect a photo-gate mechanism to a bar pendulum. Verify that the period of oscillation is independent of the amplitude for small amplitudes. What happens when the amplitude is large?
 - (iii) Connect 8 switches and a small speaker and an audio amplifier and make a piano.
 - (iv) Connect 2 sets of 3 switches for two players. Connect LCD and implement a 'rock-paper-scissors' game.

References

1. Learn Electronics with Arduino: An Illustrated Beginner's Guide to Physical Computing. Jody Culkin and Eric Hagan. Shroff Publishers. ISBN: 9789352136704.
2. Programming Arduino: Getting Started with Sketches, Second Edition. Simon Monk. McGraw-Hill Education. ISBN-10: 1259641635.
3. Physical Computing: Sensing and Controlling the Physical World with Computers, 1st Edition. Thomson. ISBN-10: 159200346X.
4. The Art of Electronics. Paul Horowitz and Winfield Hill. Cambridge University Press. 2nd Edition. ISBN-13: 978-0521689175
5. Designing Embedded Hardware. John Catsoulis. Shroff Publishers. 2nd Edition. ISBN: 9788184042597

SEC: Numerical Analysis (xxx2)
Credit:04 (Theory-02, Practical-02)
Theory : 30 Hours
Practical : 60 Hours

Course Objective

The emphasis of course is to equip students with the mathematical tools required in solving problem of interest to physicists. To expose students to fundamental computational physics skills and hence enable them to solve a wide range of physics problems. To help students develop critical skills and knowledge that will prepare them not only for doing fundamental and applied research but also prepare them for a wide variety of careers.

Course Learning Outcomes

Theory:

After completing this course, student will be able to:

- approximate single and multi-variable function by Taylor's Theorem.
- Solve first order differential equations and apply it to physics problems.
- solve linear second order homogeneous and non-homogeneous differential equations with constant coefficients.
- Calculate partial derivatives of function of several variables
- Understand the concept of gradient of scalar field and divergence and curl of vector fields. perform line, surface and volume integration
- Use Green's, Stokes' and Gauss's Theorems to compute integrals

Practical:

After completing this course, student will be able to :

- design, code and test simple programs in C++ learn Monte Carlo techniques,
- fit a given data to linear function using method of least squares find roots of a given non-linear function
- Use above computational techniques to solve physics problems

Unit 1

Errors and iterative Methods: Truncation and Round-off Errors. Floating Point Computation, Overflow and underflow. Single and Double Precision Arithmetic, Iterative Methods.

(2 Lectures)

Solutions of Algebraic and Transcendental Equations: (1) Fixed point iteration method, (2) Bisection method, (3) Secant Method, (4) Newton Raphson method, (5) Generalized Newton's method. Comparison and error estimation

(6 Lectures)

Unit 2

Interpolation: Forward and Backward Differences. Symbolic Relation, Differences of a polynomial. Newton's Forward and Backward Interpolation Formulas

(5 Lectures)

Unit 3

Least Square fitting: (1) Fitting a straight line. (2) Non-linear curve fitting: (a) Power function, (b) Polynomial of nth degree, and (c) Exponential Function. (3) Linear Weighed Least square Approximation

(5 Lectures)

Unit 4

Numerical Differentiation: (1) Newton's interpolation Formulas & (2) Cubic Spline Method, Errors in Numeric Differentiation. Maximum and Minimum values of a Tabulated Function

(4 Lectures)

Numerical Integration: Generalized Quadrature Formula. Trapezoidal Rule. Simpson's 1/3 and 3/8 Rules. Weddle's Rule, Gauss-Legendre Formula.

(4 Lectures)

Solution of Ordinary Differential Equations: First Order ODE's: solution of Initial Value problems: (1) Euler's Method, (2) Modified Euler's method

(4 Lectures)

Practical : 60 Hours

PRACTICALS-SEC LAB: Numerical Analysis Lab

Sessions on the review of experimental data analysis and its application to the specific experiments done in the lab.

At least 08 Experiments from the following

Algebraic and transcendental equation:

1. To find the roots of an algebraic equation by Bisection method.
2. To find the roots of an algebraic equation by Secant method.
3. To find the roots of an algebraic equation by Newton-Raphson method.
4. To find the roots of a transcendental equation by Bisection method.
5. Interpolation
 - a. To find the forward difference table from a given set of data values.
 - b. To find a backward difference table from a given set of data values.
6. Curve fitting
 - a. To fit a straight line to a given set of data values.

- b. To fit a polynomial to a given set of data values.
 - c. To fit an exponential function to a given set of data values.
- 7. Differentiation
 - a. To find the first and second derivatives near the beginning of the table of values of (x,y) .
 - b. To find the first and second derivatives near the end of the table of values of (x,y) .
- 8. Integration
 - a. To evaluate a definite integral by trapezoidal rule.
 - b. To evaluate a definite integral by Simpson 1/3 rule.
 - c. To evaluate a definite integral by Simpson 3/8 rule.
 - d. To evaluate a definite integral by Gauss Quadrature rule.
- 9. Differential Equations
 - a. To solve differential equations by Euler's method
 - b. To solve differential equations by modified Euler's method

References

1. Elementary Numerical Analysis, K.E. Atkinson, 3rd Edn., 2007, Wiley India Edition.
2. Introduction to Numerical Analysis, S.S. Sastry, 5th Edn., 2012, PHI Learning Pvt. Ltd.
3. Schaum's Outline of Programming with C++. J. Hubbard, 2000, McGraw Hill Pub.
4. Numerical Recipes in C++: The Art of Scientific Computing, W.H. Press et.al., 2nd Edn., 2013, Cambridge University Press.
5. An introduction to Numerical methods in C++, Brian H. Flowers, 2009, Oxford University Press.

9.4. GENERIC ELECTIVE (GE)

GE: Electricity and Magnetism (32225101)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course begins with elementary vector analysis, an essential mathematical tool for understanding static electric field and magnetic field. By the end of the course student should appreciate Maxwell's equations.

Course Learning Outcomes

At the end of this course, students will be able to

- Gain the concepts of vector analysis.
- Apply Gauss's law of electrostatics to solve a variety of problems.
- Articulate knowledge of electric current, resistance and capacitance in terms of electric field and electric potential.
- Calculate the magnetic forces that act on moving charges and the magnetic fields due to currents (Biot- Savart and Ampere laws)
- Gain brief idea of dia, para and ferro-magnetic materials
- Understand the concepts of induction and self-induction, to solve problems using Faraday's and Lenz's laws
- Have an introduction to Maxwell's equations.
- In the laboratory course the student will get an opportunity to verify network theorems and study different circuits such as RC circuit, LCR circuit. Also, different methods to measure low and high resistance, capacitance etc.

Unit 1

Vector Analysis: Vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only).

(20 Lectures)

Unit 2

Electrostatics: Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss theorem- Electric field due to point charge, infinite line of charge,

uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere. Calculation of electric field from potential. Capacitance of an isolated spherical conductor. Parallel plate, spherical and cylindrical condenser. Energy per unit volume in electrostatic field. Dielectric medium, Polarisation, Displacement vector. Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.

(22 Lectures)

Unit 3

Magnetism:

Magnetostatics: Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current. Divergence and curl of magnetic field. Magnetic vector potential. Ampere's circuital law.

Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Brief introduction of dia-, para- and ferro-magnetic materials.

(10 Lectures)

Unit 4

Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magnetic field.

(6 Lectures)

Introduction to Maxwell's equations.

(2 Lectures)

Practical : 60 Hours

PRACTICALS-GE LAB: Electricity and Magnetism Lab

Dedicated demonstration cum laboratory sessions on the construction, functioning and uses of different electrical bridge circuits, and electrical devices like the ballistic galvanometer.

Sessions on the review of scientific laboratory report writing, and on experimental data analysis, least square fitting, and computer programme to find slope and intercept of straight line graphs of experimental data.

At least 05 experiments from the following:

1. Ballistic Galvanometer:
 - (i) Measurement of charge and current sensitivity
 - (ii) Measurement of CDR
 - (iii) Determine a high resistance by Leakage Method
 - (iv) To determine Self Inductance of a Coil by Rayleigh's Method.
2. To compare capacitances using De'Sauty's bridge.
3. Measurement of field strength B and its variation in a Solenoid (Determine dB/dx)
4. To study the Characteristics of a Series RC Circuit.
5. To study a series LCR circuit LCR circuit and determine its (a) Resonant frequency, (b) Quality factor
6. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q
7. To determine a Low Resistance by Carey Foster's Bridge.
8. To verify the Thevenin and Norton theorems
9. To verify the Superposition, and Maximum Power Transfer Theorems

References for Theory :

Essential Readings :

1. Vector analysis – Schaum's Outline, M.R. Spiegel, S. Lipschutz, D. Spellman, 2nd Edn., 2009, McGraw- Hill Education.
2. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education.
3. Electricity & Magnetism, J.H. Fewkes & J.Yarwood. Vol. I, 1991, Oxford Univ.Press
4. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
5. D.J. Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings.

References for Laboratory Work:

1. Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.
2. Engineering Practical Physics, S. Panigrahi and B.Mallick, 2015, Cengage Learning India Pvt. Ltd.
3. A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Ed.2011, Kitab Mahal.
4. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press

GE: Mathematical Physics (32225102)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

The emphasis of course is to equip students with the mathematical tools required in solving problem of interest to physicists. The course will expose students to fundamental computational physics skills and hence enable them to solve a wide range of physics problems.

Course Learning Outcomes

At the end of this course, the students will be able to

- Find extrema of functions of several variables.
- Represent a periodic function by a sum of harmonics using Fourier series and their applications in physical problems such as vibrating strings etc..
- Obtain power series solution of differential equation of second order with variable coefficient using Frobenius method.
- Understand properties and applications of special functions like Legendre polynomials, Bessel functions and their differential equations and apply these to various physical problems such as in quantum mechanics.
- Learn about gamma and beta functions and their applications.
- Solve linear partial differential equations of second order with separation of variable method.
- Understand the basic concepts of complex analysis and integration.
- In the laboratory course, the students will be able to design, code and test simple programs in C++ in the process of solving various problems.

Unit 1

Calculus of functions of more than one variable: Partial derivatives, exact and inexact differentials. Integrating factor, with simple illustration. Constrained Maximization using Lagrange Multipliers.

(6 Lectures)

Fourier Series: Periodic functions. Orthogonality of sine and cosine functions, Dirichlet Conditions (Statement only). Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients. Even and odd functions and their Fourier expansions. Application. Summing of Infinite Series.

(10 Lectures)

Unit 2

Frobenius Method and Special Functions: Singular Points of Second Order Linear Differential Equations and their importance. Frobenius method and its applications to differential equations. Legendre, Bessel Differential Equations. Properties of Legendre Polynomials: Rodrigues Formula, Orthogonality. Simple recurrence relations.

(16 Lectures)

Unit 3

Some Special Integrals: Beta and Gamma Functions and Relation between them. Expression of Integrals in terms of Gamma Functions.

(4 Lectures)

Partial Differential Equations: Solutions to partial differential equations, using separation of variables: Laplace's Equation in problems of rectangular geometry. Solution of 1D wave equation.

(10 Lectures)

Unit 4

Complex Analysis: Brief revision of Complex numbers & their graphical representation. Euler's formula, D-Moivre's theorem, Roots of Complex Numbers. Functions of Complex Variables. Analyticity and Cauchy-Riemann Conditions. Examples of analytic functions. Singular functions: poles and branch points, order of singularity. Integration of a function of a complex variable. Cauchy's Integral.

Practical: 60 Hours

PRACTICALS-GE LAB: Mathematical Physics Lab

The aim of this Lab is not just to teach computer programming and numerical analysis but to emphasize its role in solving problems in Physics.

- Highlights the use of computational methods to solve physics problems
- The course will consist of lectures (both theory and practical) in the Lab. The recommended group size is not more than 15 students.
- Evaluation to be done not on the programming but on the basis of formulating the problem
- Aim at teaching students to construct the computational problem to be solved
- Students can use any one operating system :Linux or Microsoft Windows
- At least 12 programs must be attempted from the following covering the entire syllabus
- The list of programs here is only suggestive. Students should be encouraged to do more practice.

Topics	Descriptions with Applications
Introduction and Overview	Computer architecture and organization, memory and Input/output devices,
Basics of scientific computing	Binary and decimal arithmetic, Floating point numbers, single and double precision arithmetic, underflow and overflow - emphasize the importance of making equations in terms of dimensionless variables, Iterative methods
Algorithms and Flow charts	Purpose, symbols and description,

Introduction to C++	<p>Introduction to Programming: Algorithms: Sequence, Selection and Repetition, Structured programming, basic idea of Compilers. Data Types, Enumerated Data, Conversion & casting, constants and variables, Mathematical, Relational, Logical and Bit wise Operators. Precedence of Operators, Expressions and Statements, Scope and Visibility of Data, block, Local and Global variables, Auto, static and External variables.</p> <p>Programs:</p> <ul style="list-style-type: none"> • To calculate area of a rectangle • To check size of variables in bytes (Use of sizeof() Operator) • converting plane polar to Cartesian coordinates and vice versa
C++ Control Statements	<p>if-statement, if-else statement, Nested if Structure, Else-if statement, Ternary operator, Goto statement, switch statement, Unconditional and Conditional looping, While loop, Do-while loop, For loop, nested loops, break and continue statements</p> <p>Programs:</p> <ul style="list-style-type: none"> • To find roots of a quadratic equation if...else And if...else if..else • To find largest of three numbers • To check whether a number is prime or not • To list Prime numbers up to 1000
Random Number generator	Generating pseudo random numbers To find value of pi using Monte Carlo simulations. To integrate using Monte Carlo Method
Arrays and Functions	Sum and average of a list of numbers, largest of a given list of numbers and its location in the list, sorting of numbers in ascending descending order using Bubble sort and Sequential sort, Binary search, 2-dimensional arrays, matrix operations (sum, product, transpose etc)
Solution of Algebraic and Transcendental equations by Bisection, Newton Raphson and Secant methods	<p>Solution of linear and quadratic equation, solving</p> $\alpha = \tan \alpha; I = I_0 \left(\frac{\sin \alpha}{\alpha} \right)^2$ <p>in optics, square root of a number.</p>

Data Analysis and Least Square Fitting (Linear case)	Uncertainty, error and precision, mean, standard deviation and error in the mean. Combining uncertainties, Least squares method for fitting data: linear ($y=ax+b$), power law($y=ax^b$) and exponential ($y=ae^{bx}$). To find parameters a,b and errors in them using method of least squares. Ohms law- calculate R, Hooke's law - Calculate spring constant.
Numerical differentiation (Forward and Backward and central difference formulae – Using basic definition)	Given Position with equidistant time data calculate velocity and acceleration

References for Theory:

Essential Readings:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 2008, Wiley India.
2. Complex Variables and Applications, J.W.Brown & R.V.Churchill, 7th Ed. 2003, Tata McGraw-Hill.
3. Advanced Mathematics for Engineers and Scientists: Schaum Outline Series, M. R Spiegel, McGraw Hill Education (2009).
4. Applied Mathematics for Engineers and Physicists, L.A. Pipes and L.R. Harvill, Dover Publications (2014).
5. Mathematical Methods for Physics and Engineers, K.F Riley, M.P. Hobson and S. J. Bence, 3rd ed., 2006, Cambridge University Press

Additional Readings:

1. Mathematical Physics, A.K. Ghatak, I.C. Goyal and S.J. Chua, Laxmi Publications Private Limited (2017)
2. Advanced Engineering Mathematics, D.G.Zill and W.S.Wright, 5 Ed., 2012, Jones and Bartlett Learning.
3. An introduction to ordinary differential equations, E.A.Coddington, 2009, PHI learning. Differential Equations, George F. Simmons, 2007, McGraw Hill.
4. Mathematical methods for Scientists & Engineers, D.A.Mc Quarrie, 2003, Viva Books
5. C++ How to Program, Paul J. Deitel and Harvey Deitel, Pearson (2016)

References for Practical:

1. Schaum's Outline of Programming with C++', J.Hubbard, 2000, McGraw-Hill Education
2. Introduction to Numerical Analysis, S.S. Sastry, 5th Edn., 2012, PHI Learning Pvt. Ltd.
3. An introduction to Numerical methods in C++, Brian H. Flowers, 2009, Oxford University Press.

4. Computational Physics, Darren Walker, 1st Edn., Scientific International Pvt. Ltd (2015).
5. Elementary Numerical Analysis, K.E. Atkinson, 3rd Edn., 2007, Wiley India Edition.

GE: Digital, Analog and Instrumentation
(32225103)
Credit : 06 (Theory-04, Practical-02)
Theory : 60 Hours
Practical : 60 Hours

Course Objective

This paper aims to cover the basic digital and analog electronic systems. The concept of Boolean algebra is discussed in detail and arithmetic circuits are described. Students will learn the physics of semiconductor devices such as p-n junction, rectifier diodes and bipolar junction transistors.

Course Learning Outcomes

- Differentiating the Analog and Digital circuits, the concepts of number systems like Binary, BCD, Octal and hexadecimal are developed to elaborate and focus on the digital systems.
- Characteristics and working of pn junction.
- Two terminal devices: Rectifier diodes, Zener diode, photodiode etc
- NPN and PNP transistors: Characteristics of different configurations, biasing, stabilization and their applications.
- CE and two stage RC coupled transistor amplifier using h-parameter model of the transistor.
- Designing of different types of oscillators and their stabilities.
- Ideal and practical op-amps: Characteristics and applications.
- Timer circuits using IC 555 providing clock pulses to sequential circuits and develop multivibrators..
- Also impart understanding of working of CRO and its usage in measurements of voltage, current, frequency and phase measurement.
- In the laboratory students will learn to construct both combinational and sequential circuits by employing NAND as building blocks. They will be able to study characteristics of various diodes and BJT. They will also be able to design amplifiers (using BJT and Op-Amp), oscillators and multivibrators. They will also learn working of CRO.

Unit 1

Digital Circuits:

Difference between Analog and Digital Circuits. Binary Numbers. Decimal to Binary and Binary to Decimal Conversion, AND, OR and NOT Gates. NAND and NOR. Gates as Universal Gates. XOR and XNOR Gates.

(5 Lectures)

De Morgan's Theorems. Boolean Laws. Simplification of Logic Circuit using Boolean Algebra. Fundamental Products. Minterms and Maxterms. Conversion of a Truth Table into an Equivalent Logic Circuit by (1) Sum of Products Method and (2) Karnaugh Map.

(6 Lectures)

Binary Addition. Binary Subtraction using 2's Complement Method). Half Adders and Full Adders and Subtractors, 4-bit binary Adder-Subtractor.

(4 Lectures)

Unit 2

Semiconductor Devices and Amplifiers:

Semiconductor Diodes: P and N type semiconductors. PN junction and its characteristics. Static and dynamic Resistance.

(2 Lectures)

Bipolar Junction transistors: n-p-n and p-n-p Transistors. Characteristics of CB, CE and CC Configurations. Active, Cutoff & Saturation regions. Current gains α and β . Relations between α and β . Load Line analysis of Transistors. DC Load line & Q-point. Voltage Divider Bias Circuit for CE Amplifier. h-parameter Equivalent Circuit of transistor. Analysis of single-stage CE amplifier using hybrid Model. Input and output Impedance. Current and Voltage gains.

(12 Lectures)

Unit 3

Operational Amplifiers (Black Box approach):

Characteristics of an Ideal and Practical Op-Amp (IC 741), Open-loop and closed-loop Gain. CMRR, concept of Virtual ground. Applications of Op-Amps: (1) Inverting and non-inverting Amplifiers, (2) Adder, (3) Subtractor, (4) Differentiator, (5) Integrator, (6) Zero crossing detector.

(14 Lectures)

Sinusoidal Oscillators: Barkhausen's Criterion for Self-sustained Oscillations. Determination of Frequency of RC Phase-shift Oscillator.

(5 Lectures)

Unit 4

Instrumentations:

Introduction to CRO: Block diagram of CRO. Applications of CRO: (1) Study of waveform, (2) Measurement of voltage, current, frequency, and phase difference.

(3 Lectures)

Power Supply: Half-wave Rectifiers. Centre-tapped and Bridge Full-wave Rectifiers Calculation of Ripple Factor and Rectification Efficiency, Basic idea about capacitor filter, Zener Diode and Voltage Regulation.

(6 Lectures)

Timer IC: IC 555 Pin diagram and its application as Astable and Monostable Multivibrator.

(3 Lectures)

Practical : 60 Hours

PRACTICALS-GE LAB: Digital, Analog and Instrumentation Lab

Session on the construction and use of CRO, and other experimental apparatuses used in the lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to specific experiments done in the lab.

At least 06 Experiments from the following

1. To measure (a) Voltage, and (b) Frequency of a periodic waveform using CRO
2. To minimize a given (a) logic circuit and (b) Boolean equation.
3. Half adder, Full adder and 4-bit Binary Adder.
4. To design an astable multivibrator of given specifications using 555 Timer.
5. To design a monostable multivibrator of given specifications using 555 Timer.
6. To study IV characteristics of (a) PN diode, (b) Zener diode and (3) LED.
7. To study the characteristics of a Transistor in CE configuration.
8. To design a CE amplifier of given gain (mid-gain) using voltage divider bias.
9. (a) To design an inverting amplifier of given gain using Op-amp 741 and study its frequency response.
(b) To design a non-inverting amplifier of given gain using Op-amp 741 and study its Frequency Response.
10. To study Differential Amplifier of given I/O specification using Op-amp.
11. To investigate a differentiator made using op-amp.
12. To design a Wien Bridge Oscillator using an op-amp.

References for Theory :

Essential Readings :

1. Integrated Electronics, J. Millman and C.C. Halkias, 1991, Tata Mc-Graw Hill.
2. Fundamentals of Digital Circuits, Anand Kumar, 4th Edn, 2018, PHI Learning Pvt. Ltd.

3. Digital Principles and Applications, A.P.Malvino, D.P.Leach and Saha, 8th Ed., 2018, Tata McGraw Hill Education
4. OP-AMP & Linear Digital Circuits, R.A. Gayakwad, 2000, PHI Learning Pvt. Ltd.
5. Electronics: Fundamentals and Applications, J.D. Ryder, 2004, Prentice Hall.

Additional Readings :

1. Electronic devices & circuits, S. Salivahanan & N.S. Kumar, 2012, Tata Mc-Graw Hill
2. Microelectronic Circuits, M.H. Rashid, 2nd Edn., 2011, Cengage Learning.
3. Modern Electronic Instrumentation and Measurement Tech., Helfrick and Cooper, 1990, PHI Learning
4. Microelectronic circuits, A.S. Sedra, K.C. Smith, A.N. Chandorkar, 2014, 6th Edn., Oxford University Press.

References For Laboratory Work:

1. Electronic Devices and circuits, B. Kumar, S.B. Jain, 2nd Edition, 2015, PHI Learning Pvt. Ltd.
2. Basic Electronics: A text lab manual, P.B.Zbar, A.P.Malvino, M.A.Miller, 1994, McGraw Hill.

GE: Applied Dynamics (32225104)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course introduces the main topics of low-dimensional nonlinear systems, with applications to a wide variety of disciplines, including physics, engineering, mathematics, chemistry, and biology. This course begins with the first order dynamical system and the idea of phase space, flows and trajectories and ends with the elementary fluid dynamics. Students will also appreciate the introduction to chaos and fractals.

Course Learning Outcomes

Upon successful course completion, a student will be able to:

- Demonstrate understanding of the concepts that underlay the study of dynamical systems.
- Understand fractals as self-similar structures.
- Learn various forms of dynamics and different routes to chaos.
- Understand basic Physics of fluids and its dynamics theoretically and experimentally and by computational simulations
- In the Lab course, students will be able to perform Simulations/Lab experiments on: coupled Oscillators, Simulation of Simple Population, Predator-Prey Dynamics, Simple genetic circuits, rate equations for some simple chemical reactions, Fractal Formation in Deterministic Fractals, Fluid Flow Models.

Unit 1

Introduction to Dynamical systems: Definition of a continuous first order dynamical system. The idea of phase space, flows and trajectories. Simple mechanical systems as first order dynamical systems: simple and damped harmonic oscillator. Fixed points, attractors, stability of fixed points, basin of attraction, notion of qualitative analysis of dynamical systems. Examples of dynamical systems – Population models e.g. exponential growth and decay, logistic growth, predator-prey dynamics.

(22 Lectures)

Unit 2

Introduction to Chaos and Fractals: Chaos in nonlinear equations - Logistic map and Lorenz equations: Dynamics from time series. Parameter dependence- steady, periodic and chaotic states. Cobweb iteration. Fixed points. Defining chaos- aperiodic, bounded, deterministic and sensitive dependence on initial conditions.

Self-similarity and fractal geometry: Fractals in nature – trees, coastlines, earthquakes, etc. Need for fractal dimension to describe self-similar structure. Deterministic fractal vs. self-similar fractal structure.

(18 Lectures)

Unit 3

Elementary Fluid Dynamics: Importance of fluids: Fluids in the pure sciences, fluids in technology. Study of fluids: Theoretical approach, experimental fluid dynamics, computational fluid dynamics. Basic physics of fluids: The continuum hypothesis-concept of fluid element or fluid parcel; Definition of a fluid- shear stress; Fluid properties- viscosity, thermal conductivity, mass diffusivity, other fluid properties and equation of state; Flow phenomena- flow dimensionality, steady and unsteady flows, uniform and non-uniform flows, viscous and inviscid flows, incompressible and compressible flows, laminar and turbulent flows, rotational and irrotational flows, separated and unseparated flows.

Practical :60 Hours

PRACTICALS- GE LAB: APPLIED DYNAMICS

Computing and visualizing trajectories using software such as Scilab, Maple, Octave, XPPAUT based on Applied Dynamics problems like (at least 06 experiments)

1. To determine the coupling coefficient of coupled pendulums.
2. To determine the coupling coefficient of coupled oscillators.
3. To determine the coupling and damping coefficient of damped coupled oscillator.
4. To study population models e.g. exponential growth and decay, logistic growth, predator-prey dynamics.
5. To study rate equations for chemical reactions e.g. auto catalysis, bistability.
6. To study examples from game theory.
7. To study period doubling route to chaos in logistic map.
8. To study various attractors of Lorenz equations.
9. Computational visualization of fractal formations of Deterministic fractal.
10. Computational visualization of fractal formations of self-similar fractal.
11. Computational visualization of fractal formations of Fractals in nature – trees, coastlines, earthquakes.
12. Computational Flow visualization - streamlines, pathlines, Streaklines.

References For Theory:

Essential Readings:

1. Nonlinear Dynamics and Chaos, S.H. Strogatz, Levant Books, Kolkata, 2007.
2. Understanding Nonlinear Dynamics, Daniel Kaplan and Leon Glass, Springer.
3. Nonlinear Dynamics: Integrability, Chaos and Patterns, M. Lakshmanan and S. Rajasekar, Springer, 2003.
4. An Introduction to Fluid Dynamics, G.K.Batchelor, Cambridge Univ. Press, 2002.
5. Fluid Mechanics, 2nd Edition, L. D. Landau and E. M. Lifshitz, Pergamon Press, Oxford, 1987.

References For Laboratory Work:

1. Nonlinear Dynamics and Chaos, Steven H. Strogatz, Levant Books, Kolkata, 2007
2. Understanding Nonlinear Dynamics, Daniel Kaplan and Leon Glass, Springer.
3. An Introduction to Fluid Dynamics, G.K.Batchelor, Cambridge Univ. Press, 2002
4. Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific and Engineering Applications: A. Vande Wouwer, P. Saucez, C. V. Fernández. 2014 Springer

GE: Medical Physics (32225105)
Credit : 06 (Theory-04, Practical-02)
Theory : 60 Hours
Practical : 60 Hours

Course Objective

This course introduces a student to the basics of Medical Physics.

Course Learning Outcomes

This course will enable the student to

- Focus on the application of Physics to clinical medicine.
- Gain a broad and fundamental understanding of Physics while developing particular expertise in medical applications.
- Learn about the human body, its anatomy, physiology and BioPhysics, exploring its performance as a physical machine.
- Learn diagnostic and therapeutic applications like the ECG, Radiation Physics, X-ray technology, ultrasound and magnetic resonance imaging.
- Gain knowledge with reference to working of various diagnostic tools, medical imaging techniques
- Understand interaction of ionizing radiation with matter - its effects on living organisms and its uses as a therapeutic technique and also radiation safety practices.
- Gain functional knowledge regarding need for radiological protection and the sources of an approximate level of radiation exposure for treatment purposes.
- In the laboratory course, the student will be exposed to the workings of various medical devices and getting familiarized with various detectors used in medical imaging, medical diagnostics. The hands-on experience will be very useful for the students from job perspective.

Unit 1

PHYSICS OF THE BODY-I

Basic Anatomical Terminology: Standard Anatomical Position, Planes. Familiarity with terms like- Superior, Inferior, Anterior, Posterior, Medial, Lateral, Proximal and Distal. Mechanics of the body: Skeleton, forces, and body stability. Muscles and dynamics of body movement. Physics of Locomotor Systems: joints and movements, Stability and Equilibrium. Energy household of the body: Energy balance in the body, Energy consumption of the body, Heat losses of the body, Thermal Regulation. Pressure system of body: Physics of breathing, Physics of cardiovascular system. Basics of CPR.

(8 Lectures)

Unit 2

PHYSICS OF THE BODY-II

Acoustics of the body: Nature and characteristics of sound, Production of speech, Physics of the ear, Diagnostics with sound and ultrasound. Optical system of the body: Physics of the eye. Electrical system of the body: Physics of the nervous system, Electrical signals and information transfer.

(10 Lectures)

Unit 3

PHYSICS OF DIAGNOSTIC AND THERAPEUTIC SYSTEMS-I

X-RAYS: Electromagnetic spectrum, production of x-rays, x-ray spectra, Brehmsstrahlung, Characteristic x-ray. X-ray tubes & types: Coolidge tube, x-ray tube design, tube cooling stationary mode, Rotating anode x-ray tube, Tube rating, quality and intensity of x-ray. X-ray generator circuits, half wave and full wave rectification, filament circuit, kilo voltage circuit, types of X-Ray Generator, high frequency generator, exposure timers and switches, HT cables, HT generation.

(7 Lectures)

RADIATION PHYSICS: Radiation units exposure, absorbed dose, units: rad, gray, relative biological effectiveness, effective dose, inverse square law. Interaction of radiation with matter Compton & photoelectric effect, Rem & Sievert, linear attenuation coefficient. Radiation Detectors: Thimble chamber, condenser chambers, Geiger Muller counter, Scintillation counters and Solid State detectors, ionization chamber, Dosimeters, survey methods, area monitors, TLD, Semiconductor detectors.

(7 Lectures)

Unit 4

MEDICAL IMAGING PHYSICS: Evolution of Medical Imaging, X-ray diagnostics and imaging, Physics of nuclear magnetic resonance (NMR), NMR imaging, MRI Radiological imaging, Ultrasound imaging, Physics of Doppler with applications and modes, Vascular Doppler. Radiography: Filters, grids, cassette, X-ray film, film processing, fluoroscopy. Computed tomography scanner- principle & function, display, generations, mammography. Thyroid uptake system and Gamma camera (Only Principle, function and display).

(9 Lectures)

RADIATION ONCOLOGY PHYSICS: External Beam Therapy (Basic Idea): Telecobalt, Conformal Radiation Therapy (CRT), 3DCRT, IMRT, Image Guided Radiotherapy, EPID, Rapid Arc, Proton Therapy, Gamma Knife, Cyber Knife. Contact Beam Therapy (Basic Idea): Brachytherapy-LDR and HDR, Intra Operative Brachytherapy. Radiotherapy, kilo voltage machines, deep therapy machines, Telecobalt machines, Medical linear accelerator. Basics of Teletherapy units, deep x-ray, Telecobalt units, medical linear accelerator, Radiation protection, external beam characteristics, dose maximum and build up – bolus, percentage depth dose, tissue maximum ratio and tissue phantom ratio, Planned target Volume and Gross Tumour Volume.

(9 Lectures)

Unit 5

RADIATION AND RADIATION PROTECTION: Principles of radiation protection, protective materials-radiation effects , somatic, genetic stochastic and deterministic effect. Personal monitoring devices: TLD film badge , pocket dosimeter, OSL dosimeter. Radiation dosimeter. Natural radioactivity, Biological effects of radiation, Radiation monitors. Steps to reduce radiation to Patient, Staff and Public. Dose Limits for Occupational workers and Public. AERB: Existence and Purpose.

(5 Lectures)

Unit 6

PHYSICS OF DIAGNOSTIC AND THERAPEUTIC SYSTEMS-II

Diagnostic nuclear medicine: Radiopharmaceuticals for radioisotope imaging, Radioisotope imaging equipment, Single photon and positron emission tomography. Therapeutic nuclear medicine: Interaction between radiation and matter Dose andisodose in radiation treatment. Medical Instrumentation: Basic Ideas of Endoscope and Cautery, Sleep Apnea and Cpap Machines, Ventilator and its modes.

(5 Lectures)

Practical : 60 Hours

PRACTICALS- GE LAB: Medical Physics Lab

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to the specific experiments done in the lab.

1. Understanding the working of a manual Hg Blood Pressure monitor, Stethoscope and to measure the Blood Pressure.
2. Basic Process of doing CPR
3. Understanding the working of a manual optical eye-testing machine and to learn eye testing procedure.
4. Correction of Myopia (short sightedness) using a combination of lenses on an optical bench/breadboard.
5. Correction of Hypermetropia/Hyperopia (long sightedness) combination of lenses on an optical bench/breadboard.
6. To learn working of Thermo luminescent dosimeter (TLD) badges and measure the background radiation.
7. Familiarization with Geiger-Muller (GM) Counter & to measure background radiation
8. Familiarization with Radiation meter and to measure background radiation.
9. Familiarization with the Use of a Vascular Doppler.

References for Theory :

Essential Readings :

1. Medical Physics, J.R. Cameron and J.G. Skofronick, Wiley (1978)

2. Basic Radiological Physics Dr. K.Thayalan- Jayapee Brothers Medical Publishing Pvt. Ltd. New Delhi (2003)
3. Christensen's Physics of Diagnostic Radiology: Curry, Dowdey and Murry - Lippincot Williams and Wilkins (1990)
4. Physics of the human body, Irving P. Herman, Springer (2007).
5. Physics of Radiation Therapy: F M Khan - Williams and Wilkins, 3 rd edition (2003)

Additional Readings:

1. The essential physics of Medical Imaging: Bushberg, Seibert, Leidholdt and Boone Lippincot Williams and Wilkins, Second Edition (2002)
2. Handbook of Physics in Diagnostic Imaging: R.S. Livingstone: B.I. Publication Pvt Ltd.

GE: Mechanics (32225201)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course begins with the review of Vectors and Differential equations and ends with the Special Theory of Relativity. Students will also appreciate the Gravitation, Rotational Motion and Oscillations. The emphasis of this course is to enhance the basics of mechanics.

Course Learning Outcomes

Upon completion of this course, students are expected to

- Understand the role of vectors and coordinate systems in Physics.
- Learn to solve Ordinary Differential Equations: First order, Second order Differential Equations with constant coefficients.
- Understand laws of motion and their application to various dynamical situations.
- Learn the concept of inertial reference frames and Galilean transformations. Also, the concept of conservation of energy, momentum, angular momentum and apply them to basic problems.
- Understand translational and rotational dynamics of a system of particles.
- Apply Kepler's laws to describe the motion of planets and satellite in circular orbit.
- Understand concept of Geosynchronous orbits
- Explain the phenomenon of simple harmonic motion.
- Understand special theory of relativity - special relativistic effects and their effects on the mass and energy of a moving object.
- In the laboratory course, the student shall perform experiments related to mechanics:

compound pendulum, rotational dynamics (Flywheel), elastic properties (Young Modulus and Modulus of Rigidity), fluid dynamics, estimation of random errors in the observations etc.

Unit 1

Vectors: Vector algebra. Derivatives of a vector with respect to a parameter. Scalar and vector products of two, three and four vectors. Gradient, divergence and curl of vectors fields. Polar and Axial vectors.

(5 Lectures)

Ordinary Differential Equations: 1st order homogeneous differential equations, exact and non-exact differential equations, 2nd order homogeneous and non-homogenous differential equations with constant coefficients (Operator Method Only).

(8 Lectures)

Unit 2

Laws of Motion: Review of Newton's Laws of motion. Dynamics of a system of particles. Concept of Centre of Mass, determination of center of mass for discrete and continuous systems having cylindrical and spherical symmetry (1-D, 2-D, 3-D objects).

(6 Lectures)

Work and Energy: Motion of rocket. Work-Energy theorem for conservative forces. Force as a gradient of Potential Energy. Conservation of momentum and energy. Elastic and in-elastic Collisions.

(5 Lectures)

Unit 3

Rotational Dynamics: Angular velocity, Angular momentum, Torque, Conservation of angular momentum, Moment of Inertia. Theorem of parallel and perpendicular axes. Calculation of Moment of Inertia of discrete and continuous objects (1-D, 2-D and 3-D). Kinetic energy of rotation. Motion involving both translation and rotation.

(10 Lectures)

Unit 4

Gravitation: Newton's Law of Gravitation. Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's Laws (statements only). Satellite in circular orbit and applications. Geosynchronous orbits.

(5 Lectures)

Unit 5

Oscillations: Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Compound pendulum. Differential equations of damped oscillations and its solution.

(7 Lectures)

Unit 6

Special Theory of Relativity: Frames of reference. Gallilean Transformations. Inertial and Non-inertial frames. Outcomes of Michelson Morley's Experiment. Postulates of Special Theory of Relativity. Length contraction. Time dilation. Relativistic transformation of velocity. Relativistic variation of mass. Mass-energy equivalence. Transformation of Energy and Momentum.

(14 Lectures)

Note: Students are not familiar with vector calculus. Hence all examples involve differentiation either in one dimension or with respect to the radial coordinate.

Practical: 60 Hours

PRACTICALS- GE LAB: Mechanics Lab

Demonstration cum laboratory sessions on the construction and use of Vernier callipers, screw gauge and travelling microscope, and necessary precautions during their use.

Sessions and exercises on the least count errors, their propagation and recording in final result up to correct significant digits, linearization of data and the use of slope and intercept to determine unknown quantities.

Session on the writing of scientific laboratory reports, which may include theoretical and practical significance of the experiment performed, apparatus description, relevant theory, necessary precautions to be taken during the experiment, proper recording of observations, data analysis, estimation of the error and explanation of its sources, correct recording of the result of the experiment, and proper referencing of the material taken from other sources (books, websites, research papers, etc.)

At least 05 experiments from the following:

1. Measurements of length (or diameter) using Vernier calliper, screw gauge and travelling microscope.
2. To study the random error in observations.
3. To determine the height of a building using a Sextant.
4. To study the motion of the spring and calculate (a) Spring constant and, (b) g.
5. To determine the Moment of Inertia of a Flywheel.
6. To determine g and velocity for a freely falling body using Digital Timing Technique.
7. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
8. To determine the Young's Modulus of a Wire by Optical Lever Method.
9. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
10. To determine the elastic constants of a wire by Searle's method.
11. To determine the value of g using Bar Pendulum.
12. To determine the value of g using Kater's Pendulum.

References for Theory:

Essential Readings:

1. University Physics.FW Sears, MW Zemansky & HD Young13/e, 1986.
2. Addison-Wesley Mechanics Berkeley Physics course, vol.1
3. Charles Kittel,et.al. 2007, Tata McGraw-Hill Physics.
4. Resnick, Halliday & Walker 9/e, 2010, Wiley.
5. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

Additional Readings:

1. Engineering Mechanics, Basudeb Bhattacharya, 2nd ed., 2015, Oxford University Press.

References for Laboratory Work:

1. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House.
2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. Engineering Practical Physics, S. Panigrahi and B.Mallick, 2015, Cengage Learning India Pvt. Ltd.
4. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press

GE: Elements of Modern Physics (32225202)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

The objective of this course is to teach the physical and mathematical foundations necessary for learning various topics in modern physics which are crucial for understanding atoms, molecules, photons, nuclei and elementary particles. These concepts are also important to understand phenomena in laser physics, condensed matter physics and astrophysics.

Course Learning Outcomes

After getting exposure to this course, the following topics would be learnt:

- Main aspects of the inadequacies of classical mechanics as well as understanding of the historical development of quantum mechanics.
- Formulation of Schrodinger equation and the idea of probability interpretation associated with wave-functions.
- The spontaneous and stimulated emission of radiation, optical pumping and population inversion. Three level and four level lasers. Ruby laser and He-Ne laser in details. Basic lasing
- The properties of nuclei like density, size, binding energy, nuclear forces and structure of atomic nucleus, liquid drop model and nuclear shell model and mass formula.
- Decay rates and lifetime of radioactive decays like alpha, beta, gamma decay. Neutrino, its properties and its role in theory of beta decay.
- Fission and fusion: Nuclear processes to produce nuclear energy in nuclear reactor and stellar energy in stars.
- In the laboratory course, the students will get opportunity to measure Planck's constant, verify photoelectric effect, determine e/m of electron, Ionization potential of atoms, study emission and absorption line spectra. They will also find wavelength of Laser sources by single and Double slit experiment, wavelength and angular spread of He-Ne Laser using plane diffraction grating.

Unit 1

Planck's quantum, Planck's constant and light as a collection of photons; Blackbody Radiation: Quantum theory of Light; Photo-electric effect and Compton scattering. De Broglie wavelength and matter waves; Davisson-Germer experiment. Wave description of particles by wave packets. Group and Phase velocities and relation between them. Double-slit experiment with electrons. Probability. Wave amplitude and wave functions.

(12 Lectures)

Unit 2

Position measurement : gamma ray microscope thought experiment; Wave-particle duality leading to Heisenberg uncertainty principle; Uncertainty relations involving canonical pair of variables: Derivation from Wave Packets; Impossibility of a particle following a trajectory; Estimating minimum energy of a confined particle using uncertainty principle; Energy-time uncertainty principle: origin of natural width of emission lines as well as estimation of the mass of the virtual particle that mediates a force from the observed range of the force

(7 Lectures)

Unit 3

Two-slit interference experiment with photons, atoms and particles; linear superposition principle as a consequence; Schrodinger equation for non-relativistic particles; Momentum and Energy operators; stationary states; physical interpretation of a wave function, probabilities and normalization; Probability and probability current densities in one dimension.

(10 Lectures)

Unit 4

One dimensional infinitely rigid box : energy eigenvalues, eigenfunctions and their normalization; Quantum dot as an example; Quantum mechanical scattering and tunneling in one dimension : across a step potential & across a rectangular potential barrier. Lasers: Metastable states. Spontaneous and Stimulated emissions. Optical Pumping and Population Inversion.

(14 Lectures)

Unit 5

Size and structure of atomic nucleus and its relation with atomic weight; Impossibility of an electron being in the nucleus as a consequence of the uncertainty principle. Nature of nuclear force, N-Z graph, Liquid Drop model: semi-empirical mass formula and binding energy.

(6 Lectures)

Unit 6

Radioactivity: stability of the nucleus; Law of radioactive decay; Mean life and half-life; Alpha decay; Beta decay: energy released, spectrum and Pauli's prediction of neutrino; Gamma ray emission, energy-momentum conservation: electron-positron pair creation by gamma photons in the vicinity of a nucleus. Fission and fusion: mass deficit, relativity and generation of energy; Fission : nature of fragments and emission of neutrons. Fusion and thermonuclear reactions driving stellar evolution (brief qualitative discussions).

(11 Lectures)

Practical : 60 Hours

PRACTICALS- GE LAB: Elements of Modern Physics Lab

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the modern physics lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least 06 experiments from the following:

1. Measurement of Planck's constant using black body radiation and photo-detector
2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light.
3. To determine work function of material of filament of directly heated vacuum diode.
4. To determine the Planck's constant using LEDs of at least 4 different colours.
5. To determine the wavelength of H-alpha emission line of Hydrogen atom.
6. To determine the ionization potential of mercury.
7. To determine the absorption lines in the rotational spectrum of Iodine vapour.
8. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.
9. To setup the Millikan oil drop apparatus and determine the charge of an electron.
10. To show the tunneling effect in tunnel diode using I-V characteristics.
11. To determine the wavelength of laser source using diffraction of single slit.

12. To determine the wavelength of laser source using diffraction of double slits.
13. To determine angular spread of He-Ne laser using plane diffraction grating

References for Theory :

1. Concepts of Modern Physics, Arthur Beiser, 2002, McGraw-Hill.
2. Introduction to Modern Physics, Rich Meyer, Kennard, Coop, 2002, Tata McGraw Hill.
3. Physics for scientists and Engineers with Modern Physics, Jewett and Serway, Cengage Learning 2010.
4. Quantum Physics, Berkeley Physics, Vol.4. E.H.Wichman, 1971, Tata McGraw-Hill Co.
5. Theory and Problems of Modern Physics, Schaum`s outline, R. Gautreau and W. Savin, 2nd Edn, Tata McGraw-Hill Publishing Co. Ltd.
6. Modern Physics, G.Kaur and G.R. Pickrell, 2014, McGraw Hill.

References for Practical:

1. Advanced Practical Physics for students, B.L. Flint and H.T.Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4 th Edition, reprinted 1985, Heinemann Educational Publishers.
3. A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11 th Edn, 2011, Kitab Mahal.
4. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press

Additional Resources:

1. Six Ideas that Shaped Physics: Particle Behave like Waves, T.A.Moore,2003, McGraw Hill
2. Thirty years that shook physics: the story of quantum theory, George Gamow, Garden City, NY : Doubleday, 1966
3. Lectures on Quantum Mechanics: Fundamentals and Applications, eds. A. Pathak and Ajoy Ghatak, Viva Books Pvt. Ltd., 2019
4. Quantum Theory, David Bohm, Dover Publications, 1979
5. Introduction to Quantum Mechanics, David J. Griffith, 2005, Pearson Education.

GE: Solid State Physics (32225203)
Credit : 06 (Theory-04, Practical-02)
Theory : 60 Hours
Practical : 60 Hours

Course Objective

This course introduces the basic concepts and principles required to understand the various properties exhibited by condensed matter, especially solids. It enables the students to appreciate how the interesting and wonderful properties exhibited by matter depend upon its atomic and molecular constituents. The gained knowledge helps to solve problems in solid state physics using relevant mathematical tools. It also communicates the importance of solid state physics in modern society.

Course Learning Outcomes

On successful completion of the module students should be able to

- Elucidate the concept of lattice, crystals and symmetry operations.
- Understand the elementary lattice dynamics and its influence on the properties of materials.
- Describe the main features of the physics of electrons in solids: origin of energy bands, and their influence electronic behavior.
- Explain the origin of dia-, para-, and ferro-magnetic properties of solids.
- Explain the origin of the dielectric properties exhibited by solids and the concept of polarizability.
- Learn the properties of superconductivity in solid.
- In the laboratory students will carry out experiments based on the theory that they have learned to measure the magnetic susceptibility, dielectric constant, trace hysteresis loop. They will also employ to four probe methods to measure electrical conductivity and the hall set up to determine the hall coefficient of a semiconductor.

Unit 1

Crystal Structure and Elementary Lattice Dynamics: State of matter: Gas, Liquid, Solid. Solids: Amorphous and Crystalline Materials. Lattice Translation Vectors. Lattice with a Basis. Unit Cell. Types of Lattices. Miller Indices. Reciprocal Lattice. Diffraction of X-rays by Crystals. Bragg's Law. Lattice Vibrations: Linear Monoatomic and Diatomic Chains.

(12 Lectures)

Unit 2

Elementary band theory: Band Gap. Conductors, Semiconductors and insulators. P-and N- type Semiconductors. Conductivity of Semiconductors, mobility, Hall Effect, Hall coefficient.

(10 Lectures)

Unit 3

Magnetic Properties of Matter: Dia-, Para-, Ferri- and Ferro- magnetic materials. Classical Langevin Theory of dia- and Para- magnetic Domains. Curie's law, Weiss's Theory of Ferromagnetism and Ferromagnetic Domains. Discussion of B-H Curve. Hysteresis and Energy Loss.

(12 Lectures)

Unit 4

Dielectric Properties of Materials: Polarization. Local Electric Field at an Atom. Depolarization Field. Electric Susceptibility. Polarizability. Clausius Mossotti Equation. Classical Theory of Electric Polarizability

(8 Lectures)

Unit 5

Applications: Piezoelectric, Pyroelectric, Ferroelectric, Ferromagnetic materials

(3 Lectures)

Unit 6

Superconductivity: Experimental Results. Critical Temperature. Critical magnetic field. Meissner effect. Type I and type II Superconductors.

(5 Lectures)

Practical : 60 Hours

PRACTICALS- GE LAB: Solid State Physics Lab

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the solid state physics lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

At least 06 experiments from the following:

1. Measurement of susceptibility of paramagnetic solution (Quinck's Tube Method).
2. To measure the Magnetic susceptibility of solids.
3. To determine the Coupling Coefficient of a piezoelectric crystal.
4. To study the dielectric response of materials with frequency.
5. To determine the complex dielectric constant and plasma frequency of a metal using Surface Plasmon Resonance (SPR) technique.
6. To determine the refractive index of a dielectric material using SPR technique.
7. To study the PE Hysteresis loop of a Ferroelectric Crystal.
8. To draw the BH curve of Iron (Fe) using solenoid & determine the energy loss from Hysteresis loop.
9. To measure the resistivity of a semiconductor (Ge) with temperature (up to 150°C) by four-probe method and determine its band gap.
10. To determine the Hall coefficient of a semiconductor sample.

11. Analysis of X-Ray diffraction data in terms of unit cell parameters and estimation of particle size.
12. Measurement of change in resistance of a semiconductor with magnetic field.

References for Theory:

1. Introduction to Solid State Physics, Charles Kittel, 8th Ed., 2004, Wiley India Pvt. Ltd.
2. Elements of Solid State Physics, J.P. Srivastava, 2nd Ed., 2006, Prentice-Hall of India.
3. Introduction to Solids, Leonid V. Azaroff, 2004, Tata Mc-Graw Hill.
4. Solid State Physics, N.W. Ashcroft and N.D. Mermin, 1976, Cengage Learning.
5. Elementary Solid State Physics, M.Ali Omar, 2006, Pearson
6. Solid State Physics, M.A. Wahab, 2011, Narosa Publications.

Reference for Practical:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. Elements of Solid State Physics, J.P. Srivastava, 2nd Ed., 2006, Prentice-Hall of India
4. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press

GE: Embedded System: Introduction to Microcontroller (32225204)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course familiarizes students to the designing and development of embedded systems. This course gives a review of microprocessor and introduces microcontroller 8051.

Course Learning Outcomes

At the end of this course, students will be able to :

- Know the major components that constitute an embedded system.

- Understand what is a microcontroller, microcomputer embedded system.
- Describe the architecture of a 8051 microcontroller.
- Write simple programs for 8051 microcontroller in C language.
- Understand key concepts of 8051 microcontroller systems like I/O operations, interrupts, programming of timers and counters.
- Interface 8051 microcontroller with peripherals
- Understand and explain concepts and architecture of embedded systems
- Implement small programs to solve well-defined problems on an embedded platform.
- Develop familiarity with tools used to develop an embedded environment
- Learn to use the Arduino Uno (an open source microcontroller board) in simple applications.
- In the laboratory, students will program 8051 microcontroller and Arduino to perform various experiments.

Unit 1

Embedded system introduction: Introduction to embedded systems and general purpose computer systems, architecture of embedded system, classifications, applications and purpose of embedded systems, challenges and design issues in embedded systems, operational and non-operational quality attributes of embedded systems, elemental description of embedded processors and microcontrollers.

(4 Lectures)

8051 microcontroller: Introduction and block diagram of 8051 microcontroller, architecture of 8051, overview of 8051 family, 8051 assembly language programming, Program Counter and ROM memory map, Data types and directives, Flag bits and Program Status Word (PSW) register, Jump, loop and call instructions.

(12 Lectures)

Unit 2

8051 I/O port programming: Introduction of I/O port programming, pin out diagram of 8051 microcontroller, I/O port pins description and their functions, I/O port programming in 8051, (Using Assembly Language), I/O programming: Bit manipulation.

(4 Lectures)

Programming of 8051: 8051 addressing modes and accessing memory using various addressing modes, assembly language instructions using each addressing mode, arithmetic & logic instructions, 8051 programming in C:- for time delay and I/O operations and manipulation, for arithmetic & logic operations, for ASCII and BCD conversions.

(12 Lectures)

Unit 3

Timer & counter programming: Programming 8051 timers, counter programming.

(3 Lectures)

Serial port programming with and without interrupt: Introduction to 8051 interrupts, programming timer interrupts, programming external hardware interrupts and serial communication interrupt, interrupt priority in the 8051.

(6 Lectures)

Interfacing 8051 microcontroller to peripherals: Parallel and serial ADC, DAC interfacing, LCD interfacing.

(2 Lectures)

Unit 4

Programming Embedded Systems: Structure of embedded program, infinite loop, compiling, linking and locating, downloading and debugging.

(3 Lectures)

Embedded system design and development: Embedded system development environment, file types generated after cross compilation, disassembler/ decompiler, simulator, emulator and debugging, embedded product development life-cycle, trends in embedded industry.

(8 Lectures)

Unit 5

Introduction to Arduino: Pin diagram and description of Arduino UNO. Basic programming and applications.

(6 Lectures)

Practical :60 Hours

PRACTICALS- GE LAB: Embedded System: Introduction to Microcontroller Lab

At least 06 experiments based on 8051 microcontroller from the following:

1. To find that the given numbers is prime or not.
2. To find the factorial of a number.
3. Write a program to make the two numbers equal by increasing the smallest number and decreasing the largest number.
4. Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on LED's .
5. Program to glow the first four LEDs then next four using TIMER application.
6. Program to rotate the contents of the accumulator first right and then left.
7. Program to run a countdown from 9-0 in the seven segment LED display.
8. To interface seven segment LED display with 8051 microcontroller and display 'HELP' in the seven segment LED display.
9. To toggle '1234' as '1324' in the seven segment LED display.
10. Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clockwise direction.
11. Application of embedded systems: Temperature measurement, some information on LCD display, interfacing a keyboard.

References

Essential Readings :

1. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
2. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M.A.Mazidi, J.G. Mazidi, and R.D. McKinlay, 2nd Ed., 2007, Pearson Education
3. Microprocessors and Microcontrollers, Krishna Kant, 2nd Edition, 2016. PHI learning Pvt. Ltd.

Additional Readings :

1. Embedded Systems: Design & applications, S.F. Barrett, 2008, Pearson Education
2. Embedded Systems & Robots, Subrata Ghoshal, 2009, Cengage Learning

References for Laboratory Work:

1. Embedded Microcomputer systems: Real time interfacing, J.W.Valvano 2011, Cengage Learning
2. Embedded System, B.K. Rao, 2011, PHI Learning Pvt. Ltd.

GE: Biological Physics (32225205)
Credit : 06 (Theory-05, Tutorial-01)
Theory : 75 Hours
Tutorial : 15 Hours

Course Objective

This course familiarizes the students with the basic facts and ideas of biology from a quantitative perspective. It shows them how ideas and methods of physics enrich our understanding of biological systems at diverse length and time scales. The course also gives them a flavour of the interface between biology, chemistry, physics and mathematics.

Course Learning Outcomes

After completing this course, students will

- Know basic facts about biological systems, including single cells, multicellular organisms and ecosystems from a quantitative perspective.
- Gain familiarity with various biological processes at different length and time scales, including molecular processes, organism level processes and evolution.
- Be able to apply the principles of physics from areas such as mechanics, electricity and magnetism, thermodynamics, statistical mechanics, and dynamical systems to understand certain living processes.
- Gain a systems level perspective on organisms and appreciate how networks of interactions of many components give rise to complex behavior.
- Perform mathematical and computational modelling of certain aspects of living systems.
- Acquire mastery of the fundamental principles and applications of various branches of Physics in understanding biological systems.
- Learn relevance of chemistry principles and thermodynamics in understanding energy transfer mechanism and protein folding in biological systems.
- Get exposure to complexity of life at i) the level of Cell, ii) level of multi cellular organism and iii) at macroscopic system – ecosystem and biosphere
- Get exposure to models of evolution.

Unit 1

Overview:

The boundary, interior and exterior environment of living cells. Processes: exchange of matter and energy with environment, metabolism, maintenance, reproduction, evolution. Self-replication as a distinct property of biological systems. Time scales and spatial scales. Allometric scaling laws.

(6 Lectures)

Unit 2

Molecules of life:

Metabolites, proteins and nucleic acids. Their sizes, types and roles in structures and processes. Transport, energy storage, membrane formation, catalysis, replication, transcription, translation, signaling. Typical populations of molecules of various types present in cells, their rates of production and turnover. Energy required to make a bacterial cell. Simplified mathematical models of transcription and translation, small genetic circuits and signaling pathways to be studied analytically and computationally.

(18 Lectures)

Unit 3

Molecular motion in cells:

Random walks and applications to biology: Diffusion; models of macromolecules. Entropic forces: Osmotic pressure; polymer elasticity. Chemical forces: Self assembly of amphiphiles. Molecular motors: Transport along microtubules. Flagellar motion: bacterial chemotaxis.

(22 Lectures)

Unit 4

The complexity of life:

At the level of a cell: The numbers of distinct metabolites, genes and proteins in a cell. Metabolic, regulatory and signaling networks in cells. Dynamics of metabolic networks; the stoichiometric matrix. The implausibility of life based on a simplified probability estimate, and the origin of life problem. At the level of a multicellular organism: Numbers and types of cells in multicellular organisms. Cellular differentiation and development. Brain structure: neurons and neural networks. Brain as an information processing system. At the level of an ecosystem and the biosphere: Foodwebs. Feedback cycles and self- sustaining ecosystems.

(20 Lectures)

Unit 5

Evolution:

The mechanism of evolution: variation at the molecular level, selection at the level of the organism. Models of evolution. The concept of genotype-phenotype map. Examples.

(9 Lectures)

References for Theory :

Essential Readings :

1. Biological Physics: Energy, Information, Life; Philip Nelson (W H Freeman &Co, NY, 2004)
2. Physical Biology of the Cell (2nd Edition); Rob Phillips et al (Garland Science, Taylor & Francis Group, London & NY, 2013)
3. An Introduction to Systems Biology; Uri Alon (Chapman and Hall/CRC, Special Indian Edition, 2013)
4. Evolution; M. Ridley (Blackwell Publishers, 2009, 3rd edition)

GE: Waves and Optics (32225310)
Credit : 06 (Theory-04, Practical-02)
Theory : 60 Hours
Practical : 60 Hours

Course Objective

This course reviews the concepts of waves and optics learnt at school from a more advanced perspective and goes on to build new concepts. It begins with explaining ideas of superposition of harmonic oscillations leading to physics of travelling and standing waves. The course also provides an in depth understanding of wave phenomena of light, namely, interference and diffraction with emphasis on practical applications of the same.

Course Learning Outcomes

On successfully completing the requirements of this course, the students will have the skill and knowledge to:

- Understand Simple harmonic oscillation and superposition principle.
- Understand different types of waves and their velocities: Plane, Spherical, Transverse, Longitudinal.
- Understand Concept of normal modes in transverse and longitudinal waves: their frequencies and configurations.
- Understand Interference as superposition of waves from coherent sources derived from same parent source.
- Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from aperture, understand Fraunhofer and Fresnel Diffraction.
- In the laboratory course, student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt first hand. The motion of coupled oscillators, study of Lissajous figures and behaviour of transverse, longitudinal waves can be learnt in this laboratory course.

Unit 1

Superposition of Two Collinear Harmonic oscillations: Simple harmonic motion (SHM). Linearity and Superposition Principle. (1) Oscillations having equal frequencies and (2) Oscillations having different frequencies (Beats).

(6 Lectures)

Superposition of Two Perpendicular Harmonic Oscillations: Graphical and Analytical Methods. Lissajous Figures (1:1 and 1:2) and their uses.

(2 Lectures)

Unit 2

Waves Motion- General: Transverse waves on a string. Travelling and standing waves on a string. Normal Modes of a string. Group velocity, Phase velocity. Plane waves. Spherical waves, Wave intensity.

(8 Lectures)

Unit 3

Sound: Sound waves, production and properties. Intensity and loudness of sound. Decibels. Intensity levels. General idea of musical notes and musical scale. Acoustics of buildings (General idea).

(6 Lectures)

Unit 4

Wave Optics: Electromagnetic nature of light. Definition and Properties of wave front. Huygens Principle. Interference: Division of amplitude and division of wavefront. Young's Double Slit experiment. Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stokes' treatment. Interference in Thin Films: parallel and wedge-shaped films. Newton's Rings: measurement of wavelength and refractive index.

(14 Lectures)

Unit 5

Diffraction: Fraunhofer diffraction- Single slit; Double Slit. Multiple slits and Diffraction grating. Fresnel Diffraction: Half-period zones. Zone plate. Fresnel Diffraction pattern of a straight edge, a slit and a wire using half-period zone analysis.

(14 Lectures)

Unit 6

Polarization: Transverse nature of light waves. Plane polarized light – production and analysis. Circular and elliptical polarization (General idea).

(7 Lectures)

Practical : 60 Hours

PRACTICALS- GE LAB: Waves and Optics Lab

Dedicated demonstration cum laboratory session on the construction, and use of spectrometer and lasers, and necessary precautions during their use.

Session on experimental data analysis, theory of random errors and the standard error in the mean. Use of error bars in graphs and errors in slope and intercept.

At least 05 experiments from the following:

1. To investigate the motion of coupled oscillators
2. To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's Experiment and to verify $\lambda^2 - T$ Law.
3. To study Lissajous Figures

4. Familiarization with Schuster's focussing; determination of angle of prism.
5. To determine the Refractive Index of the Material of a Prism using Sodium Light.
6. To determine Dispersive Power of the Material of a Prism using Mercury Light
7. To determine the value of Cauchy Constants.
8. To determine the Resolving Power of a Prism.
9. To determine wavelength of sodium light using Fresnel Biprism.
10. To determine wavelength of sodium light using Newton's Rings.
11. To determine the wavelength of Laser light using Diffraction of Single Slit.
12. To determine wavelength of (1) Sodium and (2) Spectral lines of the Mercury light using plane diffraction Grating.
13. To determine the Resolving Power of a Plane Diffraction Grating. To determine the wavelength of laser light using diffraction grating.

References for Theory :

Essential Readings :

1. Vibrations and Waves, A.P. French, 1stEd., 2003, CRC press.
2. The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill.
3. OPTICS, (2017), 6th Edition, Ajoy Ghatak, McGraw-Hill Education, New Delhi;
4. Fundamentals of Optics, F.A Jenkins and H.E White, 1976, McGraw-Hill

Additional Readings:

1. Fundamentals of Optics, A. Kumar, H.R. Gulati and D.R. Khanna, 2011, R. Chand Publications
2. University Physics. F.W. Sears, M.W. Zemansky and H.D. Young. 13/e, 1986. Addison-Wesley.

References for Laboratory Work:

1. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
4. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press

GE: Quantum Mechanics (32225311)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

After learning the elements of modern physics, in this course students would be exposed to more advanced concepts in quantum physics and their applications to problems of the sub atomic world.

Course Learning Outcomes

The Students will be able to learn the following from this course:

- Methods to solve time-dependent and time-independent Schrodinger equation.
- Quantum mechanics of simple harmonic oscillator.
- Non-relativistic hydrogen atom: spectrum and eigenfunctions.
- Angular momentum: Orbital angular momentum and spin angular momentum.
- Bosons and fermions - symmetric and anti-symmetric wave functions.
- Application to atomic systems
- In the laboratory course, with the exposure in computational programming in the computer lab, the student will be in a position to solve Schrodinger equation for ground state energy and wave functions of various simple quantum mechanical one-dimensional and three dimensional potentials.

Unit 1

Time dependent Schrodinger equation: Time dependent Schrodinger equation and dynamical evolution of a quantum state; Properties of Wave Function. Interpretation of Wave Function: Probability and probability current densities in three dimensions; Conditions for Physical Acceptability of Wave Functions. Normalization. Linearity and Superposition Principles. Eigenvalues and Eigenfunctions. Position, momentum and Energy operators; commutator of position and momentum operators; Expectation values of position and momentum. Wave Function of a Free Particle.

(12 Lectures)

Unit 2

Time independent Schrodinger equation: Hamiltonian, stationary states and energy eigenvalues; expansion of an arbitrary wavefunction as a linear combination of energy eigenfunctions; General solution of the time dependent Schrodinger equation in terms of linear combinations of stationary states; Application to spread of Gaussian wave-packet for a free particle in one dimension; wave packets, Fourier transforms and momentum space wavefunction; Position-momentum uncertainty principle.

(12 Lectures)

Unit 3

General discussion of bound states in an arbitrary potential: continuity of wave function, boundary condition and emergence of discrete energy levels; application to one-dimensional problem-square well potential; Quantum mechanics of simple harmonic oscillator: energy levels and energy eigenfunctions using Frobenius method; Hermite polynomials; ground state, zero point energy & uncertainty principle.

(10 Lectures)

Unit 4

Quantum theory of hydrogen-like atoms: time independent Schrodinger equation in spherical polar coordinates; separation of variables for second order partial differential equation; angular momentum operator & quantum numbers; Radial wavefunctions from Frobenius method; shapes of the probability densities for ground and first excited states; Orbital angular momentum quantum numbers l and m; s, p, d shells.

(10 Lectures)

Unit 5

Atoms in Electric and Magnetic Fields: Electron angular momentum. Angular momentum quantization. Electron Spin and Spin Angular Momentum. Larmor's Theorem. Spin Magnetic Moment. Stern-Gerlach Experiment. Normal Zeeman Effect: Electron Magnetic Moment and Magnetic Energy.

(8 Lectures)

Unit 6

Many electron atoms: Pauli's Exclusion Principle. Symmetric and Anti-symmetric Wave Functions. Spin orbit coupling. Spectral Notations for Atomic States. Total angular momentum. Spin-orbit coupling in atoms-L-S and J-J couplings.

(8 Lectures)

Practical : 60 Hours

PRACTICALS- GE LAB: Quantum Mechanics Lab

Use C/C ++ /Scilab for solving the following problems based on Quantum Mechanics like:

1. Solve the s-wave Schrodinger equation for the ground state and the first excited state of the hydrogen atom:

$$\frac{d^2 y}{dr^2} = A(r)u(r), A(r) = \frac{2m}{\hbar^2} [V(r) - E] \text{ where } V(r) = \frac{-e^2}{r}$$

where m is the reduced mass of the electron. Obtain the energy eigenvalues and plot the corresponding wavefunctions. Remember that the ground state energy of the hydrogen atom is ≈ -13.6 eV. Take $e = 3.795$ (eVÅ)^{1/2}, $\hbar c = 1973$ (eVÅ) and $m = 0.511 \times 10^6$ eV/c².

2. Solve the s-wave radial Schrodinger equation for an atom:

$$\frac{d^2 y}{dr^2} = A(r)u(r), A(r) = \frac{2m}{\hbar^2}[V(r) - E]$$

where m is the reduced mass of the system (which can be chosen to be the mass of an electron), for the screened coulomb potential

$$V(r) = \frac{-e^2}{r} e^{-r/a}$$

Find the energy (in eV) of the ground state of the atom to an accuracy of three significant digits. Also, plot the corresponding wavefunction. Take $e = 3.795 \text{ (eV}\cdot\text{\AA)}^{1/2}$, $m = 0.511 \times 10^6 \text{ eV}/c^2$, and $a = 3 \text{ \AA}, 5 \text{ \AA}, 7 \text{ \AA}$. In these units $\hbar c = 1973 \text{ (eV}\cdot\text{\AA)}$. The ground state energy is expected to be above -12 eV in all three cases.

3. Solve the s-wave radial Schrodinger equation for a particle of mass m :

$$\frac{d^2 y}{dr^2} = A(r)u(r), A(r) = \frac{2m}{\hbar^2}[V(r) - E]$$

For the anharmonic oscillator potential

$$V(r) = \frac{1}{2}kr^2 + \frac{1}{3}br^3$$

for the ground state energy (in MeV) of particle to an accuracy of three significant digits. Also, plot the corresponding wave function. Choose $m = 940 \text{ MeV}/c^2$, $k = 100 \text{ MeV fm}^{-2}$, $b = 0, 10, 30 \text{ MeV fm}^{-3}$. In these units, $\hbar c = 197.3 \text{ MeV fm}$. The ground state energy is expected to lie between 90 and 110 MeV for all three cases.

4. Solve the s-wave radial Schrodinger equation for the vibrations of hydrogen molecule:

$$\frac{d^2 y}{dr^2} = A(r)u(r), A(r) = \frac{2\mu}{\hbar^2}[V(r) - E]$$

Where μ is the reduced mass of the two-atom system for the Morse potential

$$V(r) = D(e^{-2ar} - e^{-ar}), r' = \frac{r - r_0}{r}$$

Find the lowest vibrational energy (in MeV) of the molecule to an accuracy of three significant digits. Also plot the corresponding wave function.

Take: $m = 940 \times 10^6 \text{ eV}/c^2$, $D = 0.755501 \text{ eV}$, $\alpha = 1.44$, $r_0 = 0.131349 \text{ \AA}$

Where μ is the reduced mass of the two-atom system for the Morse potential

Find the lowest vibrational energy (in MeV) of the molecule to an accuracy of three significant digits. Also plot the corresponding wave function.

Take: $m = 940 \times 10^6 \text{ eV}/c^2$, $D = 0.755501 \text{ eV}$, $\alpha = 1.44$, $r_0 = 0.131349 \text{ \AA}$

Additional laboratory based experiments: (optional)

5. Study of Electron spin resonance- determine magnetic field as a function of the resonance frequency
6. Study of Zeeman effect: with external magnetic field; Hyperfine splitting

References for Theory :**Essential Readings :**

1. Introduction to Quantum Mechanics, David J. Griffiths, Second Edition, 2006, Pearson Education.
2. A Text book of Quantum Mechanics, P.M.Mathews& K.Venkatesan, 2nd Ed., 2010, McGraw Hill.
3. Quantum Mechanics: Theory and Applications, (2019), (Extensively revised 6th Edition), Ajoy Ghatak and S. Lokanathan, Laxmi Publications, New Delhi.
4. Quantum Mechanic Concepts and Applications, Nouredine Zettili, Second Edition 2001, John Wiley & Sons, Ltd.

Additional Readings:

1. Modern Quantum Mechanics, J.J Sakurai, Revised Edition, 1994, Addison-Wesley
2. Quantum Mechanics, Leonard I. Schiff, 3 rd Edn. 2010, Tata McGraw Hill.
3. Quantum Mechanics, Brian H. Bransden and C. Charles Jean Joachain, 2000, Prentice Hall.

Reference Books for Laboratory Work:

1. Schaum & Outline of Programming with C++. J.Hubbard, 2000, McGraw-Hill Pub.
2. Numerical Recipes in C: The Art of Scientific Computing, W.H. Press et.al., 3 rd Edn., 2007, Cambridge University Press.
3. A Guide to MATLAB, B.R. Hunt, R.L. Lipsman, J.M. Rosenberg, 2014, 3 rd Edn., 122 Cambridge University Press
4. Elementary Numerical Analysis, K.E. Atkinson, 3 rd Ed. 2007, Wiley India Edition
5. Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific & Engineering Applications: A.V. Wouwer, P. Saucez, C.V. Fernández.2014 Springer

GE: Communication System (32225312)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This paper aims to describe the concepts of electronics in communication and communication techniques based on Analog Modulation, Analog and digital Pulse Modulation. Communication and Navigation systems such as GPS and mobile telephony system are also introduced. This paper will essentially connect the text book knowledge with the most popular communication technology in real world.

Course Learning Outcomes

At the end of this course, students will be able to

- Understand of fundamentals of electronic communication system and electromagnetic communication spectrum with an idea of frequency allocation for radio communication system in India.
- Gain an insight on the use of different modulation and demodulation techniques used in analog communication
- Learn the generation and detection of a signal through pulse and digital modulation techniques and multiplexing.
- Gain an in-depth understanding of different concepts used in a satellite communication system.
- Study the concept of Mobile radio propagation, cellular system design and understand mobile technologies like GSM and CDMA.
- Understand evolution of mobile communication generations 2G, 3G, and 4G with their characteristics and limitations.
- In the laboratory course, students will apply the theoretical concepts to gain hands on experience in building modulation and demodulation circuits; Transmitters and Receivers for AM and FM. Also to construct TDM, PAM, PWM, PPM and ASK, PSK and FSK modulator and verify their results.

Unit 1

Electronic communication: Introduction to communication – means and modes. Power measurements (units of power). Need for modulation. Block diagram of an electronic communication system. Brief idea of frequency allocation for radio communication system in India (TRAI). Electromagnetic communication spectrum, band designations and usage. Channels and base-band signals.

(4 Lectures)

Analog Modulation: Amplitude Modulation, modulation index and frequency spectrum. Generation of AM (Emitter Modulation), Amplitude Demodulation (diode detector), Single Sideband (SSB) systems, advantages of SSB transmission, Concept of Single side band generation and detection. Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum, equivalence between FM and PM, Generation of FM using VCO, FM detector (slope detector), Qualitative idea of Super heterodyne receiver.

(12 Lectures)

Unit 2

Analog Pulse Modulation: Channel capacity, Sampling theorem, Basic Principles- PAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing (time division multiplexing and frequency division multiplexing).

(9 Lectures)

Unit 3

Digital Pulse Modulation: Need for digital transmission, Pulse Code Modulation, Digital Carrier Modulation Techniques, Sampling, Quantization and Encoding. Concept of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), and Binary Phase Shift Keying (BPSK).

(10 Lectures)

Unit 4

Satellite Communication– Introduction, need, Geosynchronous satellite orbits, geostationary satellite advantages of geostationary satellites. Transponders (C - Band), Uplink and downlink, path loss, Satellite visibility, Ground and earth stations. Simplified block diagram of earth station.

(10 Lectures)

Unit 5

Mobile Telephony System– Basic concept of mobile communication, frequency bands used in mobile communication, concept of cell sectoring and cell splitting, SIM number, IMEI number, need for data encryption, architecture (block diagram) of mobile communication network, idea of GSM, CDMA, TDMA and FDMA technologies, simplified block diagram of mobile phone handset, 2G, 3G and 4G concepts (qualitative only). GPS navigation system (qualitative idea only)

(15 Lectures)

Practical: 60 Hours

PRACTICALS- GE LAB: Communication System Lab

Session on the construction and use of CRO, and other experimental apparatuses used in the lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to specific experiments done in the lab.

At least 05 experiments from the following

1. To design an Amplitude Modulator using Transistor
2. To study envelope detector for demodulation of AM signal
3. To study FM - Generator and Detector circuit
4. To study AM Transmitter and Receiver
5. To study FM Transmitter and Receiver
6. To study Time Division Multiplexing (TDM)
7. To study Pulse Amplitude Modulation (PAM)
8. To study Pulse Width Modulation (PWM)
9. To study Pulse Position Modulation (PPM)
10. To study ASK, PSK and FSK modulators

References :

Essential Readings :

1. Electronic Communications, D. Roddy and J. Coolen, Pearson Education India.
2. Advanced Electronics Communication Systems- Tomasi, 6th Edn. Prentice Hall.
3. Electronic Communication systems, G. Kennedy, 3rd Edn., 1999, Tata McGraw Hill.
4. Principles of Electronic communication systems – Frenzel, 3rd edition, McGraw Hill

Additional Readings:

1. Modern Digital and Analog Communication Systems, B.P. Lathi, 4th Edition, 2011, Oxford University Press.
2. Communication Systems, S. Haykin, 2006, Wiley India
3. Wireless communications, Andrea Goldsmith, 2015, Cambridge University Press

References for Laboratory work:

1. Electronic Communication system, Blake, Cengage, 5th edition.
2. Introduction to Communication systems, U. Madhow, 1st Edition, 2018, Cambridge University Press

GE: Verilog and FPGA based system design (32225313)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This paper provides a review of combinational and sequential circuits such as multiplexers, demultiplexers, decoders, encoders and adder circuits. It discusses the fundamental Verilog concepts in-lieu of today's most advanced digital design techniques.

Course Learning Outcomes

At the end of this course, students will be able to

- Understand the steps and processes for design of logic circuits and systems.
- Differentiate between combinational and sequential circuits.
- Design various types of state machines..
- Understand various types of programmable logic building blocks such as CPLDs and FPGAs and their tradeoffs.
- Write synthesizable Verilog code.
- Write a Verilog test bench to test various Verilog code modules.
- Design, program and test logic systems on a programmable logic device (CPLD or FPGA) using Verilog.

Unit 1

Digital logic design flow. Review of combinational circuits. Combinational building blocks: multiplexors, demultiplexers, decoders, encoders and adder circuits. Review of sequential circuit elements: flip-flop, latch and register. Finite state machines: Mealy and Moore. Other sequential circuits: shift registers and counters. FSM (Finite State Machine with Datapath): design and analysis. Microprogrammed control. Memory basics and timing. Programmable Logic devices.

(20 Lectures)

Unit 2

Evolution of Programmable logic devices. PAL, PLA and GAL. CPLD and FPGA architectures. Placement and routing. Logic cell structure, Programmable interconnects, Logic blocks and I/O Ports. Clock distribution in FPGA. Timing issues in FPGA design. Boundary scan.

(20 Lectures)

Unit 3

Verilog HDL: Introduction to HDL. Verilog primitive operators and structural Verilog Behavioral Verilog. Design verification. Modeling of combinational and sequential circuits (including FSM and FSM) with Verilog Design examples in Verilog.

(20 lectures)

Practical: 60 Hours

PRACTICALS- GE LAB: Verilog and FPGA based System Design Lab

Session on the construction and use of experimental apparatuses used in the lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to specific experiments done in the lab

At least 08 experiments from following.

1. Write code to realize basic and derived logic gates.
2. Half adder, Full Adder using basic and derived gates.
3. Half subtractor and Full Subtractor using basic and derived gates.
4. Design and simulation of a 4 bit Adder.
5. Multiplexer (4x1) and Demultiplexer using logic gates.
6. Decoder and Encoder using logic gates.
 - (i) Clocked D, JK and T Flip flops (with Reset inputs)
 - (ii) 3-bit Ripple counter
 - (iii) To design and study switching circuits (LED blink shift)
 - (iv) To design traffic light controller.
 - (v) To interface a keyboard
 - (vi) To interface a LCD using FPGA
 - (vii) To interface multiplexed seven segment display.
 - (viii) To interface a stepper motor and DC motor.
 - (ix) To interface ADC 0804.

References for Theory :

Essential Readings :

1. Principles of Digital Systems Design and VHDL, Lizy Kurien and Charles Roth, Cengage Publishing. ISBN-13: 978-8131505748
2. Verilog HDL, Samir Palnitkar, Pearson Education; Second edition (2003).
3. FPGA Based System Design, Wayne Wolf. Pearson Education.
4. VLSI design, Debaprasad Das, 2nd Edition, 2015, Oxford University Press.
5. Digital Signal Processing with FPGAs, U. Meyer Baese, Springer, 2004

Additional Readings:

1. Digital Signal processing, S. K. Mitra, McGraw Hill, 1998.

References for Laboratory Work:

1. Digital System Designs and Practices: Using Verilog HDL and FPGAs. Ming-Bo Lin. Wiley India Pvt Ltd. ISBN-13: 978-8126536948
2. Verilog Digital System Design. Zainalabedin Navabi. TMH; 2nd edition. ISBN-13: 978-0070252219
3. Verilog HDL primer- J. Bhasker. BSP, 2003 II edition

4. Designing Digital Computer Systems with Verilog, D.J. Laja and S. Sapatnekar, Cambridge University Press, 2015.

GE: Nano Materials and Applications (32225314)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course introduces briefly the basic concepts of Quantum Mechanics and principles required to understand nanomaterials. Various nanomaterial synthesis/growth methods and characterizations techniques are discussed to explore the field in detail. The effect of dimensional confinement of charge carries on the electrical, optical and structural properties are discussed.

Course Learning Outcomes

On successful completion of the module students should be able to

- Understand the basic concepts of Quantum Mechanics and solve Schrodinger wave equation for simple problems.
- Explain the difference between nanomaterials and bulk materials and their properties.
- Explain the role of confinement on the density of state function and so on the various properties exhibited by nanomaterials compared to bulk materials.
- Explain various methods for the synthesis/growth of nanomaterials including top down and bottom up approaches.
- Analyze the data obtained from the various characterization techniques.
- Explain various applications of nano particles, quantum dots, nano wires etc.
- Explain why nanomaterials exhibit properties which are sometimes very opposite, like magnetic, to their bulk counterparts.
- In the Lab course students will synthesize nanoparticles by different chemical routes and characterize them in the laboratory using the different techniques, learnt in the theory. They will also carry out thin film preparation and prepare capacitors and evaluate its performance. They will fabricate a PN diode and study its I-V characteristics.

Unit 1

Brief Historical achievements: Use of nanoparticle by artisans or craftsman's in glass wares, pottery etc. Introduction to naturally occurring nanoparticles/nanostructures (explore the surroundings). Discussion on Michael Faraday's experiment with the gold films. Discussion on the visionary articles: (1) There's Plenty of Room at the Bottom: An Invitation to Enter a New Field of Physics by Prof. Richard P. Feynman, (2) Room at the Bottom, Plenty of Tyranny at the Top by Prof. Karl Hess.

(8 Lectures)

Unit 2

Basic Quantum Mechanics: Idea about particles as wave, electron interference experiment, superposition principle, position (or amplitude), and momentum. Wave-particle duality, uncertainty principle, energy quantization, Schrodinger equation. Applications of Schrodinger equation (**qualitative**): The free particle, potential step, rectangular potential barrier and the tunnel effect, free and bound states of a particle in square well potential, particle in a box (3D) problem.

(10 Lectures)

Unit 3

Basic Introduction to solids and Nanoscale Systems: Classification of solids into crystalline and amorphous materials, classification based on conductivity (range of values) as metals, semiconductors and insulators, idea of bandgap and its consequences on optical and electrical properties, electrons as free particles for current conduction ($I = nevA$), introduce bulk (3D) and nanomaterials {thin films (2D), nanowires (1D) nanodots or quantum dots (0D)} with an example of the colour of say Gold metals and its nanoparticles. Bulk materials Density of states function and its implication on electrical properties, Band structure and density of states function for nanoscale materials (Quantitative for 2D, 1D, 0D), Applications of quantum confinement of carriers in 3D, 2D, 1D nanostructures and its consequences on electronic and optical properties.

(DOS function can be introduced through the population census survey, the plot of no. of persons (in millions) vs age)

(17 Lectures)

Unit 4

Synthesis and Characterization (Qualitative): Top down and Bottom up approach, Photolithography. Ball milling. Spin coating, Vacuum deposition: Physical vapor deposition (PVD): Thermal evaporation, Sputtering, Pulsed Laser Deposition (PLD), electric arc deposition for CNT, C_{60} , grapheme, Chemical vapor deposition (CVD). Preparation

through colloidal methods (Metals, Metal Oxide nanoparticles), MBE growth of quantum dots. **Structure and Surface morphology:** X-Ray Diffraction (XRD). Scanning Electron Microscopy (SEM), Scanning Tunnel Microscopy (STM) (must discuss Quantum Corral). Transmission Electron Microscopy (TEM). **Spectroscopy:** UV-Vis spectroscopy. (Emphasis should be on to discuss data and plots gathered from these techniques)

(10 Lectures)

Unit 5

Optical and Electron Transport Properties: Bandgap tuning as a function of particle size (discuss results of oxide and metal nanoparticles) Radiative processes: General formalization-absorption, emission and luminescence. Defects and impurities. Idea about time and length scale, diffusive and ballistic transport of electrons in nanostructures, Discuss interesting experiments (no derivations) (1) Charging effect, Coulomb blockade effect (2) Single electron device.

(10 Lectures)

Unit 6

Applications (Qualitative): based on optical, electrical and magnetic properties of nanoparticles, nanowires and thin films in electronic industry, medical industry, beauty products, Micro Electromechanical Systems (MEMS).

(5 Lectures)

Practical: 60 Hours

PRACTICALS- GE LAB: Nano Materials and Applications Lab

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the nano physics lab, including necessary precautions.

Sessions on the review of experimental data analysis and its application to the specific experiments done in the lab.

At least 06 experiments from the following:

1. Synthesis of metal (Au/Ag) nanoparticles by chemical route and study/observe its optical absorption properties.
2. Synthesis of semiconductor (CdS/ZnO/TiO₂/Fe₂O₃etc) nanoparticles and study/observe its optical absorption properties.
3. Study the XRD pattern of nanoparticles and estimation the particle size.
4. Surface Plasmon study of metal nanoparticles by UV-Visible spectrophotometer.
5. To study/observe the effect of size on color of nanomaterials.
6. To prepare composite of CNTs with other materials.
7. Growth of quantum dots by thermal evaporation.
8. Prepare a disc of ceramic of a compound and study its XRD.
9. Fabricate a thin film of nanoparticles by spin coating (or chemical route) and study its XRD and UV-Visible spectra.
10. Prepare a thin film capacitor and measure capacitance as a function of temperature or frequency.
11. Fabricate a PN diode by diffusing Al over the surface of N-type Si/Ge and study its V-I characteristic.

Reference For Theory:

Essential Readings:

1. Introduction to Nanoelectronics, V.V. Mitin, V.A. Kochelap and M.A. Stroscio, 2011, Cambridge University Press.

2. C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology 1st edition (2003) Wiley India Pvt. Ltd.
3. S.K. Kulkarni, Nanotechnology: Principles & Practices 2nd edition (2011) (Capital Publishing Company)
4. K.K. Chattopadhyay and A. N. Banerjee, Introduction to Nanoscience and Technology (2009) (PHI Learning Private Limited).
5. Electronic transport in mesoscopic systems by SupriyoDatta (1997) Cambridge University Press.

Additional Readings:

1. Solid State Physics, M. A. Wahab, 2011, Narosa Publications
2. Solid State Physics by J. R. Hall and H. E. Hall, 2nd edition (2014) Wiley
3. Quantum Mechanics by S. P. Singh, M. K. Bagde and K. Singh, S. Chand and Company Ltd.
4. Fundamentals of molecular spectroscopy by C. N. Banwell and E. M. McCASH, 4th edition, McGraw Hill.

Reference for Practical:

1. C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology 1st edition (2003) Wiley India Pvt.Ltd.
2. S.K. Kulkarni, Nanotechnology: Principles & Practices 2nd edition (2011) (Capital Publishing Company).
3. K.K. Chattopadhyay and A. N. Banerjee, Introduction to Nanoscience and Technology (2009) (PHI Learning Private Limited).
4. Richard Booker, Earl Boysen, Nanotechnology for Dummies (2005) (Wiley Publishing Inc.).

GE: Thermal Physics and Statistical Mechanics (32225415)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

This course will introduce Thermodynamics, Kinetic theory of gases and Statistical Mechanics to the students. The primary goal is to understand the fundamental laws of thermodynamics and its applications to various thermodynamical systems and processes. This coursework will also enable the students to understand the connection between the macroscopic observations of physical systems and microscopic behaviour of atoms and molecule through statistical mechanics.

Course Learning Outcomes

At the end of this course, students will

- Learn the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations. They are also expected to learn Maxwell's thermodynamic relations.
- Know the fundamentals of the kinetic theory of gases, Maxwell-Boltzmann distribution law, equipartition of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.
- Learn about the black body radiations, Stefan-Boltzmann's law, Rayleigh-Jean's law and Planck's law and their significances.
- Learn the quantum statistical distributions, viz., the Bose-Einstein statistics and the Fermi-Dirac statistics.
- In the laboratory course, the students are expected to: Measure of Planck's constant using black body radiation, determine Stefan's Constant, coefficient of thermal conductivity of a bad conductor and a good conductor, determine the temperature coefficient of resistance, study variation of thermo emf across two junctions of a thermocouple with temperature etc

Unit 1

Laws of Thermodynamics: Thermodynamic Description of system: Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: General Relation between C_p and C_v , Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Coefficient, Reversible and irreversible processes, Second law, Entropy, Carnot's cycle & theorem, Entropy changes in reversible and irreversible processes, Entropy-temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero.

(22 lectures)

Unit 2

Thermodynamical Potentials: Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations and applications - Joule-Thomson Effect, Clausius Clapeyron Equation, Expression for $(C_p - C_v)$, C_p/C_v , TdS equations.

(10 lectures)

Unit 3

Kinetic Theory of Gases: Derivation of Maxwell's law of distribution of velocities and its experimental verification, Mean free path (Zeroth Order), Transport Phenomena: Viscosity, Conduction and Diffusion (for vertical case), Law of equipartition of energy (no derivation) and its applications to specific heat of gases.

(10 lectures)

Unit 4

Theory of Radiation: Blackbody radiation, Spectral distribution, Derivation of Planck's law, Deduction of Wien's law, Rayleigh-Jeans Law, Stefan Boltzmann Law & Wien's displacement law from Planck's law.

(6 lectures)

Unit 5

Statistical Mechanics: Macrostate and Microstate, phase space, Entropy and Thermodynamic Probability, Maxwell-Boltzmann law, Fermi-Dirac distribution law - Bose-Einstein distribution law - comparison of three statistics.

(12 lectures)

Practical : 60 Hours

PRACTICALS- GE LAB: Thermal Physics and Statistical Mechanics Lab

Sessions on the construction and use of specific measurement instruments and experimental apparatuses used in the thermal physics lab, including necessary precautions.

Sessions on the review of experimental data analysis, sources of error and their estimation in detail, writing of scientific laboratory reports including proper reporting of errors. Application to the specific experiments done in the lab.

1. To determine Mechanical Equivalent of Heat, J , by Callender and Barne's constant flow method.
2. Measurement of Planck's constant using black body radiation.
3. To determine Stefan's Constant.
4. To determine the coefficient of thermal conductivity of Cu by Searle's Apparatus.
5. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.
6. To determine the temperature co-efficient of resistance by Platinum resistance thermometer.
7. To study the variation of thermo emf across two junctions of a thermocouple with temperature.

References for Theory:

Essential Readings:

1. A Treatise on Heat, Meghnad Saha, and B.N. Srivastava, 1969, Indian Press.
2. Heat and Thermodynamics, M.W.Zemasky and R. Dittman, 1981, McGraw Hill
3. Thermodynamics, Kinetic theory & Statistical thermodynamics, F.W.Sears and G.L.Salinger. 1988, Narosa.
4. Thermal Physics, A. Kumar and S.P. Taneja, 2014, R. Chand Publications.
5. Thermal Physics: S.C.Garg, R. M.Bansaland C.K. Ghosh (Tata McGraw-Hill).

Additional Readings:

1. An Introduction to Thermal Physics: D. Schroeder (Pearson)

2. Concepts in Thermal Physics: Blundell and Blundell (Oxford Univ. press)

References for Laboratory Work:

1. Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.
2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. A Laboratory Manual of Physics for Undergraduate Classes, D.P. Khandelwal, 1985, Vani Publication.
4. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press
5. An Advanced Course in Practical Physics :D. Chattopadhyay& P.C. Rakshit(New Central Book Agency)

GE: Digital Signal Processing (32225416)

Credit : 06 (Theory-04, Practical-02)

Theory : 60 Hours

Practical : 60 Hours

Course Objective

The prime goal of this paper is to develop a thorough understanding of the central elements of discrete time signal processing theory and correlate this theory with the real-world signal processing applications.

Course Learning Outcomes

At the end of this course, students will be able to

- Learn basic discrete-time signal and system types, convolution sum, impulse and frequency response concepts for linear time-invariant (LTI) systems.
- Understand use of different transforms and analyze the discrete time signals and systems.
- Realize the use of LTI filters for filtering different real world signals. The concept of transfer
- Learn to solve Difference Equations.
- Develop an ability to analyze DSP systems like linear-phase, FIR, IIR, All-pass, averaging and notch Filter etc.

- Understand the discrete Fourier transform (DFT) and realize its implementation using FFT techniques.
- Design and understand different types of digital filters such as finite & infinite impulse response filters for various applications.
- In the Lab course, the students will realize various concepts using Scilab simulations like Digital Filters and their classifications based on the response, design and algorithm, Fluency in using Fast Fourier Transform, Signal generation, realization of systems and finding their transfer function, characterization using pole-zero plots and designing digital filters.

Unit 1

Discrete-Time Signals and Systems: Classification of Signals, Transformations of the Independent Variable, Periodic and Aperiodic Signals, Energy and Power Signals, Even and Odd Signals, Discrete-Time Systems, System Properties. Impulse Response, Convolution Sum; Graphical Method; Analytical Method, Properties of Convolution; Commutative; Associative; Distributive; Shift; Sum Property System Response to Periodic Inputs, Relationship Between LTI System Properties and the Impulse Response; Causality; Stability; Invertibility, Unit Step Response.

(10 Lectures)

Unit 2

Discrete-Time Fourier Transform: Fourier Transform Representation of Aperiodic Discrete-Time Signals, Periodicity of DTFT, Properties; Linearity; Time Shifting; Frequency Shifting; Differencing in Time Domain; Differentiation in Frequency Domain; Convolution Property.

The z-Transform: Bilateral (Two-Sided) z-Transform, Inverse z-Transform, Relationship Between z-Transform and Discrete-Time Fourier Transform, z-plane, Region-of-Convergence; Properties of ROC, Properties; Time Reversal; Differentiation in the z-Domain; Power Series Expansion Method (or Long Division Method); Analysis and Characterization of LTI Systems; Transfer Function and Difference-Equation System. Solving Difference Equations.

(15 Lectures)

Unit 3

Filter Concepts: Phase Delay and Group delay, Zero-Phase Filter, Linear-Phase Filter, Simple FIR Digital Filters, Simple IIR Digital Filters, All pass Filters, Averaging Filters, Notch Filters.

(5 Lectures)

Discrete Fourier Transform: Frequency Domain Sampling (Sampling of DTFT), The Discrete Fourier Transform (DFT) and its Inverse, DFT as a Linear transformation, Properties; Periodicity; Linearity; Circular Time Shifting; Circular Frequency Shifting; Circular Time Reversal; Multiplication Property; Parseval's Relation, Linear Convolution Using the DFT (Linear Convolution Using Circular Convolution), Circular Convolution as Linear Convolution with aliasing.

(10 Lectures)

Unit 4

Fast Fourier Transform: Direct Computation of the DFT, Symmetry and Periodicity Properties of the Twiddle factor (WN), Radix-2 FFT Algorithms; Decimation-In-Time (DIT) FFT Algorithm; Decimation-In-Frequency (DIF) FFT Algorithm, Inverse DFT Using FFT Algorithms.

(5 Lectures)

Unit 5

Realization of Digital Filters: Non Recursive and Recursive Structures, Canonic and Non Canonic Structures, Equivalent Structures (Transposed Structure), FIR Filter structures; Direct-Form; Cascade-Form; Basic structures for IIR systems; Direct-Form I.

Finite Impulse Response Digital Filter: Advantages and Disadvantages of Digital Filters, Types of Digital Filters: FIR and IIR Filters; Difference Between FIR and IIR Filters, Desirability of Linear-Phase Filters, Frequency Response of Linear-Phase FIR Filters, Impulse Responses of Ideal Filters, Windowing Method; Rectangular; Triangular; Kaiser Window, FIR Digital Differentiators.

Infinite Impulse Response Digital Filter: Design of IIR Filters from Analog Filters, IIR Filter Design by Approximation of Derivatives, Backward Difference Algorithm, Impulse Invariance Method.

(15 Lectures)

Practical : 60 Hours

PRACTICAL-GE LAB: Digital Signal Processing Lab

At least 06 experiments from the following using Scilab/Matlab. Introduction to Numerical computation software Scilab/Matlab be introduced in the lab.

1. Write a program to generate and plot the following sequences: (a) Unit sample sequence $\delta(n)$, (b) unit step sequence $u(n)$, (c) ramp sequence $r(n)$, (d) real valued exponential sequence $x(n) = (0.8)^n u(n)$ for $0 \leq n \leq 50$.
2. Write a program to compute the convolution sum of a rectangle signal (or gate function) with itself for $N = 5$

$$x(n) = \text{rect}\left(\frac{n}{2N}\right) = \Pi\left(\frac{n}{2N}\right) = \begin{cases} 1 & -N \leq n \leq N \\ 0 & \text{otherwise} \end{cases}$$

3. An LTI system is specified by the difference equation

$$y(n) = 0.8y(n-1) + x(n)$$

- (a) Determine $H(e^{j\omega})$
- (b) Calculate and plot the steady state response $y_{ss}(n)$ to $x(n) = \cos(0.5\pi n)u(n)$

4. Given a casual system

$$y(n] = 0.9y(n-1) + x(n]$$

- (a) Find $H(z)$ and sketch its pole-zero plot

- (b) Plot the frequency response $|H(e^{j\omega})|$ and $\angle H(e^{j\omega})$

5. Design a digital filter to eliminate the lower frequency sinusoid of $x(t) = \sin 7t + \sin 200t$. The sampling frequency is $f_s = 500 \text{ Hz}$. Plot its pole zero diagram, magnitude response, input and output of the filter.

6. Let $x(n)$ be a 4-point sequence:

$$x(n) = \begin{matrix} (1, 1, 1, 1) \\ \uparrow \\ \end{matrix} = \begin{cases} 1 & 0 \leq n \leq 3 \\ 0 & \text{otherwise} \end{cases}$$

Compute the DTFT $X(e^{j\omega})$ and plot its magnitude

- Compute and plot the 4 point DFT of $x(n)$
- Compute and plot the 8 point DFT of $x(n)$ (by appending 4 zeros)
- Compute and plot the 16 point DFT of $x(n)$ (by appending 12 zeros)

7. Let $x(n)$ and $h(n)$ be the two 4-point sequences,

$$\begin{matrix} x(n) = (1, 2, 2, 1) \\ \uparrow \\ h(n) = (1, -1, -1, 1) \\ \uparrow \end{matrix}$$

Write a program to compute their linear convolution using circular convolution.

8. Using a rectangular window, design a FIR low-pass filter with a pass-band gain of unity, cut off frequency of 1000 Hz and working at a sampling frequency of 5 KHz. Take the length of the impulse response as 17.

9. Design an FIR filter to meet the following specifications:

passband edge $F_p = 2 \text{ KHz}$

stopband edge $F_s = 5 \text{ KHz}$

Passband attenuation $A_p = 2 \text{ dB}$

Stopband attenuation $A_s = 42 \text{ dB}$

Sampling frequency $F_s = 20 \text{ KHz}$

10. The frequency response of a linear phase digital differentiator is given by

$$H_d(e^{j\omega}) = j\omega e^{-j\pi\omega} \quad |\omega| \leq \pi$$

Using a Hamming window of length $M = 21$, design a digital FIR differentiator. Plot the amplitude response.

Reference for Theory:

Essential Readings:

- Digital Signal Processing, Tarun Kumar Rawat, Oxford University Press, India.
- Digital Signal Processing, S. K. Mitra, McGraw Hill, India.
- Fundamentals of signals and systems, P.D. Cha and J.I. Molinder, 2007, Cambridge University Press.

References for Laboratory Work:

- A Guide to MATLAB, B.R. Hunt, R.L. Lipsman, J.M. Rosenberg, 2014, 3rd Edn., Cambridge University Press
- Fundamentals of Digital Signal processing using MATLAB, R.J. Schilling and S.L. Harris, 2005, Cengage Learning.
- Getting started with MATLAB, Rudra Pratap, 2010, Oxford University Press.

GE: Nuclear and Particle Physics (32225417)

Credit : 06 (Theory-05, Tutorial-01)

Theory : 75 Hours

Tutorial : 15 Hours

Course Objective

The objective of the course is to impart the understanding of the sub atomic particles and their properties. It will emphasize to gain knowledge about the different nuclear techniques and their applications in different branches Physics and societal application. The course will focus on the developments of problem based skills.

Course Learning Outcomes

- To be able to understand the basic properties of nuclei as well as knowledge of experimental determination of the same, the concept of binding energy, its various dependent parameters, N-Z curves and their significance
- To appreciate the formulations and contrasts between different nuclear models such as Liquid drop model, Fermi gas model and Shell Model and evidences in support.
- Knowledge of radioactivity and decay laws. A detailed analysis, comparison and energy kinematics of alpha, beta and gamma decays.
- Familiarization with different types of nuclear reactions, Q- values, compound and direct reactions.
- To know about energy losses due to ionizing radiations, energy losses of electrons, gamma ray interactions through matter and neutron interaction with matter. Through the section on accelerators students will acquire knowledge about Accelerator facilities in India along with a comparative study of a range of detectors and accelerators which are building blocks of modern day science.
- It will acquaint students with the nature and magnitude of different forces, particle interactions, families of sub- atomic particles with the different conservation laws, concept of quark model.
- The acquired knowledge can be applied in the areas of nuclear medicine, medical physics, archaeology, geology and other interdisciplinary fields of Physics and Chemistry. It will enhance the special skills required for these fields.

Unit 1

General Properties of Nuclei: Constituents of nucleus and their Intrinsic properties, quantitative facts about mass, radii, charge density, matter density (experimental determination of each), binding energy, average binding energy and its variation with mass number, main features of binding energy versus mass number curve, N/Z plot, angular momentum, parity, magnetic moment, electric moments.

(10 Lectures)

Unit 2

Nuclear Models: Liquid drop model approach, semi empirical mass formula and significance of its various terms, condition of nuclear stability, nucleon separation energies (up to two nucleons), Fermi gas model (degenerate fermion gas, nuclear symmetry potential in Fermi gas), evidence for nuclear shell structure and the basic assumption of shell model.

(11 Lectures)

Unit 3

Radioactivity decay: Decay rate and equilibrium (Secular and Transient)(a) Alpha decay: basics of α -decay processes, theory of α -emission, Gamow factor, Geiger Nuttall law, α -decay spectroscopy, decay Chains. (b) β - decay: energy kinematics for β -decay, β -spectrum, positron emission, electron capture, neutrino hypothesis. (c)

Gamma decay: Gamma rays emission from the excited state of the nucleus & kinematics, internal conversion.

(10 Lectures)

Unit 4

Nuclear Reactions: Types of Reactions, units of related physical quantities, Conservation Laws, kinematics of reactions, Q-value, reaction rate, reaction cross section, Concept of compound and direct reaction, resonance reaction, Coulomb scattering (Rutherford scattering).

(8 Lectures)

Unit 5

Interaction of Nuclear Radiation with matter: Energy loss due to ionization (Bethe-Block formula), energy loss of electrons, Cerenkov radiation. Gamma ray interaction through matter (photoelectric effect, Compton scattering, pair production), neutron interaction with matter.

(9 Lectures)

Detector for Nuclear Radiations: Gas detectors: estimation of electric field, mobility of particle for ionization chamber and GM Counter. Basic principle of Scintillation Detectors and construction of photo-multiplier tube (PMT). Semiconductor Detectors (Si and Ge) for charge particle and photon detection (concept of charge carrier and mobility), neutron detector.

(9 Lectures)

Particle Accelerators: Accelerator facility available in India: Van-de Graaff generator (Tandem accelerator), Linear accelerator, Cyclotron, Synchrotrons (Principal, construction, working, advantages and disadvantages).

(7 Lectures)

Unit 6

Particle physics: Particle interactions (concept of different types of forces), basic features, Cosmic Rays, types of particles and its families, Conservation Laws (energy and momentum, angular momentum, parity, baryon number, Lepton number, Isospin, Strangeness) concept of quark model, color quantum number and gluons.

(11 Lectures)

References for Theory :

Essential Readings:

1. Basic ideas and concepts in Nuclear Physics: An introductory approach by K Heyde, third edition, IOP Publication, 1999.
2. Nuclear Physics by S N Ghoshal, First edition, S. Chand Publication, 2010.
3. Introductory Nuclear Physics by K S Krane, Wiley-India Publication, 2008.
4. Nuclear Physics: principles and applications by J Lilley, Wiley Publication, 2006.
5. Radiation detection and measurement, G F Knoll, John Wiley & Sons, 2010.
6. Introduction to elementary particles by D J Griffiths, Wiley, 2008.

Additional Readings:

1. Concepts of Nuclear Physics by B L Cohen, Tata McGraw Hill Publication, 1974.
2. Physics and Engineering of Radiation Detection by S N Ahmed, Academic Press Elsevier, 2007.
3. Techniques for Nuclear and Particle Physics experiments by WR Leo, Springer, 1994.
4. Modern Physics by R A Serway, C J Moses and C A Moyer, 3rd edition, Thomson Brooks Cole, 2012.
5. Modern Physics for Scientists and Engineers by S T Thornton and A Rex, 4th edition, Cengage Learning, 2013.
6. Modern Physics by R A Serway, C J Moses and C A Moyer, 3rd edition, Thomson Brooks Cole, 2012.
7. Concepts of Modern Physics by Arthur Beiser, McGraw Hill Education, 2009.

References for Tutorial:

1. Schaum's Outline of Modern Physics, McGraw-Hill, 1999.
2. Schaum's Outline of College Physics, by E. Hecht, 11th edition, McGraw Hill, 2009.
3. Modern Physics by K Sivaprasath and R Murugesan, S Chand Publication, 2010.
4. Nuclear Physics "Problem-based Approach" Including MATLAB by Hari M. Aggarwal, PHI Learning Pvt. Ltd. (2016).

GE: Astronomy and Astrophysics (32225418)

Credit : 06 (Theory-05, Tutorial-01)

Theory : 75 Hours

Tutorial : 15 Hours

Course Objective

This General Elective course is meant to introduce undergraduate students to the wonders of the Universe. Students will understand how astronomers over millennia have come to understand mysteries of the universe using laws of geometry and physics, and more recently chemistry and biology. They will learn about diverse set of astronomical and astrophysical phenomenon, from the daily and yearly motion of stars and planets in the night sky which they can observe themselves, to the expansion of the universe deduced from the latest observations and cosmological models. The course presupposes school level understanding of mathematics and physics.

Course Learning Outcomes

Students completing this course will gain an understanding of

- Different types of telescopes, diurnal and yearly motion of astronomical objects, and astronomical coordinate systems and their transformations.
- Brightness scale for stars, types of stars, their structure and evolution on HR diagram.
- Components of Solar System and its evolution
- The large scale structure of the Universe and its history
- Distribution of chemical compounds in the interstellar medium and astrophysical conditions necessary for the emergence and existence of life.

Unit 1

Introduction to Astronomy and Astronomical Scales: Wonders of the Universe, Overview of the Night Sky, Diurnal and Yearly motions of the Sun, Stars and Constellations. Size, Mass, Density and Temperature of Astronomical objects, Basic concepts of Positional Astronomy: Celestial Sphere, Astronomical Coordinate Systems, Horizon System, Equatorial System, Measurement of Time, Sidereal Time, Apparent Solar Time, Mean Solar Time, Equation of Time, Calendar, Astronomical Time Systems (LMT, UT, UTC)

(15 Lectures)

Unit 2

Basic Parameters of Stars: Determination of Distance by Parallax Method; Aberration, Proper Motion, Brightness, Radiant Flux and Luminosity, Apparent and Absolute Magnitude Scales, Distance Modulus; Determination of Temperature and Radius of a Star; Stellar Spectra, Atomic Spectra Revisited, Spectral Types and their Temperature

Dependence, Black Body Approximation, Luminosity Classification, H R Diagram and Relations Between Stellar Parameters

(15 Lectures)

Unit 3

Observational Tools and Physical Principles: Observing through the atmosphere (Scintillation, Seeing, Atmospheric Windows and Extinction) Basic Optical Definitions for Telescopes: Magnification, Light Gathering Power, Limiting magnitude, Resolving Power, Diffraction Limit, Optical and Radio Telescopes, Current Indian Observatories. Virial Theorem for N Particle Systems and Applications, Mean Molecular Weight of Stellar Gas, Stellar Energy Sources.

(15 Lectures)

Unit 4

Sun and the Solar Family: Solar Parameters, Sun's Internal Structure, Solar Photosphere, Solar Atmosphere, Chromosphere. Corona, Solar Activity.

The Solar Family: Facts and Figures, Origin of the Solar System, The Nebular Model. Tidal Forces and Planetary Rings, Extra-Solar Planets.

(8 Lectures)

Unit 5

Milky Way: Basic Structure and Properties of the Milky Way, Nature of Rotation of the Milky Way (Differential Rotation of the Galaxy and Oort Constants, Rotation Curve of the Galaxy and the Dark Matter, Nature of the Spiral Arms), Properties of and around the Galactic Nucleus. Interstellar molecules.

(10 lectures)

Unit 6

Cosmology and Astrobiology: Standard Candles (Cepheids and SNe Type Ia), Cosmic Distance Ladder, Olber's Paradox, Hubble's Expansion, History of the Universe, Chemistry of Life, Origin of Life, Chances of Life in the Solar System, Exoplanets

(12 Lectures)

References for Theory:

Essential Readings:

1. Seven Wonders of the Cosmos, Jayant V Narlikar, Cambridge University Press
2. Fundamental of Astronomy (Fourth Edition), H. Karttunen et al. Springer
3. Modern Astrophysics, B.W. Carroll & D.A. Ostlie, Addison-Wesley Publishing Co.
4. Introductory Astronomy and Astrophysics, M. Zeilik and S.A. Gregory, 4th Edition, Saunders College Publishing.
5. The Molecular Universe, A.G.G.M. Tielens (Sections I, II and III), Reviews of Modern Physics, Vol 85, July September, 2013

Additional Readings:

1. Explorations: Introduction to Astronomy, Thomas Arny and Stephen Schneider, 2014, 7th edition, McGraw Hill
2. Astrophysics Stars and Galaxies K D Abhyankar, Universities Press
3. Textbook of Astronomy and Astrophysics with elements of cosmology, V.B. Bhatia, Narosa Publication.
4. Baidyanath Basu, An introduction to Astrophysics, Second printing, Prentice Hall of India Private limited, New Delhi, 2001.
5. The Physical Universe: An Introduction to Astronomy, F H Shu, University Science Books

GE: Atmospheric Physics (32225419)**Credit : 06 (Theory-04, Practical-02)****Theory : 60 Hours****Practical : 60 Hours****Course Objective**

This paper aims to describe the characteristics of the Earth's atmospheric thermal structure and chemical composition. It enables to learn remote sensing techniques to explore atmospheric processes and helps to understand long term oscillations and fluid system dynamics which control climate change. Also, it delineates characteristics of pollutants and aerosols variability in the lower and middle atmosphere.

Course Learning Outcomes

At the end of this course, students will be able to:

- Learn and understand structure of temperature profiles and fine scale features in the troposphere using observations.
- Understand Atmospheric waves: surface water waves, atmospheric gravity waves, acoustic waves etc
- Learn remote sensing techniques such as radar, lidar, and satellite to explore atmospheric processes.

- Understand properties of aerosols, their radiative and health effects.

Unit 1

General features of Earth's atmosphere: Thermal structure of the Earth's Atmosphere, Composition of atmosphere, Hydrostatic equation, Potential temperature, Atmospheric Thermodynamics, Greenhouse effect, Local winds, monsoons, fogs, clouds, precipitation, Atmospheric boundary layer, Sea breeze and land breeze. Instruments for meteorological observations including RS/RW, meteorological processes and convective systems, fronts, Cyclones and anticyclones, thunderstorms.

(12 Lectures)

Unit 2

Atmospheric Dynamics: Scale analysis, Fundamental forces, Basic conservation laws, The Vectorial form of the momentum equation in rotating coordinate system, scale analysis of equation of motion, Applications of the basic equations, Circulations and vorticity, Atmospheric oscillations, Quasi biennial oscillation, annual and semi-annual oscillations, Mesoscale circulations, The general circulations, Tropical dynamics.

(12 Lectures)

Unit 3

Atmospheric Waves: Surface water waves, wave dispersion, acoustic waves, buoyancy waves, propagation of atmospheric gravity waves (AGWs) in a nonhomogeneous medium, Lamb wave, Rossby waves and its propagation in three dimensions and in sheared flow, wave absorption, non-linear consideration

(12 Lectures)

Unit 4

Atmospheric Radar and Lidar: Radar equation and return signal, Signal processing and detection, Various type of atmospheric radars, Applications of radars to study atmospheric phenomena, Lidar and its applications, Application of Lidar to study atmospheric phenomenon. Data analysis tools and techniques.

(12 Lectures)

Unit 5

Atmospheric Aerosols: Spectral distribution of the solar radiation, Classification and properties of aerosols, Production and removal mechanisms, Concentrations and size distribution, Radiative and health effects, Observational techniques for aerosols, Absorption and scattering of solar radiation, Rayleigh scattering and Mie scattering, Bouguert-Lambert

law, Principles of radiometry, Optical phenomena in atmosphere, Aerosol studies using Lidars.

(12 Lectures)

Practical: 60 Hours

PRACTICALS- GE LAB: Atmospheric Physics Lab

Scilab/C ++ based simulations experiments based on Atmospheric Physics problems like (at least 05 experiments)

1. Numerical Simulation for atmospheric waves using dispersion relations
 - (a) Atmospheric gravity waves (AGW)
 - (b) Kelvin waves
 - (c) Rossby waves and mountain waves
2. Offline and online processing of radar data
 - (a) VHF radar,
 - (b) X-band radar, and
 - (c) UHF radar
3. Offline and online processing of LIDAR data 1374. Radiosonde data and its interpretation in terms of atmospheric parameters using vertical profiles in different regions of the globe.
4. Handling of satellite data and plotting of atmospheric parameters using different techniques such as radio occultation technique
5. Time series analysis of temperature using long term data over metropolitan cities in India – an approach to understand the climate change
6. PM 2.5 measurement using compact instruments
7. Field visits to National center for medium range weather forecasting, India meteorological departments, and ARIES Nainital to see onsite radiosonde balloon launch, simulation on computers and radar operations on real time basis.

References for Theory :

Essential Readings :

1. Fundamental of Atmospheric Physics, M.L Salby; Academic Press, Vol 61, 1996
2. The Physics of Atmosphere – John T. Houghton; Cambridge University press; 3 rd edn. 2002.
3. An Introduction to dynamic meteorology – James R Holton; Academic Press, 2004
4. Radar for meteorological and atmospheric observations – S Fukao and K Hamazu, Springer Japan, 2014.

Additional Readings:

1. Stratosphere Troposphere Interactions - K Mohanakumar, Springer Netherlands, 2008.
2. Climate change in the Himalayas , Springer publication, by GB Pant, P Pradeep Kumar, J V Revadekar, Narendra Singh, 2018
3. Gravity wave generation in the lower stratosphere due to passage of the typhoon 9426 (Orchid) observed by the MU radar at Shigaraki (34.85 N, 136.10 E), SK Dhaka, M Takahashi, Y. Shibagaki, MD Yamanaka, S Fukao, Journal of Geophysical Research: Atmosphere 108 (D19), 2003.

4. Indian MST radar observations of gravity wave activities associated with tropical convection, SK Dhaka, PK Devrajan, Y Shibagaki, RK Choudhary, S Fukao, Journal of Atmospheric and Solar-Terrestrial Physics 63 (15), 1631-1642

References for Laboratory Work:

Data sources for radar, lidar, satellite and radiosondes

1. <https://www.narl.gov.in>
2. <http://www.imd.gov.in>
3. <https://www.ncmrwf.gov.in/>
4. <https://www.aries.res.in/>
5. <http://www.rish.kyoto-u.ac.jp/ear/index-e.html>

GE: Physics of Earth (32225420)

Credit : 06 (Theory-05, Tutorial-01)

Theory : 75 Hours

Tutorial : 15 Hours

Course Objective

This course familiarizes the students with the origin of universe and role of earth in the solar system.

Course Learning Outcomes

At the end of this course student will be able to

- Have an overview of structure of the earth as well as various dynamical processes occurring on it.
- Develop an understanding of evolution of the earth.
- Apply physical principles of elasticity and elastic wave propagation to understand modern global seismology as a probe of the Earth's internal structure.
- Understand the origin of magnetic field, Geodynamics of earthquakes and the description of seismic sources; a simple but fundamental theory of thermal convection; the distinctive rheological behaviour of the upper mantle and its top.
- Explore various roles played by water cycle, carbon cycle, nitrogen cycles in maintaining steady state of earth leading to better understanding of the contemporary dilemmas (climate change, bio diversity loss, population growth, etc.) disturbing the Earth

- In the tutorial section, through literature survey on the various aspects of health of Earth, project work / seminar presentation, the students will be able to appreciate need to 'save' Earth.

Unit 1

The Earth and the Universe: (a) Origin of universe, creation of elements and earth. A Holistic understanding of our dynamic planet through Astronomy, Geology, Meteorology and Oceanography . Introduction to various branches of Earth Sciences. (b) General characteristics and origin of the Universe. The Big Bang Theory. Age of the universe and Hubble constant. Formation of Galaxies. The Milky Way galaxy, Nebular Theory, solar system, Earth's orbit and spin, the Moon's orbit and spin. The terrestrial and Jovian planets. Titius-Bode law. Asteroid belt. Asteroids: origin types and examples. Meteorites & Asteroids. Earth in the Solar system, origin, size, shape, mass, density, rotational and revolution parameters and its age. (c) Energy and particle fluxes incident on the Earth. (d) The Cosmic Microwave Background.

(17 Lectures)

Unit 2

Structure: (a) The Solid Earth: Mass, dimensions, shape and topography, internal structure, magnetic field, geothermal energy. How do we learn about Earth's interior? (b) The Hydrosphere: The oceans, their extent, depth, volume, chemical composition. River systems. (c) The Atmosphere: layers, variation of temperature with altitude, adiabatic lapse rate, variation of density and pressure with altitude, cloud formation (d) The Cryosphere: Polar caps and ice sheets. Mountain glaciers, permafrost.

(18 Lectures)

Unit 3

Dynamical Processes: (a) **The Solid Earth:** Origin of the magnetic field. Source of geothermal energy. Convection in Earth's core and production of its magnetic field. Mechanical layering of the Earth. Introduction to geophysical methods of earth investigations. Concept of plate tectonics; types of plate movements, hotspots; sea-floor spreading and continental drift. Geodynamic elements of Earth: Mid Oceanic Ridges, trenches, transform faults and island arcs. Origin of oceans, continents, mountains and rift valleys. Earthquake and earthquake belts. Seismic waves, Richter scale, geophones. Volcanoes: types products and distribution. (b) **The Hydrosphere:** Ocean circulations. Oceanic current system and effect of coriolis forces. Concepts of eustasy, land – air-sea interaction; wave erosion and beach processes. Tides. Tsunamis. (c) **The Atmosphere:** Atmospheric circulation. Weather and climatic changes. Earth's heat budget. Cyclones and anti-cyclones. Climate: i. Earth's temperature and greenhouse effect. ii. Paleoclimate and recent climate changes. iii. The Indian monsoon system. (d) **Biosphere:** Water cycle, Carbon cycle. The role of cycles in maintaining a steady state.

(18 Lectures)

Unit 4

Evolution: Stratigraphy: Introduction and types, Standard stratigraphic time scale and introduction to the concept of time in geological studies. Time line of major geological and

biological events. Introduction to geochronological methods and their application in geological studies. Radiometric dating: Advantages & disadvantages of various isotopes. History of development of concepts of uniformitarianism, catastrophism and neptunism. Various laws of stratigraphy. Introduction to the geology and geomorphology of Indian subcontinent. Origin of life on Earth, Role of the biosphere in shaping the environment. Future of evolution of the Earth and solar system: Death of the Earth (Probable causes).

(18 Lectures)

Unit 5

Disturbing the Earth – Contemporary dilemmas (a) Human population growth. (b) Atmosphere: Green house gas emissions, climate change, air pollution. (c) Hydrosphere: Fresh water depletion. (d) Geosphere: Chemical effluents, nuclear waste. (e) Biosphere: Biodiversity loss. Deforestation. Robustness and fragility of ecosystems.

(4 Lectures)

References :

Essential Readings :

1. Planetary Surface Processes, H. Jay Melosh, 2011, Cambridge University Press.
2. Holme's Principles of Physical Geology, 1992, Chapman & Hall.
3. Planet Earth, Cosmology, Geology and the Evolution of Life and Environment, C. Emiliani, 1992, Cambridge University Press.
4. Physics of the Earth, Frank D. Stacey, Paul M. Davis, 2008, Cambridge University Press.

Additional Readings:

1. The Blue Planet: An Introduction to Earth System Science, Brian J. Skinner, Stephen C. Portere, 1994, John Wiley & Sons.
2. Consider a Spherical Cow: A course in environmental problem solving, John Harte, University Science Books.
3. Fundamentals of Geophysics, William Lowrie, 1997, Cambridge University Press.
4. The Solid Earth: An Introduction to Global Geophysics, C. M. R. Fowler, 1990, Cambridge University Press.
5. Climate Change: A Very Short Introduction, Mark Maslin, 3rd Edition, 2014, Oxford University Press.
6. The Atmosphere: A Very Short Introduction, Paul I. Palmer, 2017, Oxford University Press.
7. IGNOU Study material: PHE 15 Astronomy and Astrophysics Block 2

ANNEXURE-1A

Steering Committee

LOCF (CBCS) Undergraduate Physics courses revision 2019

Department of Physics & Astrophysics, University of Delhi

1. Prof. Sanjay Jain – HoD (Chairman)
2. Prof. A. G. Vedeshwar – (Coordinator)
3. Prof. Vinay Gupta – (Convener)
4. Prof. Debajyoti Choudhury
5. Prof. P. Das Gupta
6. Prof. S. Annapoorni
7. Prof. H.P. Singh
8. Prof. T.R. Seshadri
9. Prof. Anjan Dutta
10. Prof. S.K. Mandal
11. Prof. Kirti Ranjan
12. Dr. G.S. Chilana (Department of Physics, Ramjas College)
13. Dr. Mallika Verma (Department of Physics, Miranda House)
14. Dr. Anuradha Gupta (Department of Physics, SGTB Khalsa College)
15. Dr. Sangeeta D. Gadre (Department of Physics, Kirori Mal College)
16. Dr. Jacob Cherian (Department of Physics, St. Stephens' College)
17. Dr. Vandana Luthra (Department of Physics, Gargi College)
18. Dr. Mamta (Department of Physics, SGTB Khalsa College)
19. Dr. P.K. Jha (Department of Physics, Deen Dyal Upadhyaya College)
20. Dr. Sanjay Kumar (Department of Physics, St. Stephens' College)
21. Dr. Abhinav Gupta (Department of Physics, St. Stephen's College)
22. Dr. Monika Tomar (Department of Physics, Miranda House)
23. Dr. Roshan Kshetrimayum (Department of Physics, Kirori Mal College)
24. Mr. Ashish Tyagi (Department of Physics, Swami Shraddhanand College)
25. Dr. Shalini Lumb Talwar (Department of Physics, Maitreyi College)
26. Dr. Shiva Upadhyay (Department of Physics, Swami Shraddhanand College)
27. Dr. Divya Haridas (Department of Physics, Keshav Mahavidyalaya)
28. Dr. Chetana Jain (Department of Physics, Hansraj College)

ANNEXURE 1B

Subject working groups LOCF (CBCS) Undergraduate Physics courses revision 2019 Department of Physics & Astrophysics, University of Delhi

Group	Papers	Name of faculty	Role	College
I	<ul style="list-style-type: none"> Waves and Optics (Hons. core /GE) Electricity and magnetism (Hons. core/GE) Electromagnetic theory (Hons. core) Electricity and magnetism (Prog. core) Waves and Optics (Prog. core) Electrical circuits and Networks (SEC) Applied Optics (SEC) Introduction to Physical Computing (SEC) 	Prof. Kirti Ranjan	Coordinator	Department of Physics & Astrophysics
		Dr. Sangeeta D. Gadre	Convenor	Kirori Mal College
		Dr. Pragati Ishdhir	Member	Hindu College
		Dr. K.C. Singh		Sri Venkateswara College
		Dr. Pushpa Bindal		Kalindi College
		Dr. Geetanjali Sethi		St. Stephen's College
		Dr. Pradeep Kumar		Hansraj College
		Dr. N. Chandrika		Gargi College
II	<ul style="list-style-type: none"> Elements of Modern Physics (Hons. core/GE) Quantum Mechanics and applications (Hons. Core) Elements of Modern Physics (Prog. DSE) Quantum Mechanics (Prog. DSE/GE) Advanced Quantum Mechanics (Hons. DSE) Renewable energy and Energy harvesting (SEC) 	Prof. P. Das Gupta	Coordinator	Department of Physics & Astrophysics
		Dr. P.K. Jha	Convenor	Deen Dyal Upadhyaya college
		Dr. N. Santakrus Singh		Hindu College
		Dr. Punita Verma		Kalindi College
		Dr. Siddharth Lahon		Kirorimal College
		Dr. Onkar Mangla		Daulat Ram College
		Dr. Sandhya		Miranda House
		Dr. Ajay Kumar		Sri Aurobindo College

III	<ul style="list-style-type: none"> Thermal Physics (Hons. Core) Statistical Mechanics (Hons. Core) Thermal Physics and Statistical Mechanics (Program core/GE) 	Prof. S. Annapoorni	Coordinator	Department of Physics & Astrophysics
		Dr. Anuradha Gupta	Convenor	SGTB Khalsa College
		Dr. Deepak Jain	Member	Deen Dyal Upadhyaya college
		Dr. Nimmi Singh		SGTB Khalsa College
		Dr. Ashok Kumar		Ramjas College
		Dr. Aditya Saxena		Deshbandhu College
		Dr. Maya Verma		Hansraj College
IV	<ul style="list-style-type: none"> Solid State Physics (Hons. Core) Solid State Physics (Prog. DSE/GE) Nanomaterials and Applications (DSE-Hons.+ Prog.)/GE 	Prof. S. Annapoorni	Coordinator	Department of Physics & Astrophysics
		Dr. Divya Haridas	Convenor	Keshav Mahavidyalaya
		Dr. Mamta Bhatia	Member	AND College
		Dr. Rajveer Singh		ARSD College
		Dr. Shiva Upadhyaya		S.S.N. College
		Dr. Harish K. Yadav		St. Stephen's College
		Dr. Rashmi Menon		Kalindi College
		Dr. Yogesh Kumar		Deshbandhu College
V	<ul style="list-style-type: none"> Mathematical Physics-I (Hons. Core) Mathematical Physics-II (Hons. Core) Mathematical Physics -III (Hons. Core) Advanced Mathematical Physics (Hons. DSE) Mathematical Physics (Program DSE/ Hons. GE) Advanced Mathematical 	Prof. T.R. Seshadri	Coordinator	Department of Physics & Astrophysics
		Dr. G.S. Chilana	Convenor	Ramjas College
		Dr. Abha Dev Habib	Member	Miranda House
		Dr. Agam Kumar Jha		Kirori Mal College
		Dr. Subhash Kumar		AND College

	Physics -II (Hons. DSE) <ul style="list-style-type: none"> Computational Physics Skills (SEC) Numerical Analysis (SEC) Linear Algebra & Tensor Analysis (DSE) 	Dr. Mamta		SGTB Khalsa College
		Dr. Neetu Aggarwal		Daulat Ram College
		Dr. Bhavna Vidhani		Hansraj College
		Dr. Ajay Mishra		Dyal Singh College
VI	<ul style="list-style-type: none"> Mechanics (Hons. Core/GE) Mechanics (Prog. Core) Applied Dynamics (DSE/GE) Classical Dynamics (DSE) Physics Workshop Skills (SEC) 	Prof. A. G. Vedeshwar	Coordinator	Department of Physics & Astrophysics
		Dr. Ashish Tyagi	Convenor	SSN College
		Dr. Shalini Lumb Talwar	Member	Maitreyi College
		Dr. Vandana Arora		Keshav Mahavidyalaya
		Dr. Arvind Kumar		Ramjas College
		Dr. Chitra Vaid		Bhagini Nivedita College
		Dr. Omwati Rana		Daulat Ram College
		Dr. Sunita Singh		Miranda House
		Dr. Pranav Kumar		Kirori Mal College
		Dr. Pooja Devi		Shyam lal College
VII	<ul style="list-style-type: none"> Nuclear and particle Physics (Hons. DSE/GE) Nuclear and particle physics (Prog. DSE) Radiation Safety (SEC) 	Prof. Samit Mandal	Coordinator	Department of Physics & Astrophysics
		Dr. Vandana Luthra	Convenor	Gargi College
		Dr. Namrata	Member	S.S.N. College
		Dr. Supriti Das		Gargi College
		Dr. Punit Tyagi		Ramjas College
VIII	<ul style="list-style-type: none"> Astronomy and Astrophysics (DSE/GE) Weather Forecasting (SEC) 	Prof. Anjan Datta	Coordinator	Department of Physics & Astrophysics

	<ul style="list-style-type: none"> Medical Physics (DSE/GE) Atmospheric Physics (DSE/GE) Biological Physics (DSE/GE) Physics of Earth (DSE/GE) Technical Drawing (SEC) Dissertation 	Dr. Jacob Cherian	Convenor	St. Stephen's College
		Dr. S.K. Dhaka	Member	Rajdhani College
		Dr. Sanjay Kumar		St. Stephen's College
		Dr. Sushil Singh		SGTB Khalsa College
		Dr. Chetna Jain		Hansraj College
		Dr. Ayushi Paliwal		Deshbandhu College
		Dr. Rekha Gupta		St. Stephen's College
IX	<ul style="list-style-type: none"> Digital Systems and Applications (Hons. Core) Embedded Systems - Introduction to Microcontroller (DSE/GE) Digital, Analog and Instrumentation (Prog. DSE/Hons. GE) Verilog and FPA based System design (DSE/GE) Digital Signal Processing (DSE/GE) Linear and Digital Integrated Circuits –E Microprocessors and Microcontrollers –E Electronic Instrumentation - E(DSE) Basic Instrumentation Skills (SEC) Dissertation-E 	Prof. Vinay Gupta	Coordinator	Department of Physics & Astrophysics
		Dr. Mallika Verma	Convenor	Miranda House
		Dr. Shashi Bala	Member	Ramjas College
		Dr. Arijit Chowdhuri		AND College
		Dr. Anjali Sharma		ARSD College
		Dr. Kajal Jindal		Kirori Mal College
		Dr. Poonam Jain		Sri Aurobindo College
		Dr. Savita Sharma		Kalindi College
		Dr. Alka Garg		Gargi College
X	<ul style="list-style-type: none"> Analog systems and Applications (Hons. Core) Experimental techniques 	Prof. Vinay Gupta	Coordinator	Department of Physics & Astrophysics

	<div>(DSE)</div> <ul style="list-style-type: none">• Physics of Device and Communication (DSE)• Communication System (DSE/GE)• Network Analysis and Analog Electronics-E• Communication Electronics –E• Semiconductor Devices Fabrication - E(DSE)• Photonic Devices and Power Electronics -E (DSE)• Antenna theory and wireless network -E (DSE)• Electrical circuit network skills-Prog. SEC	Dr. Monika Tomar	Convenor	Miranda House
		Dr. Sanjay Tandon	Member	Deen Dyal Upadhyaya college
		Dr. Sangeeta Sachdeva		St. Stephen's College
		Dr. Roshan		Kirorimal College
		Dr. Kuldeep Kumar		SGTB Khalsa College
		Dr. Reema Gupta		Hindu College
		XI	<ul style="list-style-type: none">• Practicals of all Courses	Prof. Vinay Gupta
Dr. Sanjay Kumar	Convenor			St. Stephen's College
Prof. P. D. Gupta	Member			Department of Physics & Astrophysics
Prof. A.G. Vedeshwar				Department of Physics & Astrophysics
Prof. Samit Mandal				Department of Physics & Astrophysics
Dr. G.S. Chilana				Ramjas College
Dr. Mallika Verma				Miranda House
Dr. Anuradha Gupta				SGTB Khalsa College
Dr. Monika Tomar				Miranda House

		Dr. Sangeeta D. Gadre		Kirori Mal College
		Dr. Mamta		SGTB Khalsa College
		Dr. Vandana Luthra		Gargi College
		Dr. Roshan		Kirori Mal College

Final drafting team
LOCF (CBCS) Undergraduate Physics courses revision 2019
Department of Physics & Astrophysics, University of Delhi

1. Prof. Sanjay Jain
2. Prof. A. G. Vedeshwar
3. Prof. Vinay Gupta
4. Prof. Samit K. Mandal
5. Dr. Sanjay Kumar – St. Stephens' College
6. Dr. Sangeeta Gadre – Kirori Mal College
7. Dr. Mamta – SGTB Khalsa College
8. Dr. Punita Verma – Kalindi College
9. Dr. Rajveer Singh – ARSD College
10. Dr. Yogesh Kumar – Deshbandhu College
11. Mrs. Poonam Jain – Sri Aurobindo College
12. Dr. Ajay Kumar – Sri Aurobindo College

**UNDER GRADUATE COURSE FOR
SANSKRIT (HON.)
UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)**



LOCF

**Approved by the Committee of courses (Hons.)
on 11.06.2019**

**UNIVERSITY OF DELHI
DELHI**

.....

**Approved by the Faculty of Arts
on 14.06.2019**

Contents		Page No.
LOCF Introduction		02-11
Background/Preamble and Guidelines		12-17
Detail of Course		18-23
Scheme of Romanization of Devanagari Script		24
List of the Courses		25-27
I.	Core Course B.A. (Hons) Sanskrit	28-76
II.	Elective Course	
	A. Discipline Specific (DSE) B.A. (Hons) Sanskrit	77-105
	B. Generic (GE) B.A. (Hons) other than Sanskrit, B.Sc. (Hons) & B.Com (Hons)	106-147
III.	Ability Enhancement Course	
	1. Ability Enhancement Elective Course (AEEC) Skill Based	148-164
	BA (Hons), B.Sc (Hons) & B.Com (Hons.)	
	2. Ability Enhancement Compulsory Course (AECC)	165-175
	BA (Hons) other than Sanskrit, B.Sc (Hons) & B.Com (Hons)	

Learning Outcomes-based Curriculum Framework for Undergraduate Education

SECTION 1

1.1 Introduction

A high priority task in the context of future education development agenda in India is fostering quality higher education. Further improvement of quality of higher education is considered critical for enabling effective participation of young people in knowledge production and participation in the knowledge economy, improving national competitiveness in a globalized world and for equipping young people with skills relevant for global and national standards and enhancing the opportunities or social mobility. Sustained initiatives are required for institutionalizing an outcome-oriented higher education system and enhancing employability of graduates through curriculum reform based on a learning outcomes-based curriculum framework, improving/upgrading academic resources and learning environment, raising the quality of teaching and research across all higher education institutions; technology use and integration to improve teaching-learning processes and reach a larger body of students through alternative learning modes such as open and distance learning modes and use of MOOCs. Other priority areas of action for fostering quality higher education include translation of academic research into innovations for practical use in society and economy, promoting efficient and transparent governance and management of higher education system, enhancing the capacity of the higher education system to govern itself through coordinated regulatory reform and increasing both public and private sector investment in higher education, with special emphasis on targeted and effective equity-related initiatives.

1.2 Learning outcomes-based approach to curriculum planning and development

The fundamental premise underlying the learning outcomes-based approach to curriculum planning and development is that higher education qualifications such as a Bachelor's Degree programmes are awarded on the basis of demonstrated achievement of outcomes (expressed in terms of knowledge, understanding, skills, attitudes and values) and academic standards expected of graduates of a programme of study. Learning outcomes specify what graduates completing a particular programme of study are expected to know, understand and be able to do at the end of their programme of study. The expected learning outcomes are used as reference points that would help formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes which in turn will help in curriculum planning and development, and in the design, delivery and review of academic programmes. They provide general guidance for articulating the essential learnings associated with programmes of study and courses within a programme. It may be noted that the learning outcomes-based curriculum framework is not intended to promote designing of a national common syllabus for a programme of study or learning contents of courses within each programme of study or to prescribe a set of approaches to teaching-learning process and assessment of student learning levels. Instead, they are intended to allow for flexibility and innovation in (i) programme design and syllabi development by higher education institutions (HEIs), (ii) teaching-learning process, (iii) assessment of student learning levels, and (iv) periodic programme review within a broad framework

of agreed expected graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes.

The overall objectives of the learning outcomes-based curriculum framework are to:

- help formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes that are expected to be demonstrated by the holder of a qualification;
- enable prospective students, parents, employers and others to understand the nature and level of learning outcomes (knowledge, skills, attitudes and values) or attributes a graduate of a programme should be capable of demonstrating on successful completion of the programme of study;
- maintain national standards and international comparability of learning outcomes

and academic standards to ensure global competitiveness, and to facilitate student/graduate mobility; and

- provide higher education institutions an important point of reference for designing teaching-learning strategies, assessing student learning levels, and periodic review of programmes and academic standards.

1.3 Key outcomes underpinning curriculum planning and development

The learning outcomes-based curriculum framework for undergraduate educationist a framework based on the expected learning outcomes and academic standards that are expected to be attained by graduates of a programme of study and holder of a qualification. The key outcomes that underpin curriculum planning and development at the undergraduate level include Graduate Attributes, Qualification Descriptors, Programme Learning Outcomes, and Course Learning Outcomes:

1.3.1 Graduate attributes

The graduate attributes reflect the particular quality and feature or characteristics of an individual, including the knowledge, skills, attitudes and values that are expected to be acquired by a graduate through studies at the higher education institution (HEI) such as a college or university. The graduate attributes include capabilities that help strengthen one's abilities for widening current knowledge base and skills, gaining new knowledge and skills, undertaking future studies, performing well in a chosen career and playing a constructive role as a responsible citizen in the society. The graduate attributes define the characteristics of a student's university degree programme(s), and describe a set of characteristics/competencies that are transferable beyond study of a particular subject area and programme contexts in which they have been developed. Graduate attributes are fostered through meaningful learning experiences made available through the curriculum, the total college/university experiences and a process of critical and reflective thinking. The learning outcomes-based curriculum framework is based on the premise that every student and graduate is unique. Each student or graduate has his/her own characteristics in terms of previous learning levels and experiences, life experiences,

learning styles and approaches to future career-related actions. The quality, depth and breadth of the learning experiences made available to the students while at the higher education institutions help develop their characteristic attributes. The graduate attributes reflect both disciplinary knowledge and understanding, generic skills, including global competencies, that all students in different academic fields of study should acquire/attain and demonstrate. Some of the characteristic attributes that a graduate should demonstrate are as follows:

- **Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.
- **Communication Skills:** Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.
- **Critical thinking:** Capability to apply analytic thought to a body of knowledge; analyze and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.
- **Problem solving:** Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.
- **Analytical reasoning:** Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.
- **Research-related skills:** A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.
- **Cooperation/Team work:** Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.
- **Scientific reasoning:** Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences LOCF 4 from an open-minded and reasoned perspective.
- **Reflective thinking:** Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.
- **Information/digital literacy:** Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.

- **Self-directed learning:** Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
- **Multicultural competence:** Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.
- **Moral and ethical awareness/reasoning:** Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
- **Leadership readiness/qualities:** Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.
- **Lifelong learning:** Ability to acquire knowledge and skills, including „learning how to learn“, that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.

1.3.2 Qualification descriptors

A qualification descriptor indicates the generic outcomes and attributes expected for the award of a particular type of qualification (for eg. a bachelor's degree or a bachelor's degree with honours). The qualification descriptors also describe the academic standard for a specific qualification in terms of the levels of knowledge and understanding, skills and competencies and attitudes and values that the holders of the qualification are expected to attain and demonstrate. These descriptors also indicate the common academic standards for the qualification and help the degree-awarding bodies in designing, approving, assessing and reviewing academic programmes. The learning experiences and assessment procedures are expected to be designed to provide every student with the opportunity to achieve the intended programme learning outcomes. The qualification descriptors reflect both disciplinary knowledge and understanding as well as generic skills, including global competencies, that all students in different academic fields of study should acquire/attain and demonstrate.

Qualification descriptors for a Bachelor's Degree programme: The students who complete three years of full-time study of an undergraduate programme of study will be awarded a Bachelor's Degree. Some of the expected learning outcomes that a student should be able to demonstrate on completion of a degree-level programme may include the following:

- Demonstrate (i) a fundamental/systematic or coherent understanding of an academic field of study, its different learning areas and applications, and its linkages with related disciplinary areas/subjects; (ii) procedural knowledge that creates different types of professionals related to the disciplinary/subject

area of study, including research and development, teaching and government and public service; (iii) skills in areas related to one's specialization and current developments in the academic field of study.

- Use knowledge, understanding and skills required for identifying problems and issues, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources, and their application, analysis and evaluation using methodologies as appropriate to the subject(s) for formulating evidence-based solutions and arguments;
- Communicate the results of studies undertaken in an academic field accurately in a range of different contexts using the main concepts, constructs and techniques of the subject(s);
- Meet one's own learning needs, drawing on a range of current research and development work and professional materials;
- Apply one's disciplinary knowledge and transferable skills to new/unfamiliar contexts, rather than replicate curriculum content knowledge, to identify and analyse problems and issues and solve complex problems with well-defined solutions.
- Demonstrate subject-related and transferable skills that are relevant to some of the job trades and employment opportunities.

Qualification descriptors for a Bachelor's Degree with honours:

The qualification descriptors for a Bachelor degree with honours may include the following:

- Demonstrate (i) a systematic, extensive and coherent knowledge and understanding of an academic field of study as a whole and its applications, and links to related disciplinary areas/subjects of study; including a critical understanding of the established theories, principles and concepts, and of a number of advanced and emerging issues in the field of study; (ii) procedural knowledge that creates different types of professionals related to the disciplinary/subject area of study, including research and development, teaching and government and public service; (iii) skills in areas related to one's specialization and current developments in the academic field of study, including a critical understanding of the latest developments in the area of specialization, and an ability to use established techniques of analysis and enquiry within the area of specialization.
- Demonstrate comprehensive knowledge about materials, including current research, scholarly, and/or professional literature, relating to essential and advanced learning areas pertaining to the chosen disciplinary areas (s) and field of study, and techniques and skills required for identifying problems and issues relating to the disciplinary area and field of study.
- Demonstrate skills in identifying information needs, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources, analysis and interpretation of data using methodologies as appropriate to the subject(s) for formulating evidence-based solutions and arguments;
- Use knowledge, understanding and skills for critical assessment of a wide range of ideas and complex problems and issues relating to the chosen field of study.

- Communicate the results of studies undertaken in an academic field accurately in a range of different contexts using the main concepts, constructs and techniques of the subject(s) of study;
- Address one's own learning needs relating to current and emerging areas of study, making use of research, development and professional materials as appropriate, including those related to new frontiers of knowledge.
- Apply one's disciplinary knowledge and transferable skills to new/unfamiliar contexts and to identify and analyze problems and issues and seek solutions to real-life problems.
- Demonstrate subject-related and transferable skills that are relevant to some of the job trades and employment opportunities.

1.3.3 Programme learning outcomes

The outcomes and attributes described in qualification descriptors are attained by students through learning acquired on completion of a programme of study. The term 'programme' refers to the entire scheme of study followed by learners leading to a qualification. Individual programmes of study will have defined learning outcomes which must be attained for the award of a specific certificate/diploma/degree. The programme learning outcomes are aligned with the relevant qualification descriptors. Programme learning outcomes will include subject-specific skills and generic skills, including transferable global skills and competencies, the achievement of which the students of a specific programme of study should be able to demonstrate for the award of the certificate/Diploma/Degree qualification. The programme learning outcomes would also focus on knowledge and skills that prepare students for further study, employment, and citizenship. They help ensure comparability of learning levels and academic standards across colleges/universities and provide a broad picture of the level of competence of graduates of a given programme of study. A programme of study may be monodisciplinary, multi-disciplinary or inter-disciplinary. Some examples of programme learning outcomes for B.Sc (Physics) and Bachelor programme in Education are given in Section 2.

1.3.4 Course learning outcomes

The programme learning outcomes are attained by learners through the essential learning's acquired on completion of selected courses of study within a programme. The term 'course' is used to mean the individual courses of study that make up the scheme of study for a programme. Course learning outcomes are specific to the learning for a given course of study related to a disciplinary or interdisciplinary/multi-disciplinary area. Some programmes of study are highly structured, with a closely laid down progression of compulsory/core courses to be taken at particular phases/stages of learning. Some programmes allow learners much more freedom to take a combination of courses of study according to the preferences of individual student that may be very different from the courses of study pursued by another student of the same programme. Course-level learning outcomes will be aligned to programme learning outcomes. Course level learning outcomes are specific to a course of study within a given programme of study. The achievement by students of course-level learning

outcomes lead to the attainment of the programme learning outcomes. At the course level, each course may well have links to some but not all graduate attributes as these are developed through the totality of student learning experiences across the years of their study.

A course map would indicate the linkage between course learning outcomes and each programme learning outcome (Table 1). Some examples of course learning outcomes are indicated in Section 3.

Table 1							
Programme outcomes	Courses						
	Course1	Course2	Course...	Course..	Course...	Course..	Course..
Outcome 1	x	x	X	x	x	x	x
Outcome 2	x		X	x		x	
Outcome..		x		x	x	x	x
Outcome..		x		x	x	x	
Outcome..	x		X		x		x
Outcome..	x		X		x	x	x
Outcome..		x		x		x	

1.4 Teaching - learning process

The Learning Outcomes-Based Approach to curriculum planning and transaction requires that the teaching-learning processes are oriented towards enabling students to attain the defined learning outcomes relating to the courses within a programme. The outcomebased approach, particularly in the context of undergraduate studies, requires a significant shift from teacher-centric to learner-centric pedagogies, and from passive to active/participatory pedagogies. Planning for teaching therein becomes critical. Every programme of study lends itself to well-structured and sequenced acquisition of knowledge and skills. Practical skills, including an appreciation of the link between theory and experiment, will constitute an important aspect of the teaching-learning process. Teaching methods, guided by such a framework, may include: lectures supported by group tutorial work; practicum and field-based learning; the use of prescribed textbooks and e-learning resources and other self-study materials; open-ended project work, some of which may be team-based; activities designed to promote the development of generic/transferrable and subject-specific skills; and internship and visits to field sites, and industrial or other research facilities etc.

1.5 Assessment methods

A variety of assessment methods that are appropriate to a given disciplinary/subject area and a programme of study will be used to assess progress towards the course/programme learning outcomes. Priority will be accorded to formative assessment. Progress towards achievement of learning outcomes will be assessed using the following: time-constrained examinations; closed-book and open-book tests; problem based assignments; practical assignment laboratory reports; observation of practical skills; individual project reports (case-study reports); team project reports; oral presentations, including seminar presentation; viva voce interviews; computerised adaptive testing; peer and self assessment etc. and any other pedagogic approaches as per the context .

Programme learning outcomes relating to bachelor degree in Sanskrit

B.A.(Hons.)

For centuries Sanskrit has been the repository of Indian wisdom. In the ancient period of her history itself, India had made significant strides in several areas of knowledge production. She had a rich tradition of philosophy and religion along with major achievements in logic, mathematics, law, medicine, literature, dramatics, agricultural sciences, marine technology and many crafts and trades.

Prior to the imposition of the colonialist agenda by British imperialists, these subjects were being taught in Indian schools and universities. However, these subjects were replaced with western knowledge systems under the Education policies pursued by the British government.

In the twenty first century, the Euro –centric approach is being challenged and it is being increasingly recognized that Asian and especially Indian knowledge systems need to be revived and used for the betterment of humankind. As the principal medium of all intellectual advancements in India, Sanskrit needs to be given a pride of place in the scheme of studies. India's Education policies of 1968 and 1986 declare that 'more liberal facilities' must be provided for the study of Sanskrit in universities.

Sanskrit is offered in different forms as an Honours course where students read at least twenty papers in Sanskrit; as a Programme course where students study lesser number of papers in Sanskrit ; as a Generic Elective subject for students from other disciplines.

The Sanskrit Honours and Programme syllabus has a two pronged objective – to introduce students to a variety of traditional disciplines in Sanskrit studies and to strengthen their knowledge of the language.

When students come from school to College, the level of difficulty both in terms of the language and content rises dramatically. Therefore, the Sanskrit Honours Course aims to train them in classical Sanskrit in which major works on various disciplines are written. It is also aims to train them in important traditional disciplines which may be put under the category of humanities. These are - Vedic studies ; the huge volume of literature – prose, poetry and drama which have inspired and continue to inspire great literary works in almost all Indian languages; literary criticism or kavya Shastra; vyakarana which covers a large area of linguistics; darshana i.e. philosophy and logic; dharma Shastra which covers many areas of sociology and legal studies.

The syllabus also realizes that Sanskrit has been the language of governance for centuries and therefore several ruling dynasties and even private entities got their inscriptions written in Sanskrit. These inscriptions are extremely important for the study of Indian history, paleography and chronology. These find place in various forms in this syllabus.

This course also seeks to introduce certain non technical aspects of scientific disciplines - the Indian system of medicine, mathematics and astronomy.

The Honours course will especially focus on issues which have a contemporary resonance. It will seek to enrich our modern understanding of these issues with traditional Indian wisdom. It will combine traditional wisdom with modern studies and research in these various disciplines in India and abroad. In most courses an attempt will be made to expose students to e-resources and help them to use them fruitfully.

The Honours course will thus make students better equipped to pursue their post graduate studies and undertake further research in these disciplines.

The BA Programme in Sanskrit is less ambitious in range and level of difficulty. It offers limited courses in literature and language. Students pursuing the BA Programme course will also get the opportunity to read some Generic Courses in Sanskrit where the emphasis will be more on introducing domain knowledge than language studies.

Background/Preamble:

Ministry of Human Resource Development (HRD), Govt. of India, has already initiated the process for developing New Education Policy (NEP) in our country to bring out reforms in Indian education system. University Grants Commission (UGC) participates more actively in developing National Education Policy, its execution and promotion of higher education in our country. The UGC has already initiated several steps to bring equity, efficiency and academic excellence in National Higher Education System. The important ones include innovation and improvement in course- curricula, introduction of paradigm shift in learning and teaching pedagogy, examination and education system.

The education plays enormously significant role in building of a nation. There are quite a large number of educational institutions, engaged in imparting education in our country. Majority of them have entered recently into semester system to match with international educational pattern. However, our present education system produces young minds lacking knowledge, confidence, values and skills. It could be because of complete lack of relationship between education, employment and skill development in conventional education system. The present alarming situation necessitates transformation and/or redesigning of education system, not only by introducing innovations but developing “learner-centric approach in the entire education delivery mechanism and globally followed evaluation system as well.

Majority of Indian higher education institutions have been following marks or percentage based evaluation system, which obstructs the flexibility for the students to study the subjects/courses of their choice and their mobility to different institutions. There is need to allow the flexibility in education system, so that students depending upon their interests and aims can choose inter-disciplinary, intra-disciplinary and skill-based courses. This can only be possible when choice based credit system (CBCS), an internationally acknowledged system, is adopted. The choice based credit system not only offers opportunities and avenues to learn core subjects but also exploring additional avenues of learning beyond the core subjects for holistic development of an individual. The CBCS will undoubtedly facilitate us bench mark our courses with best international academic practices. The CBCS has more advantages than disadvantages.

Advantages of the choice based credit system:

- Shift in focus from the teacher-centric to student-centric education.
- Student may undertake as many credits as they can cope with (without repeating all courses in a given semester if they fail in one/more courses).
- CBCS allows students to choose inter-disciplinary, intra-disciplinary courses, skill oriented papers (even from other disciplines according to their learning needs, interests and aptitude) and more flexibility for students).
- CBCS makes education broad-based and at par with global standards. One can take credits by combining unique combinations. For example, Physics with Economics, Microbiology with Chemistry or Environment Science etc.

- CBCS offers flexibility for students to study at different times and at different institutions to complete one course (ease mobility of students). Credits earned at one institution can be transferred.

Disadvantages:

- Difficult to estimate the exact marks
- Workload of teachers may fluctuate
- Demand good infrastructure for dissemination of education

Choice Based Credit System (CBCS):

The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill based courses. The courses can be evaluated following the grading system, which is considered to be better than the conventional marks system. Therefore, it is necessary to introduce uniform grading system in the entire higher education in India. This will benefit the students to move across institutions within India to begin with and across countries. The uniform grading system will also enable potential employers in assessing the performance of the candidates. In order to bring uniformity in evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations, the UGC has formulated the guidelines to be followed.

Outline of Choice Based Credit System:

1. **Core Course:** A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.
2. **Elective Course:** Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.
 - 2.1 **Discipline Specific Elective (DSE) Course:** Elective courses may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective. The University/Institute may also offer discipline related Elective courses of interdisciplinary nature (to be offered by main discipline/subject of study).
 - 2.2 **Dissertation/Project:** An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher/faculty member is called dissertation/project.
 - 2.3 **Generic Elective (GE) Course:** An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective.
P.S.: A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.
3. **Ability Enhancement Courses (AEC)/Competency Improvement Courses/Skill Development Courses/Foundation Course:** The Ability Enhancement (AE) Courses may be of two kinds: AE Compulsory Course (AECC) and AE Elective Course (AEEC). "AECC" courses are the courses based upon the content that leads to Knowledge enhancement. They ((i) Environmental Science, (ii) English/MIL Communication) are mandatory for all disciplines. AEEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.
 - 3.1 AE Compulsory Course (AECC): Environmental Science, English Communication/MIL Communication.
 - 3.2 AE Elective Course (AEEC): These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based instruction.

Project work/Dissertation is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A Project/Dissertation work would be of 6 credits. A Project/Dissertation work may be given in lieu of a discipline specific elective paper.

Implementation:

1. The CBCS may be implemented in Central/State Universities subject to the condition that all the stakeholders agree to common minimum syllabi of the core papers and at least follow common minimum curriculum as fixed by the UGC. The allowed deviation from the syllabi being 20 % at the maximum.
2. The universities may be allowed to finally design their own syllabi for the core and elective papers subject to point no. 1. UGC may prepare a list of elective papers but the universities may further add to the list of elective papers they want to offer as per the facilities available.
3. Number of Core papers for all Universities has to be same for both UG Honors as well as UG Program.
4. Credit score earned by a student for any elective paper has to be included in the student's overall score tally irrespective of whether the paper is offered by the parent university (degree awarding university/institute) or not.
5. For the introduction of AE Courses, they may be divided into two categories:
 - a) AE Compulsory Courses: The universities participating in CBCS system may have common curriculum for these papers. There may be one paper each in the 1st two semesters viz. (i) English/MIL Communication, (ii) Environmental Science.
 - b) AE Elective Courses: The universities may decide the papers they may want to offer from a common pool of papers decided by UGC or the universities may choose such papers themselves in addition to the list suggested by UGC. The universities may offer one paper per semester for these courses.
6. The university/Institute may plan the number of seats per elective paper as per the facility and infrastructure available.
7. An undergraduate degree with honours in a discipline may be awarded if a student completes 14 core papers in that discipline, 2 AE Compulsory Courses, minimum 2 AE Elective Courses and 4 papers each from a list of discipline specific elective and generic elective papers respectively.
8. An undergraduate program degree may be awarded if a student completes 4 core papers

each in three disciplines of choice, 2 AE Compulsory Courses, minimum 4 AE Elective Courses and 2 papers each from a list of discipline specific elective papers based on three disciplines of choice selected above, respectively.

9. The credit(s) for each theory paper/practical/tutorial/project/dissertation will be as per the details given in A, B, C, D for B.Sc. Honours, B.A./B.Com. Honours, B.Sc. Program and B.A./B.Com. Program, respectively.

Details of courses under B.A (Honors), B.Com (Honors) & B.Sc. (Honors)

Course	*Credits	
	Theory+ Practical	Theory + Tutorial
<u>I. Core Course</u>		
(14 Papers)	14X4= 56	14X5=70
Core Course Practical / Tutorial*		
(14 Papers)	14X2=28	14X1=14
<u>II. Elective Course</u>		
(8 Papers)		
A.1. Discipline Specific Elective	4X4=16	4X5=20
(4 Papers)		
A.2. Discipline Specific Elective		
Practical/ Tutorial*	4 X 2=8	4X1=4
(4 Papers)		
B.1. Generic Elective/		
Interdisciplinary	4X4=16	4X5=20
(4 Papers)		
B.2. Generic Elective		
Practical/ Tutorial*	4 X 2=8	4X1=4
(4 Papers)		
▪ Optional Dissertation or project work in place of one Discipline Specific Elective paper (6 credits) in 6th Semester		
<u>III. Ability Enhancement Courses</u>		
1. Ability Enhancement Compulsory		
(2 Papers of 2 credit each)	2 X 2=4	2 X 2=4
Environmental Science		
English/MIL Communication		
2. Ability Enhancement Elective (Skill Based)		
(Minimum 2)	2 X 2=4	2 X 2=4
(2 Papers of 2 credit each)		
Total credit	140	140

Institute should evolve a system/policy about ECA/ General Interest/Hobby/Sports/NCC/NSS/related courses on its own.

*** wherever there is a practical there will be no tutorial and vice-versa**

**PROPOSED SCHEME FOR CHOICE BASED CREDIT
SYSTEM IN B.A (Honors), B.Com (Honors) & B.Sc.
(Honors)**

	CORE COURSE (14)	Ability Enhancement Compulsory Course (AECC) (2)	Ability Enhancement Elective Course (AEEC) (2) (Skill Based)	Elective: Discipline Specific DSE (4)	Elective: Generic (GE) (4)
I	C 1 C 2	(English Communication/MIL)/ Environmental Science			GE-1
II	C 3 C 4	Environmental Science/(English/MIL Communication)			GE-2
III	C 5 C 6 C 7		AECC -1		GE-3
IV	C 8 C 9 C 10		AECC -2		GE-4
V	C 11 C 12			DSE-1 DSE -2	
VI	C 13 C 14			DSE -3 DSE -4	

10. The Universities/Institutes may offer any number of choices of papers from different disciplines under Generic Elective and Discipline Specific Elective as per the availability of the courses/faculty.

11. Universities/Institutes should evolve a system/policy about Extra Curricular Activities/ General Interest and Hobby Courses/Sports/NCC/NSS/related courses on its own.
12. A student can opt for more number of Elective and AE Elective papers than proposed under the model curriculum of UGC. However the total credit score earned will not exceed 160 credits for UG Honours and 140 credits for UG Program degree.
13. The new scheme of UG courses should be given due consideration while framing the admission eligibility requirement for PG/ Technical courses in Indian Universities/Institutions to ensure that students following inter and multi-disciplinary format under CBCS are not at a disadvantage. It may be suggested that obtaining 24 credits in a particular discipline may be considered as the minimum eligibility requirement for admission to PG/ Technical courses in Indian Universities/Institutions.

Conversion of credit(s) into grade(s): The following illustrations could be taken as an example for computing SGPA and CGPA from credits for Honours courses in all disciplines, degree Program courses in Science subjects and degree Program courses in Humanities, Social Sciences and Commerce subjects:

1. Grades and Grade Points

Letter Grade	Grade Point
O (Outstanding)	10
A+(Excellent)	9
A (Very Good)	8
B+(Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F (Fail)	0
Ab (Absent)	0

1. A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.
2. For non credit courses ‘Satisfactory’ or ‘Unsatisfactory’ shall be indicated instead of the

letter grade and this will not be counted for the computation of SGPA/CGPA.

3. The Universities can decide on the grade or percentage of marks required to pass in a course and also the CGPA required to qualify for a degree taking into consideration the recommendations of the statutory professional councils such as AICTE, MCI, BCI, NCTE etc.,
4. The statutory requirement for eligibility to enter as assistant professor in colleges and universities in the disciplines of arts, science, commerce etc., is a minimum average mark of 50% and 55% in relevant postgraduate degree respectively for reserved and general category. Hence, it is recommended that the cut-off marks for grade B shall not be less than 50% and for grade B+, it should not be less than 55% under the absolute grading system. Similarly cut-off marks shall be fixed for grade B and B+ based on the recommendation of the statutory bodies (AICTE, NCTE etc.,) of the relevant disciplines.

Illustration of Computation of SGPA and CGPA and Format for Transcripts

2. B. Sc. / B. Com./ B.A. Honors Course

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit X Grade)	SGPA (Credit Point/Credit)
Semester I					
C-1	06	A	8	48	
C-2	06	B+	7	42	
AECC-1	02	B	6	12	
GE-1	06	B	6	36	
Total	20			138	6.9 (138/20)
Semester II					
C-3	06	B	6	36	
C-4	06	C	5	30	
AECC -2	02	B+	7	14	
GE-2	06	A+	9	54	
Total	20			134	6.7 (134/20)

Semester III					
C-5	06	A+	9	54	
C-6	06	0	10	60	
C-7	06	A	8	48	
AEEC-1	02	A	8	16	
GE-3	06	0	10	60	
Total	26			238	9.15 (238/26)
Semester IV					
C-8	06	B	6	36	
C-9	06	A+	9	54	
C-10	06	B	6	36	
AEEC-2	02	A+	9	18	
GE-4	06	A	8	48	
Total	26			192	7.38 (192/26)
Semester V					
C-11	06	B	6	36	
C-12	06	B+	7	42	
DSE-1	06	0	10	60	
DSE-2	06	A	8	48	
Total	24			186	7.75 (186/24)
Semester VI					
C-13	06	A+	9	54	
C-14	06	A	8	48	
DSE-3	06	B+	7	42	

DSE-4	06	A	8	48	
Total	24			192	8.0 (192/24)
CGPA					
Grand Total	140			1080	7.71 (1080/144)

Semester 1	Semester 2	Semester 3	Semester 4
Credit: 20; SGPA: 6.9	Credit: 20; SGPA: 6.7	Credit: 26; SGPA: 9.15	Credit: 26; SGPA: 7.38

Semester 5	Semester 6
Credit: 24; SGPA: 7.75	Credit: 24; SGPA: 8.0

Thus, **CGPA** = $(20 \times 6.9 + 20 \times 6.7 + 26 \times 9.15 + 26 \times 7.38 + 24 \times 7.75 + 24 \times 8.0) / 140 = 7.71$

*Transcript (Format): Based on the above recommendations on Letter grades, grade points and SGPA and CCPA, the HEIs may issue the transcript for each semester and a consolidated transcript indicating the performance in all semesters.

Scheme of Romanization of Devanagari Script (International Alphabet for Sanskrit Transliteration (IAST))

अ <i>a</i>	आ <i>ā</i>	इ <i>i</i>	ई <i>ī</i>	उ <i>u</i>
ऊ <i>ū</i>	ऋ <i>ṛ</i>	ॠ <i>ṝ</i>	लृ <i>ḷ</i>	ए <i>e</i>
ऐ <i>ai</i>	ओ <i>o</i>	औ <i>au</i>	ं <i>m/in</i>	ः <i>ḥ</i>
क् <i>k</i>	ख् <i>kh</i>	ग् <i>G</i>	घ् <i>gh</i>	ङ् <i>ṅ</i>
च् <i>c</i>	छ् <i>C</i>	ज् <i>J</i>	झ् <i>jh</i>	ञ् <i>ñ</i>
ट् <i>ṭ</i>	ठ् <i>ṭh</i>	ड् <i>ḍ</i>	ढ् <i>ḍh</i>	ण् <i>ṇ</i>
त् <i>t</i>	थ् <i>th</i>	द् <i>D</i>	ध् <i>dh</i>	न् <i>n</i>
प् <i>p</i>	फ् <i>ph</i>	ब् <i>B</i>	भ् <i>bh</i>	म् <i>m</i>
य् <i>y</i>	र् <i>r</i>	ल् <i>L</i>	व् <i>v</i>	
स् <i>s</i>	श् <i>ś</i>	ष् <i>ṣ</i>	ह् <i>h</i>	
क्ष् <i>kṣ</i>	ज्ञ् <i>jñ</i>	श्र् <i>śr</i>		

List of Courses

Core Papers (14) B.A. (Hons) Sanskrit

Semester: I

C-1
Classical Sanskrit Literature (Poetry)

C-2
Critical Survey of Sanskrit Literature

Semester: II

C-3
Classical Sanskrit Literature (Prose)

C-4
Self-Management in the Gītā

Semester: III

C-5
Classical Sanskrit Literature
(Drama)

C-6
Poetics and Literary
Criticism

C-7
Indian Social Institutions
and Polity

Semester: IV

C-8
Indian Epigraphy,
Palaeography and
Chronology

C-9
Modern Sanskrit Literature

C-10
Sanskrit and World
Literature

Semester: V

C-11
Vedic Literature

C-12
Sanskrit Grammar

Semester: VI

C-13
Indian Ontology and Epistemology

C-14
Sanskrit Composition and
Communication

Discipline Specific Elective (DSE) B.A. (Hons) Sanskrit

DSE-1
Indian System of Logic and Debate

DSE-2
Art of Balanced Living

DSE -3
Theatre & Dramaturgy

DSE-4
Sanskrit and Other Modern Indian
Languages

DSE-5
Sanskrit Linguistics

DSE-6
Computational Linguistics for Sanskrit

DSE-7 Fundamentals of Ayurveda	DSE-8 Environmental Awareness in Sanskrit Literature
Generic Elective (GE)(Any Four) B.A. (Hons) Sanskrit	
Semester: I/II/III/IV	
GE-1 Basic Sanskrit	GE-2 Indian Culture and Social Issues
GE-3 Tools and Techniques for Computing Sanskrit Language	GE-4 Basic Principles of Indian Medicine System (Ayurveda)
GE-5 Indian Aesthetics	GE-6 Fundamentals of Indian Philosophy
GE-7 Ancient Indian Polity	GE-8 Indian Epigraphy & Paleography
GE-9 Computer Applications for Sanskrit	GE-10 Individual, Family and Community In Indian Social Thought
GE-11 Nationalism and Indian Literature	GE-12 Indian Architectural System
Ability Enhancement Elective Course (AEEC) (Any Two)Skill Based B.A. (Hons) Sanskrit	
Semester: III/IV	
AEEC-1 Acting & Script Writing	AEEC -2 Reading skills in Brāhmī Scripts
AEEC-3 Machine Translation: Tools and Techniques	AEEC-4 Evolution of Indian scripts
AEEC-5 Sanskrit Meters and Music	

<p align="center">Ability Enhancement Course Compulsory (AECC) (Any Two) MIL B.A. (Hons Sanskrit)/B.Sc. (Hons)/B.Sc./B.Com. (Hons)/B.Com Semester: I/II</p>	
<p align="center">AECC-1 Sanskrit as MIL: A (Advance) Sanskrit Literature</p>	<p align="center">AECC-2 Sanskrit as MIL: B (Intermediate) Upaniṣad and Bhagawad Gītā</p>
<p align="center">AECC-3 Sanskrit as MIL:C (Introductory) Niti Literature</p>	

Core Papers (14)
B.A. (Hons) Sanskrit

Semester: I

C-1
Classical Sanskrit Literature (Poetry)

C-2
Critical Survey of Sanskrit Literature

Semester: II

C-3
Classical Sanskrit Literature (Prose)

C-4
Self-Management in the Gītā

Semester: III

C-5
**Classical Sanskrit Literature
(Drama)**

C-6
**Poetics and Literary
Criticism**

C-7
**Indian Social Institutions
and Polity**

Semester: IV

C-8
**Indian Epigraphy,
Palaeography and
Chronology**

C-9
Modern Sanskrit Literature

C-10
**Sanskrit and World
Literature**

Semester: V

C-11
Vedic Literature

C-12
Sanskrit Grammar

Semester: VI

C-13
Indian Ontology and Epistemology

C-14
**Sanskrit Composition and
Communication**

C-1
Classical Sanskrit Literature (Poetry)
(12131101)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60+ Tutorials 12

[A] Course Objectives:

This course aims at getting the students acquainted with the general outlines of Classical Sanskrit Literature (Poetry) through classical texts.

[B] Course Learning Outcomes :

This course will help the students develop a fair idea of the works of great Sanskrit poets. They will be able to appreciate the styles and thoughts of individual poets focusing on the poetical, artistic, cultural and historical aspects of their works.

This course will enhance competence in chaste classical Sanskrit and give them skills in translation and interpretation of poetic works.

[C] Contents :

Unit: I Raghuvaṃśam: Canto-I (Verse: 1-25): Credits : 10

Raghuvaṃśam: Introduction (Author and Text), Appropriateness of title, Canto I, 1-25 Grammatical analysis, Meaning/translation, Explanation, Characteristics of Raghu Clan (Raghuvaṃśa) and Role of Dilīpa in the welfare of subjects content analysis i.e. metrical, poetical, artistic, cultural and historic aspects.

Unit: II Kumārasambhavam: Canto-V (Verses: 1-30): Credits : 12

Kumārasambhavam: Introduction (Author and Text), Appropriateness of title, Background of given contents.

Text Reading Canto V Verses 1-30, (Grammatical analysis, Translation and Explanation), Poetic excellence and Plot, Penance of Pārvati, Poetic excellence, Plot. content analysis i.e. metrical, poetical, artistic, cultural and historic aspects.

Unit: III Kirātārjunīyam - Canto I (1-25 Verses): Credits : 16

Kirātārjunīyam: Introduction (Author and Text), Appropriateness of title, Background of given contents, Canto I Verses 1-25, Grammatical analysis, Translation, Explanation, Poetic excellence, thematic analysis. content analysis i.e. metrical, poetical, artistic, cultural and historic aspects.

Unit: IV **Nīṭisatakam (1-20 Verses, 1st two Paddhatis) -** **Credits : 12**

M. R. Kale Edition

Nīṭisatakam: Verses (1-20) grammatical analysis Translation, explanation and thematic analysis, Bhartṛhari's comments on society. content analysis i.e. metrical, poetical, artistic, cultural and historic aspects.

Unit: V **Origin and Development of Mahākāvya :** **Credits: 05**

Origin and development of different types of Māhākāvya with special reference to Aśvaghōṣa, Kālidāsa, Bhāravi, Māgha, Bhatti, Śṛīharṣa and their works.

Unit: VI **Origin and Development of Gītikāvya :** **Credits: 05**

Origin & Development of Sanskrit gītikāvayas with special reference to Kālidāsa, Bilhaṇa, Jayadeva, Amarūka, Bhartṛhari and their works.

[D] Suggested Books/Readings:

Compulsory Readings:

1. त्रिपाठी, कृष्णमणि, रघुवंशम् (मल्लिनाथकृत सञ्जीवनीटीका), चौखम्बा सुरभारती प्रकाशन, वाराणसी
2. जनार्दन शास्त्री, भारवि कृत किरातार्जनीयम्, मोतीलाल बनारसीदास, दिल्ली
3. झा, तारिणीश (व्या.), भर्तृहरि कृत नीतिशतकम्, संस्कृत टीका, हिन्दी व अंग्रेजी व्याख्यानवादसहित, रामनारायणलाल बेनीमाधव, इलाहाबाद, १९७६.
4. नेमिचन्द्र शास्त्री, कुमारसम्भवम्, मोतीलाल बनारसीदास, दिल्ली
5. त्रिपाठी, बाबूराम (सम्पा.), भर्तृहरि कृत नीतिशतकम् महालक्ष्मी प्रकाशन, आगरा, १९८६
6. पाण्डेय, ओमप्रकाश (व्या.), मनोरमा हिन्दी-व्याख्या सहित, भर्तृहरि कृत नीतिशतकम्, चौखम्बा अमरभारती प्रकाशन, वाराणसी, १९८२
7. विष्णुदत्त शर्मा शास्त्री (व्या.), भर्तृहरि कृत नीतिशतकम्, विमलचन्द्रिकासंस्कृतटीका व हिन्दी- व्याख्यासहित, ज्ञानप्रकाशन, मेरठ, संवत् २०३४.
8. शर्मा, समीर, मल्लिनाथकृत घंटापथ टीका, भारवि कृत किरातार्जनीयम्, चौखम्बा विद्याभवन, वाराणसी
9. C.R. Devadhar (Ed.), Raghuvamśam of Kālidāsa, MLBD, Delhi.
10. Gopal Raghunath Nandargikar (Ed.), Raghuvamśam of Kālidāsa, MLBD, Delhi.
11. M.R. Kale (Ed.), Kirātārjunīyam of Bhāravi, MLBD, Delhi.
12. M.R. Kale (Ed.), Kumarasambhavam, MLBD, Delhi.
13. M.R. Kale (Ed.), Nīṭisatakam of Bhartṛhari, MLBD., Delhi.
14. M.R. Kale (Ed.), Raghuvamśam of Kālidāsa, MLBD, Delhi.

Additional Resources:

1. Mirashi, V.V., Kālidāsa, Popular Publication, Mumbai.
2. Keith, A.B., History of Sanskrit Literature, MLBD, Delhi.
3. Krishnamachariar, History of Classical Sanskrit Literature, MLBD, Delhi.

4. Gaurinath Shastri, *A Concise History of Sanskrit Literature*, MLBD, Delhi.
5. Winternitz, Maurice: *Indian Literature* (Vol. I-III), also Hindi Translation, MLBD, Delhi.

[E] Teaching Learning Process

1. Since most learners will be new to classical Sanskrit poetry, a step by step approach is recommended.
2. Teachers must read aloud the Sanskrit text and the students should repeat.
3. Teachers must help students in disjoining all sandhis and dissolving all samāśas.
4. Teachers will arrange the words according to the prose order (anvaya).
5. Students will identify the grammatical structure of each word.
6. Teachers will guide students in translating each word and then the complete verse.
7. Teachers will discuss the social, political, cultural issues occurring in the text and their contemporary relevance.
8. Teachers may also analyze the text according to the principles of traditional Sanskrit poetics.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 3
 Week 8 – Unit 5
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 5
 Week 12 – Unit 6

[G] Assessment :

I. Basic Structure of Question Paper & Division of Marks

75

I	i.	Translation-4 (from unit-1 to 4)	04 x 05 =	20
	ii.	Explanations-3 (from unit-1 to 4)	03 x 08 =	24
	iii.	Questions 02 (Unit 1 to 4) <u>Or</u> short notes	02 x 10 =	20
	iv.	Grammatical notes on underlined words of verses (from Unit s 1 to 4) -		4
	v.	Sanskrit Question -1 (Comprehension or text based from 3 rd & 4 th Units)		7

II		Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)		25
		Total Marks : (I+II)	(75+25) =	100

[H] Keywords :

Sanskrit Literature, Mahākāvya, Gītikāvya, Kumārasambhavam, Raghuvaṃśam, Kirātārjunīyam, Nītiśatakam, Classical Sanskrit Literature, Poetry, etc.

C-2
Critical Survey of Sanskrit Literature
(12131102)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60+ Tutorials 12

[A] Course Objectives:

This course aims to get students acquainted with the journey of the Ārsha literature from the Vedas to the Purāṇas. It also intends to give an outline of three traditional śāstras i.e. vyākaraṇa, darśana and kāvya śāstra. .

[B] Course Learning Outcomes :

This course will help the students develop a fair idea of the works of great Sanskrit seers. They will be able to improve their knowledge about philosophy, socio-religious life, polity as depicted in the prescribed areas of study.

This course will also introduce them to three important śāstras.

[C] Contents :

Unit: I Vedic Literature Credits : 14

Samhitā (Ṛk, Yajuh, Sāma, Atharva) time, subject– matter, religion and philosophy, social life, Brāhmaṇa, Āraṇyaka, Upaniṣad, Vedāṅga (Brief Introduction)

Unit: II Rāmāyaṇa : Credits : 8

Rāmāyaṇa-time, subject–matter, Rāmāyaṇa as an Ādikāvya. Rāmāyaṇa as a Source Text and its cultural importance.

Unit: III Mahābhārata : Credits : 10

Mahābhārata and its Time, evolution of the text, subject matter; Mahābhārata : Encyclopaedic nature, As a Source text, Cultural Importance.

Unit: IV Purāṇas Credits : 06

Purāṇas: Subject matter, Characteristics
Purāṇas: Social, Cultural and Historical Importance

Unit: V General Introduction to Vyākaraṇa and Sāhityaśāstra: Credits: 10

General Introduction to Vyākaraṇa- Brief History of Vyākaraṇaśāstra,
General Introduction to Poetics- Six major Schools of Indian Poetics-
Rasa, Alamkāra, Rīti, Dhvani, Vakrokti and Aucitya.

Unit: VI General Introduction to Darśana Credits : 12

General Introduction to Darśana-Major schools of Indian Philosophy Cārvāka,
Bauddha, Jaina, Sāṅkhya-yoga, Nyāya-Vaiśeṣika, Pūrva- mīmāṃsā and Uttara
mīmāṃsā.

[D] Suggested Books/Readings:**Compulsory Reading:**

1. उपाध्याय, बलदेव, वैदिक साहित्य और संस्कृति, वाराणसी
2. शर्मा, उमाशंकर ऋषि, संस्कृत साहित्य का इतिहास, चौखम्बा भारती अकादमी, वाराणसी.
3. Keith, A.B., *History of Sanskrit Literature*, also Hindi translation, MLBD, Delhi. (हिन्दी अनुवाद, मंगलदेव शास्त्री, मोतीलाल बनारसीदास, दिल्ली).
4. M. Krishnamachariar, *History of Classical Sanskrit Literature*, MLBD, Delhi.
5. Gaurinath Shastri, *A Concise History of Sanskrit Literature*, MLBD, Delhi.

Additional Resources:

1. बलदेव उपाध्याय, संस्कृत साहित्य का इतिहास, शारदा निकेतन, वाराणसी,
2. प्रीतिप्रभा गोयल, संस्कृत साहित्य का इतिहास, राजस्थानी ग्रन्थागार, जोधपुर.
3. राधावल्लभ त्रिपाठी, संस्कृत साहित्य का अभिनव इतिहास, विश्वविद्यालय प्रकाशन, वाराणसी
4. RC Majumadar, *History and culture of Indian people vol-1(Vedic age)* Bharatiya bidyabhavan.
5. Maurice Winternitz, *Indian Literature* (Vol. I-III), also Hindi Translation, MLBD, Delhi.

[E] Teaching Learning Process

- Largely lecture based teaching.
- Social, political, and cultural issues in the related section will be discussed and placed in the current context.
- Students must be involved in conversation or debate about these issues to sharpen their analytical skills.

[F] Weekly Plan

Week 1 – Unit 1

Week 2 – Unit 1

Week 3 – Unit 1
 Week 4 – Unit 1
 Week 5 – Unit 2
 Week 6 – Unit 3
 Week 7 – Unit 3
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :				
	I.		Basic Structure of Question Paper & Division of Marks	75
		i.	Long Questions -03 (1-6 Units)	03x 10 = 30
		ii.	Short notes- 04 (1-6 Units)	04 x 5 = 20
		iii.	Short Answer Type Questions -10(Limit1-2Lines) (from all Units)	10 x 1 = 13
		Iv	Sanskrit Question-1	7
	II.		Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25
			Total Marks : (I+II)	(75+25) = 100

[H] Keywords :

Samhitā ,Brāhmaṇa, Āraṇyaka, Upaniṣad, Vedāṅga , Rāmāyaṇa,Mahābhārata,Purāṇas
 Vyākaraṇaśāstra, , Poetics-Rasa, Alamkāra, Rīti, Dhvani,Vakrokti and Aucitya Darśana
 Cārvāka, Bauddha, Jaina, Sāṅkhya-yoga, Nyāya-Vaiśeṣika, Pūrva- mīmāṃsā , Uttara
 mīmāṃsā etc.

C-3
Classical Sanskrit Literature (Prose)
(12131201)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60+ Tutorials 12

[A] Course Objectives:

This course aims to acquaint students with Classical Sanskrit Prose literature. Origin and development of prose, important prose romances and Sanskrit fables are also included here for students to get acquainted with the beginnings of Sanskrit Prose literature. The course also seeks to help students negotiate texts independently.

[B] Course Learning Outcomes:

The course will enable students to familiarize themselves with some leading classical prose works and the individual literary styles of their authors. After the completion of this course the learner will be exposed to the socio-cultural conditions of the Indian society as reflected in the prescribed texts. They will acquire skills in advanced Sanskrit communication.

[C] Contents:

Unit: I Śukanāsopadeśa (Ed. Prahlad Kumar) Credit : 12

Introduction - Author and his works, text up to page 116
 (यथा-यथा चेयं चपला दीप्यते.....)

Unit: II Śukanāsopadeśa (Ed. Prahlad Kumar) : Credits : 12

Śukanāsopadeśa : Society, elements of Āyurveda and political thoughts depicted in Śukanāsopadeśa, discussion on बाणोच्छिष्टं जगत्सर्वम्, वाणी बाणो बभूव, बाणस्तु पञ्चाननः etc.

Unit: III Viśrutacaritam Upto 15th Para (सुरेन्द्रदेव शास्त्री edition) : Credits : 12

Para 1 to 15 - Introduction- Author and his works, Text reading (Grammar, Translation, and Explanation)

Unit: IV Viśrutacaritam Credits : 12

Poetic excellence, plot, Timing of Action. Society, language and style of Daṇḍin. Exposition of दण्डिनः पदलालित्यम्, कविर्दण्डी कविर्दण्डी कविर्दण्डी न संशयः।

Unit: V Origin and development of prose : Credits: 06

Subandhu, Daṇḍin, Bāṇa, Ambikāḍatta Vyāsa: biography, works, style, thoughts, special contribution

Unit: VI Origin and development of Sanskrit fables: Credits : 06

Origin and development of prose, important prose romances and fables: Pañcatantra, Hitopadeśa, Vetālapañcaviṃśatikā, Simhāsanadvātrimśikā, Puruṣaparīkṣā, Śukasaptati.

[D] Suggested Books/Readings:

Compulsory Readings:

1. प्रह्लाद कुमार (व्या.), शुकनासोपदेश, मेहरचन्द लछमनदास, दिल्ली ।
2. सुरेन्द्रदेव शास्त्री (व्या.), विश्रुतचरितम्, साहित्यभण्डार, मेरठ ।
3. उपाध्याय, बलदेव : संस्कृत साहित्य का इतिहास, शारदा निकेतन, वाराणसी ।
4. शर्मा, उमाशंकर ऋषि: संस्कृत साहित्य का इतिहास, चौखम्बा भारती अकादमी, वाराणसी ।

Additional Resources:

1. रामपाल शास्त्री, शुकनासोपदेश, सुबोधिनी संस्कृत) हि .व्या.(., चौखम्बा ओरियन्टलिया, वाराणसी ।
2. झा, रमाकान्त, शुकनासोपदेश, चौखम्बा विद्याभवन, वाराणसी ।
3. पन्त, सुबोधचन्द्र एवं विश्वनाथ झा, दशकुमारचरितम् -अर्थप्रकाशिकोपेतम्, मोतीलाल बनारसीदास, दिल्ली ।
4. प्रीतिप्रभा गोयल : संस्कृत साहित्य का इतिहास, राजस्थानी ग्रन्थागार, जोधपुर ।
5. त्रिपाठी, राधावल्लभ : संस्कृत साहित्य का अभिनव इतिहास, विश्वविद्यालय प्रकाशन, वाराणसी ।
6. Keith, A.B. , *History of Sanskrit Literature*, also Hindi translation, MLBD, Delhi.
हिन्दी अनुवाद सहित, मंगलदेव शास्त्री, मोतीलाल बनारसीदास, दिल्ली ।
7. M. Krishnamachariar : *History of Classical Sanskrit Literature*, MLBD, Delhi.
8. Gaurinath Shastri: *A Concise History of Sanskrit Literature*, MLBD, Delhi.
9. Maurice Winternitz : *Ancient Indian Literature* (Vol. I-III), also Hindi Translation, MLBD, Delhi

[E] Teaching Learning Process

1. Since most learners will be new to classical Sanskrit prose, a step by step approach is recommended.
2. Teachers must read aloud the Sanskrit text and the students should repeat.
3. Teachers must help students in disjoining all sandhis and dissolving all samāśas.
4. Students will identify the grammatical structure of each word.
5. Teachers will guide students in translating each word and then the complete sentences.
6. Teachers will discuss the social, political, cultural issues occurring in the text and their contemporary relevance.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :				
	I		Basic Structure of Question Paper & Division of Marks	75
		i	Translation-4 (from unit-1 to 4)	04 x 05 = 20
		ii.	Explanations-4 (from unit-1 to 4)	03 x 08 = 24
		iii.	questions 02 (Unit 1 to 4) <u>Or</u> short notes	02 x 10 = 20
		iv.	Grammatical notes on underlined words of verses (from Unit s 1 to 4) = 4	04
		v.	Sanskrit Question -1 (Comprehension or text based from 3 rd & 4 th Units)	07
	II		Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25
			Total Marks : (I+II)	(75+25) = 100

[H] Keywords :

Bāṇa, Kadambari, Śukanāsopadeśa, Daṇḍin, Dashakumarcharit, Viśrutacaritam,
 Subandhu, Ambikādatta, Hitopadeśa, Vetālapañcaviṃśatikā, Simhāsanadvātrimśikā,
 Puruṣaparīkṣā, Śukasaptati etc.

C-4
Self-Management in the Gītā
(12131202)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60 + Tutorials 12

[A] Course Objectives:

The objective of this course is to study the philosophy of self-management in the Gītā. The course seeks to help students negotiate the text independently without referring to the traditional commentaries so as to enable them to experience the richness of the text.

[B] Course Learning Outcomes:

This course will help students to learn to read the Gītā as a multipolar text which is open to several alternative interpretations.

This course will equip them with the practical skills to negotiate conflicts and emotional disturbances and define and pursue their goals with clarity and dedication. The course will instill leadership qualities in learners and also help them to grow as balanced and successful human beings who can face the challenges of life successfully.

[C] Contents:

Unit: I Gita: Cognitive and Emotive apparatus: Credit : 08

- Hierarchy of Indriya, Manas, Buddhi and Atman III.42; XV.7
- Role of the Atman - XV.7, XV.9

Unit: II Gita: Cognitive and Emotive apparatus : Credits : 08

- Mind as a product of Prakriti VII.4
- Properties of three Gunas and their impact on the Mind- XIII. 5-6; XIV.5-8, 11-13; XIV.17

Unit: III Gita: Controlling of the Mind : Credits : 16

- Confusion and Conduct, Nature of Conflict I.1; I.45; II.6, IV.16
- Casual Factors- Ignorance- II.41; Indriya- II.60, Mind- II.67; Rajoguna- III.36-39; XVI.21; Weakness of Mind- II.3, IV.5

Unit: IV Means of Controlling the Mind: Credits : 08

- Meditation Difficulties- VI.34-35; Procedure VI.11-14
- Balanced Life- III.8
- Diet Control- XVII.8-10
- Physical and Mental discipline- VI.36, XVII.14-19

Unit: V Means of Conflict Resolution : Credits: 10

- VI-42
- Importance of Knowledge- II.52; IV.38-39;
 - Clarity of Buddhi- XVII.30-32
 - Process of Decision Making- XVIII.63
 - Control over Senses- II.59, 64
 - Surrender of Kartṛbhava- XVIII.13-16, V.8-9
 - Desirelessness- II.48; II-55
 - Putting others before Self- III.25

Unit: VI Gītā: Self-management through devotion: Credits : 10

- Surrender of Ego- II.7, II.47, VIII.7, IX.27, XI.55,
- Abandoning frivolous Debates- IV.11, VII.21, IX.26
- Acquisition of Moral Qualities- XII.11, XII.13-19

[D] Suggested Books/Readings:

Compulsory Readings:

1. श्रीमद्भगवद्गीता
2. Panchamukhi, V.R.- Managing One-Self (Śrīmadbhagavadgītā: Theory and Practice), R.S. Panchamukhi Indological Research Centre, New Delhi & Amar Grantha Publications, Delhi, 2001.

Additional Resources:

1. Śrīmadbhagavadgītā , The Scripture of Mankind, text in Devanagari with transliteration in English and notes by Swami Tapasyananda, Sri Ramakrishna Math, 1984.
2. Śrīmadbhagavadgītā - English commentary by Jayadaya Goyandka, Tattvavivecinī Gītā Press, Gorakhpur, 1997.
3. श्रीमद्भगवद्गीतारहस्य और कर्मयोगशास्त्र — बालगङ्गाधर तिलक, अपोलो प्रकाशन, दिल्ली, 2008.
4. Śrīmadbhagavadgītārāhasya or Karmayogaśāstra - The Hindu Philosophy of Life, Ethics and Religion, Original Sanskrit Stanzas with English Translation, Bal Gangadhar Tilak & Balchandra Sitaram Sukthankar, J.S.Tilak & S.S.Tilak, 1965.
5. Śrīmadbhagavadgītā - A Guide to Daily Living, English translation and notes by Pushpa Anand, Arpana Publications, 2000.
6. Chinmayananda - The Art of Man Making (114 short talks on the Bhagavadgītā), Central Chinmaya Mission Trust, Bombay, 1991.
7. Sri Aurobindo - Essays on the Gītā, Sri Aurobindo Ashram, Pondicherry, 1987.
8. Srinivasan, N.K. - Essence of Śrīmadbhagavadgītā : Health & Fitness (commentary on selected verses), Pustak Mahal, Delhi, 2006.

[E] Teaching Learning Process

1. Students shall read the text at home and prepare discussion points
2. Teachers and students will read the text in the class – analyzing all grammatical structures
3. Teachers will help students in disjoining sandhis and dissolving compounds
4. Teachers will discuss the themes occurring in various verses in the class and involve students in the discussion
5. Teachers will give an overview of each topic as a lecture
6. A case study based approach may be encouraged to enable students to connect themes and ideas of the text with real life issues.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment Method			
	I.	Basic Structure of Question Paper & Division of Marks	75
		i. Explanation -3 (Unit-1 to 6)	3 x 8 = 24
		ii. Long Question-3 (Unit-1 to 6)	3 x 10 = 33
		iii. Short Notes- 2 (Unit-1 to 6)	2 x 3 = 6
		iv. Critical Question to be answered in Sanskrit -1	07
		v. Short answer Type Questions 2	05
	II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25
		Total Marks : (I+II)	(75+25) = 100

[H] Keyword

Gita, Self Managemnt, Ignorance, Mind, Meditation, Balanced Life, Desirelessness, Devotion, Ego, Frivolous Debates. Gunas etc.

C-5
Classical Sanskrit Literature (Drama)
(12131301)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60+ Tutorials 12

[A] Course Objectives:

This course is intended to acquaint the students with three of the most famous dramatic works of Sanskrit literature which represent the three stages of the development of Sanskrit drama.

[B] Course Learning Outcomes:

After completion of this course the students will be aware about the beauty and richness of classical Sanskrit dramatic tradition. This course will enhance the ability for critical thinking on issues of culture, polity, morality, religion etc as reflected in the prescribed texts. The course will make the students aware of the formal structures of Sanskrit drama in the tradition of Bharata's natya Shastra.

[C] Contents:

Unit: I Svapnavāsavadattam– Bhāsa Act I & VI : Credits : 12

Svapnavāsavadattam: Act I & VI Story, Translation and Explanation.

Unique features of Bhāsa's style, Characterization, Importance of 1st and 6th Act, thematic analysis - Society, Norms of Marriage, Svapnavāsavadattam as a story of 'regains' Exposition of भासो हासः।

Unit: II Abhijñānaśākuntalam– Kālidāsa I & IV : Credits : 12

Abhijñānaśākuntalam : Act I-

- (a) Introduction, Author, Explanation of terms like nāndī, prastāvanā, sūtradhāra, naṭī, viṣkambhaka, vidūṣaka, kañcukī,
- (b) Text Reading (Grammar, Translation, Explanation), Poetic excellence, Plot, Timing of Action. Personification of nature, Language of Kālidāsa, dhvani, Upamā Kālidāsa, Purpose and design behind Abhijñānaśākuntalam and other problems related to texts, popular sayings about Kālidāsa & Śākuntalam.

Abhijñānaśākuntalam Act IV- Text Reading (Grammar, Translation, Explanation), Poetic excellence, Plot, Timing of Action.

Unit: III Mudrārākṣasam – I :

Credits : 10

Mudrārākṣasam: Act I –

(a) Introduction, Author, Purpose and design behind *Mudrārākṣasa*.

(b) Text - Prescribed verses for translation and explanation- 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 14, 16, 18, 19, 21, 22, 24, 26, 27. (Grammar, Translation, Explanation), Poetic excellence, Plot, Timing of Action, thematic analysis

Unit: IV Mudrārākṣasam – II :

Credits : 10

Mudrārākṣasam: Act II - prescribed verses for translation and explanation- 1, 3, 4, 5, 7, 8, 9, 10, 13, 15, 16, 17, 18, 19, 22, and 23, Text Reading (Grammar, Translation, Explanation), Poetic excellence, Plot, Timing of Action, thematic analysis

Unit: V Mudrārākṣasam – III :

Credits: 10

Mudrārākṣasam: Act III - prescribed verses for translation and explanation- 1, 3, 4, 6, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 29, 31 and 33. Text Reading (Grammar, Translation, Explanation), Poetic excellence, Plot, Timing of Action.)

Unit: VI Critical survey of Sanskrit Drama:

Credits : 06

Sanskrit Drama: Origin and Development, Nature of Nāṭaka

Some important dramatists and dramas: Bhāsa, Kālidāsa, Śūdraka, Viśākhadatta, ŚrīHarṣa, Bhavabhūti, Bhaṭṭanārāyaṇa and their works.

[D] Suggested Books/Readings:

1. सुबोधचन्द्र पन्त, अभिज्ञानशाकुन्तलम्, मोतीलाल बनारसीदास, दिल्ली ।
2. सुरेन्द्रदेव शास्त्री, रामनारायण बेनीप्रसाद, अभिज्ञानशाकुन्तलम्, इलाहाबाद ।
3. नारायणराम आचार्य, अभिज्ञानशाकुन्तलम्, निर्णयसागर प्रेस ।
4. C.R.Devadhar (Ed.), Abhijñānaśākuntalam, MLBD, Delhi.
5. M.R. Kale(Ed.), Abhijñānaśākuntalam, MLBD, Delhi.
6. Gajendra Gadakar(Ed.), Bose, Ramendramohan, Abhijñānaśākuntalam, Modern Book Agency, 10 College, Square, Calcutta.
7. जयपाल विद्यालंकार, स्वप्नवासवदत्तम्, मोतीलाल बनारसीदास, दिल्ली ।
8. M.R. Kale (Ed.), Svapnavāsavadattam, M.L.B.D., Delhi.
9. जगदीशचन्द्र मिश्र, मुद्राराक्षसम्, चौखम्बा विद्याभवन, वाराणसी ।
10. निरूपण विद्यालंकार, मुद्राराक्षसम्, साहित्य भण्डार मेरठ ।
11. रमाशंकर त्रिपाठी, मुद्राराक्षसम्, वाराणसी ।
12. M.R. Kale(Ed.), Mudrārākṣasam, MLBD, Delhi.
13. K.T.Telang(Ed.), Mudrārākṣasam, Nag Publishers, Delhi.
14. रमाशंकर तिवारी, महाकवि कालिदास

15. भगवतशरण, उपाध्याय, कालिदास, कवि और काव्य, भारतीय ज्ञानपीठ, काशी.
16. हजारीप्रसाद द्विवेदी, कालिदास की लालित्य योजना, राजकमल प्रकाशन, दिल्ली
17. पंकज कुमार, मिश्र शाकुन्तलविषयक रम्यत्व की अवधारणा, परिमल पब्लिकेशन, दिल्ली

Additional Resources:

1. Minakshi Dalal, *Conflict in Sanskrit Drama*, Somaiya Publication Pvt. Ltd.
2. Ratnamayi Dikshit, *Women in Sanskrit Dramas*, Meherchand Lachhman Das, Delhi.
3. A.B. Keith, *Sanskrit Drama*, Oxford University Press London, 1970.
4. Minakshi Dalal, *Conflict in Sanskrit Drama*, Somaiya Publication Pvt. Ltd.
5. G. K. Bhat, *Sanskrit Drama*, Karnataka University Press, Dharwar 1975.
6. Henry W. Wells, *Six Sanskrit Plays*, Asia Publishing House, Bombay.

[E] Teaching Learning Process

1. Since most learners will be new to classical Sanskrit drama, a step by step approach is recommended.
2. Teachers must read aloud the Sanskrit text and the students should repeat.
3. Teachers must help students in disjoining all sandhis and dissolving all samāśas.
4. Teachers will arrange words in verses according to the prose order (anvaya).
5. Students will identify the grammatical structure of each word.
6. Teachers will guide students in translating each word and then the complete verse.
7. Teachers will discuss the social, political, cultural issues occurring in the text and their contemporary relevance.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 3
 Week 8 – Unit 4
 Week 9 – Unit 4
 Week 10 – Unit 5
 Week 11 – Unit 5
 Week 12 – Unit 6

[G] Assessment Method			
	I.	Basic Structure of Question Paper & Division of Marks	75
	ii	Translation-4 (from unit-1 to 5)	04 x 05 = 20
	ii.	Explanations-3 (from unit-1 to 5)	03 x 08 = 24

	iii.	Questions 02 (Unit 1 to 5) <u>Or</u> short notes	02 x 10 = 20
	iv.	Grammatical notes on underlined words of verses (from Unit s 1 to 4) = 4	4
		Sanskrit Question -1 (Comprehension or text based from 3 rd & 4 th Units)	7
		Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25
		Total Marks : (I+II)	(75+25) = 100

[H] Keyword

Sanskrit drama, Critical survey of Sanskrit Drama, Mudrārākṣasam, Abhijñānaśākuntalam, Svapnavāsavadattam etc.

C-6
Poetics and Literary Criticism
(12131302)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60+ Tutorials 12

[A] Course Objectives:

This course on Poetics and Literary Criticism aims at providing the students with the knowledge of fundamental principles of literary criticism in the Indian tradition on the basis of Kāvya prakāśa and Sahityadarpana.

[B] Course Learning Outcomes:

This course will make students aware of with the skills to assess the merits or demerits of works on poetry, prose and drama. They will be able recognize the various genres of poetry, appreciate the objectives of poetry and also analyze the structure of a work in terms of the essential ingredients of poetry as propounded. Students will be inspired and encouraged to compose.

[C] Contents :

Unit: I Introduction to Sanskrit Poetics: Credits : 10

- Origin and development of Sanskrit poetics,
- its various names- kriyākalpa, alamkāraśāstra, sāhityaśāstra, saundaryaśāstra.
- Lakṣaṇa (definition),
- Prayojana (objectives) and
- Hetu (causes) of poetry. (According to *kāvya prakāśa*)

Unit: II Forms of Kāvya-Literature: Credits : 06

- Forms of poetry: Dṛśya, Śravya, Miśra, (campū)
- Mahākāvya, Khaṇḍakāvya, Gadya-Kāvya: Kathā, Ākhyāyikā (According to Sāhityadarpana)

Unit: III Śabda-śakti: Credits : 12

- Power/Function of word and meaning (according to Kāvya prakāśa).
- Abhidhā (expression/ denotative meaning),
- Lakṣaṇā (indication/ indicative meaning) and
- Vyañjanā (suggestion/ suggestive meaning).

Unit: IV Rasa-sūtra: Credits : 12

- Rasa: Rasa-sūtra of Bharata and its prominent expositions:
 - Utpattivāda,
 - Anumitivāda,
 - Bhuktivāda and
 - Abhivyaktivāda,
- Alaukikatā (transcendental nature) of Rasa (as discussed in Kāvya prakāśa).

Unit: V Figures of speech : Credits: 10

- Figures of speech-
Anuprāsa, Yamaka, Śleṣa, Upamā, Rūpaka, Sandeha, Bhrāntimān, Apahnuti, Utprekṣā, Atiśayokti, Tulyayogitā, Dīpaka, Dṛṣṭānta, Nidarśanā, Vyatireka, Samāsokti, Svabhāvokti, Aprastutaprasaṁsā, Arthāntaranyāsa, Kāvya liṅga and Vibhāvanā.

Unit: VI Sanskrit Meter : Credits : 10

- Metres-
Anuṣṭup, Āryā, Indravajrā, Upendravajrā, Drutavilambita, Upajāti, Vasantatilakā, Mālinī, Mandākrāntā, Śikharinī, Śārdūlavikrīḍita and Sragdharā.

[D] Suggested Books/Readings:

Compulsory Readings:

1. Alaṅkāras according to *Sāhityadarpaṇa* (Ch. X)
2. Metres according to prescribed texts of poetry and drama.
3. *Sāhityadarpaṇa*: (Ch.VIth), Kārikā 6/1,2,313-37
4. Dwivedi, R.C, *The Poetic Light*., Motilal Banarsidas, Delhi.1967.
5. *Kāvya prakāśa*, kārikās 4/27, 28 with explanatory notes.
6. Ray, Sharad Ranjan, *Sāhityadarpaṇa*; Viśvanātha, (Ch I, VI & X) with Eng. Exposition, Delhi.
7. नगेन्द्र, (सं०), काव्यप्रकाश : मम्मटकृत, आचार्य विश्वेश्वर की व्याख्या सहित, ज्ञानमंडल लि०, वाराणसी ।
8. शालिग्राम शास्त्री, साहित्यदर्पण : (व्या०), मोतीलाल बनारसीदास, दिल्ली ।

Additional Resources:

1. बलदेव उपाध्याय, संस्कृत—आलोचना, हिन्दी समिति, सूचना विभाग, उ .प्र., 1963.
2. Kane P.V., *History of Sanskrit Poetics* pp.352-991,
3. Kane, P.V., 1961, *History of Sanskrit Poetics* and its Hindi translation by Indrachandra Shastri, Motilal Banarasidas, Delhi.

[E] Teaching Learning Process

1. Teachers will read and explain the text in the class.
2. Shastra specific terminology will be explained unit-wise.
3. For encouraging application based study the technical terminology of the Shastra will be applied to kavyas like Raghuvamsham , Kiratarjuniyam etc and explained with its context.
4. Topic wise lectures and discussions will be held in the class.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment Method			
	I	Basic Structure of Question Paper & Division of Marks	75
	I	Long Questions-3 (from unit-1 to 4)	03x 10 = 30
	ii.	Short notes- 02 (from unit-1 to 4)	02 x 05 = 10
	iii.	Almkara definition with examples-2 (5 th unit)	2 x 07 = 14
	iv.	Chhands Definition with examples (6 th unit)	02 x 07 = 14
	v.	Sanskrit Question-1	07
	II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25
		Total Marks : (I+II)	(75+25) = 100

[H] Keyword

Sanskrit Poetics, *Kavyaprakash*, *Sahityadarpana* , alamkāra ,chandas etc.

C-7
Indian Social Institutions and Polity
(12131303)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60 + Tutorials 12

[A] Course Objectives:

The aim of this course is to make the students acquainted with various aspects of social institutions and Indian polity as propounded in the ancient Sanskrit texts such as Samhitās, Mahābhārata, Purāṇa, Kauṭilya's Arthaśāstra and other works from Dharma śāstra and Nītiśāstra.

[B] Course Learning Outcomes:

After the completion of this course students will be able to connect the theoretical model propounded by the prescribed texts in the forms of saptanga theory, shadguna theories and mandala theories with contemporary governance issues. The learners will be able to see Dharma as dynamic institution. This will free them from the traces of fundamentalism and they should become more open minded and liberal. Learning and developing a critical approach about the institution of caste and women's issues will make the participants sensitive to discriminating practices.

[C] Contents:

Unit: I Indian Social Institutions: Nature and Concepts Credit : 10

- Sociological Definition of Social Institutions.
 - Trends of Social Changes, Sources of Indian Social Institutions (Vedic Literature, Sūtra Literature, Purāṇas, Rāmāyaṇa, Mahābhārata, Dharmaśāstras, Buddhist and Jain Literature, Literary Works, Inscriptions, Memoirs of Foreign Writers)
- Social Institutions and Dharmaśāstra Literature:
 - Dharmaśāstra as a special branch of studies of Social Institutions, sources of Dharma (Manusmṛti, 2.12; Yājñavalkyasmṛti, 1.7).
- Different kinds of Dharma in the sense of Social
 - Ethics (Manusmṛti, 10.63; Viṣṇupurāṇa 2.16-17);
- Six kinds of Dharma in the sense of Duties (Mitākṣarāṭīkā on Yājñavalkyasmṛti, 1.1).
- Tenfold Dharma as Ethical Qualities (Manusmṛti, 6.92);
- Fourteen-Dharmasthānas (Yājñavalkyasmṛti, 1.3)
 - Varṇa-System and Caste System:
- Four-fold division of Varṇa System, (Ṛgveda, 10.90.12), Mahābhārata, Śāntiparva, 72.3-8);
- Division of Varṇa according to Guṇa and Karma (Bhagvadgītā 4.13, 18.41-44).

- Origin of Caste-System from Inter-caste Marriages
- (Mahābhārata, Anuśāsanaparva, 48.3-11);
- Emergence of non-Aryan tribes in Varna-System
- (Mahābhārata, Śāntiparva, 65.13-22).
- Social rules for up-gradation and down-gradation of Caste System (Āpastambadharmasūtra, 2.5.11.10-11, Baudhāyanadharmasūtra, 1.8.16.13-14, Manusmṛti, 10.64, Yājñavalkyasmṛti, 1.96)
- Position of Women in the Society: Brief survey of position of women in different stages of Society.
- Position of women in Mahābhārata (Anuśāsanaparva, 46.5-11, Sabhāparva, 69.4-13.
- Praise of women in The Bṛhatsamhitā of Varāhamihira (Strīprasamsā, chapter-74.1-10)
- Social Values of Life:
- Social Relevance of Indian life style with special reference to Sixteen Saṃskāras.
- Four aims of life 'Puruṣārtha Catuṣṭaya'-1. Dharma, 2. Artha, 3. Kāma, 4. Mokṣa.
- Four Āśramas- 1. Brahmacharya, 2. Gṛhastha, 3. Vānaprastha, 4. Saṃnyāsa

Unit: II Social Institutions and Dharmaśāstra Literature: Credits : 06

- Dharmaśāstra as a special branch of studies of Social Institutions
- Sources of Dharma (Manusmṛti, 2.12; Yājñavalkyasmṛti, 1.7).
- Different kinds of Dharma in the sense of Social Ethics Manusmṛti, 10.63; Viṣṇupurāṇa 2.16-17);
- Six kinds of Dharma in the sense of Duties (Mitākṣarāṭīkā on Yājñavalkyasmṛti, 1.1).
- Tenfold Dharma as Ethical Qualities (Manusmṛti, 6.92);
- Fourteen-Dharmasthānas (Yājñavalkyasmṛti, 1.3)

Unit: III Indian Polity: Origin and Development : Credits : 12

- Initial stage of Indian Polity (from Vedic period to Buddhist period).
- Election of King by the people: 'Viśas' in Vedic period (Ṛgveda, 10.173;10.174; Atharvaveda,3.4.2; 6.87.1-2).
- Parliamentary Institutions: 'Sabhā', 'Samiti' and 'Vidatha' in Vedic period (Atharvaveda,7.12.1;12.1.6 ; Ṛgveda,10.85.26);
- King-maker 'Rājakartāraḥ' Council in Atharvaveda (3.5.6-7), Council of 'Ratnis' in
- śatapathabrāhmaṇa (5.2.5.1); Coronation Ceremony of Samrāt in śatapathabrāhmaṇa (5.1.1.8-13; 9.4.1.1-5)
- Republic States in the Buddhist Period (Digghnikāya, Mahāparinibbāṇa Sutta, Aṅguttaranikāya,1.213;4.252,256)

Unit: IV Later Stages of Indian Polity (From Kauṭilya to**Mahatma Gandhi)****Credits : 10**

- Concept of Welfare State in Arthaśāstra of Kauṭilya (Arthaśāstra, 1.13: 'Matsyanyāyābhibhūth' to 'yo' Asmāṅgopāyatīti');
- Essential Qualities of King (Arthaśāstra, 6.1.16-18: Sampādayatyasampannaḥ' to 'Jayatyeva na Hīyate');
- State Politics 'Rajadharma' (Mahābhārata, Śāntiparva, 120.1-15; Manusmṛti, 7.1-15; Śukranīti, 1.1-15);
- Constituent Elements of Jain Polity in Nitivākyāmṛta of Somadeva Suri, (Daṇḍanīti- samuddeśa, 9.1.18 and Janapada- samuddeśa, 19.1.10).
- Relevance of Gandhian Thought in Modern Period with special reference to 'Satyāgraha' Philosophy ('Satyāgrahagītā' of Panditā Kṣamārāva and 'Gandhi Gītā', 5.1-25 of Prof. Indra)

Unit: V Cardinal Theories and Thinkers of Indian Polity**Credits: 12**

- 'Saptāṅga' Theory of State: 1. Svāmi, 2. Amātya, 3. Janapada 4. Pura, 5. Kośa, 6. Daṇḍa and 7. Mitra (Arthaśāstra, 6.1. Mahābhārata, Śāntiparva, 56.5, Śukranīti, 1.61-62).
- 'Maṇḍala' Theory of Inter-State Relations: 1. Ari, 2. Mitra, 3. Ari-mitra, 4. Mitra-mitra, 5. Ari-mitra-mitra;
- Śāḍgunya' Policy of War and Peace : 1. Sandhi, 2. Vighraha, 3. Yāna, 4. Āsana, 5. Saṁśraya 6. Dvaidhibhāva.
- 'Caturvidha Upāya' for Balancing the power of State: 1. Sāma 2. Dāma, 3. Daṇḍa. 4. Bheda;
- Three Types of State Power 'Śakti': 1. Prabhu-śakti, 2. Mantra-śakti, 3. Utsāha-śakti.

Unit: VI Important Thinkers of Indian Polity**Credits : 10**

Manu, Kautilya, Kāmandaka, Śukrācārya, Somadeva Suri, Mahatma Gandhi.

[D] Suggested Books/Readings:

1. कपूर, अनूपचन्द राजनीतिविज्ञान के—सिद्धान्त, प्रीमियर पब्लिशिंग हाउस, दिल्ली, 1967
2. काणे, पी.वी., धर्मशास्त्र का इतिहास) 1—4 भाग(, अनु० अर्जुन चौबे काश्यप, हिन्दी समिति, लखनऊ, 1966-73
3. जायसवाल सुवीरा- वर्ण जातिव्यवस्था: उद्भव, प्रकार्य और रूपान्तरण, दिल्ली, 2004
4. ,Hindu Social Organization -Prabhu P.H. Popular Prakashan, Mumbai, 1998
5. जैन, कैलाशचन्द्र, प्राचीनभारतीय सामाजिक और आर्थिक संस्थाएं, मध्यप्रदेश हिन्दी ग्रन्थ अकादमी,, भोपाल, 1976
6. ठाकुर, आद्यादत्त, वेदों में भारतीय संस्कृति, हिन्दीसमिति, लखनऊ, 1967
7. नाटाणी, प्रकाशनारायण, प्राचीनभारत के राजनीतिक विचारक, पोइन्टर पब्लिशर्स, जयपुर, 2002
8. वाजपेयी, अम्बिकाप्रसाद, हिन्दूराज्य शास्त्र, प्रयाग, संवत् 2006

9. विद्यालंकार, सत्यकेतु, प्राचीन भारतीय शासनव्यवस्था और राजशास्त्र, सरस्वतीसदन, मसूरी, 1968
10. सहाय, शिवस्वरूप, प्राचीनभारत का सामाजिक एवं आर्थिक इतिहास, मोतीलालबनारसीदास, दिल्ली, 2012

Additional Resources:

1. नीतिवाक्यामृतम्, सोमदेवसूरिविरचित, व्यासरायचन्द्र मालवीय, चौखम्बा विद्याभवन, वाराणसी, 1972
2. शुक्रनीति, हिन्दी अनुवाद, ब्रह्मशंकर मिश्र, चौखम्बा संस्कृतसीरीज, वाराणसी, 1968
3. सत्याग्रहगीता, पण्डिता क्षमाराव, पेरिस, 1932
4. नारायण, इकबाल, आधुनिक राजनीतिक विचारधाराएं, ग्रन्थविकास, जयपुर, 2001
5. मिश्र, जयशंकर, प्राचीनभारत का सामाजिक इतिहास, बिहार हिन्दीग्रन्थ अकादमी, पटना, 1974
6. मोहनचन्द, जैन संस्कृत महाकाव्यों में भारतीय समाज, ईस्टर्नबुकलिंगर्स, दिल्ली, 1989
7. सिन्हा विनोद एवं रेखा सिन्हा, प्राचीन भारतीय इतिहास एवं राजनैतिक चिन्तन, राधा पब्लिकेशन्स, दिल्ली, 1989।

[E] Teaching Learning Process

Teachers will explain the contents of the text and involve students in the discussion on relevant issues. Caste and women's issues must be highlighted through newspaper reports and leading cases. Examination questions should be so framed as to focus on contemporary problems.

While reading the sections on polity students must be encouraged to connect their study of theory with how international diplomacy is being conducted today, particularly in India's neighbourhood. A case study based approach may be encouraged. News items, articles and opeds on foreign policy and governance issues must be studied as a part of the course and examination questions should require a thorough reading of these articles.

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3
- Week 6 – Unit 3
- Week 7 – Unit 4
- Week 8 – Unit 4
- Week 9 – Unit 5
- Week 10 – Unit 5
- Week 11 – Unit 6
- Week 12 – Unit 6

[G]	Assessment Method			
	I		Basic Structure of Question Paper & Division of Marks	75
		I	Long Questions -4 (from 1-6 Units)	04 x 15 = 60
		ii.	Short notes - 3 (from unit-1 to 4)	03 x 3 = 9
		iii.	One explanation in Sanskrit	01x 6 = 6
	II		Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25
			Total Marks : (I+II)	(75+25) = 100

[H] Keyword

Indian Society, Social Issue, Ancient Polity, Social Institutions and Dharmaśāstra Literature etc.

C-8
Indian Epigraphy, Paleography and Chronology
(12135908)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60+ Tutorials 12

[A] Course Objectives:

This course intends to provide students the knowledge of inscriptions in India through the ages. They get to study the development of various scripts including Brahmi and Kharoshthi used in ancient India. The course will further help students to co-relate various historical facts, chronology, literary elements and other information contents available in the inscriptions.

[B] Course Learning Outcomes:

This course will equip students with the necessary tools for the study of Indian inscriptions. They will learn ancient scripts and use their knowledge in studying more inscriptions later. Students will be able to read, collate and interpret inscriptions to reconstruct history. Thus, it will be useful for students who are interested in pursuing advance study in archaeology.

[C] Contents:

Unit: I	Epigraphy:	Credits : 08
	<ul style="list-style-type: none"> • Introduction to Epigraphy and Types of Inscriptions. • Importance of Indian Inscriptions in the reconstruction of Ancient Indian History and Culture • History of Epigraphical Studies in India • History of Decipherment of Ancient Indian Scripts (Contribution of Scholars in the field of epigraphy): Fleet, Cunningham, Prinsep, Buhler, Ojha, D.C.Sircar. 	
Unit: II	Paleography:	Credits : 10
	<ul style="list-style-type: none"> • Antiquity of the Art of Writing • Writing Materials, Inscribers and Library • Introduction to Ancient Indian Scripts. 	
Unit: III	Study of selected inscriptions:	Credits : 12
	<ul style="list-style-type: none"> • Aśoka's Giranāra Rock Edict-1 • Aśoka's Sāranātha Pillar Edict 	

Unit: IV Study of selected inscriptions: Credits : 12

- Girnāra Inscription of Rudradāman
- Eran Pillar Inscription of Samudragupta

Unit: V Study of selected inscriptions Credits: 12

- Mehrauli Iron Pillar Inscription of Candia
- Delhi Topra Edict of Bīsaladeva

Unit: VI Ancient Indian Chronology Credits : 06

- General Introduction to Ancient Indian Chronology
- System of Dating the Inscriptions (Chronograms)
- Main Eras used in Inscriptions – Kali Era, Vikrama Era, Śaka Era and Gupta Era

[D] Suggested Books/Readings:**Compulsory Readings:**

1. सैनी, रणजीत सिंह, *अभिलेख-मंजूषा*, न्यूभारतीय बुक कार्पोरेशन, दिल्ली, 2000.
2. झा बन्धु, *उत्कीर्णलेखपञ्चकम्*, वाराणसी, 1968.
3. राणा, एस.एस., *भारतीय अभिलेख*, भारतीय विद्याप्रकाशन, दिल्ली, 1978.
4. भारतीय प्राचीन लिपिमाला, गौरीशंकरहीराचन्द ओझा, अजमेर, 1918.
5. नारायण, अवध किशोर एवं ठाकुरप्रसाद वर्मा : प्राचीनभारतीय लिपिशाला और अभिलेखिकी , वाराणसी, 1970.
6. पाण्डे, राजबली : भारतीय पुरालिपि, लोकभारती प्रकाशन, इलाहाबाद, 1978.
7. राही, ईश्वरचन्दः लेखनकला का इतिहास) खण्ड 1—2), उत्तरप्रदेश हिन्दीसंस्थान, लखनऊ, 1983.
8. सरकार, डी.सी. : भारतीय पुरालिपिविद्या, (हिन्दीअनु० (कृष्णदत्त वाजपेयी, विद्यानिधि प्रकाशन, दिल्ली, 1996.
9. Select Inscriptions (Vol.I) - D.C. Sircar, Calcutta, 1965
10. Dani, Ahmad Hasan: *Indian Paleography*, Oxford, 1963.

Additional Resources:

1. काम्बोज, जियालाल, *उत्कीर्णलेखस्तवकम्*, ईस्टर्न बुकलिंगर्स, दिल्ली.
2. सहाय, शिवस्वरूप : भारतीय पुरालेखों का अध्ययन, मोतीलाल बनारसीदास, दिल्ली .
3. मुले, गुणाकर : अक्षरकथा, प्रकाशनविभाग, भारतसरकार, दिल्ली, 2003.
4. ब्यूलर, जॉर्ज : भारतीय पुरालिपि शास्त्र, (हिन्दीअनु० (मङ्गलनाथ सिंह, मोतीलाल बनारसीदास, दिल्ली, 1966
5. Satyamurty, K. : *Text Book of Indian Epigraphy*, Lower Price Publication, Delhi, 1992.
6. Pillai, Swami Kannu & K.S. Ramchandran: *Indian Chronology (Solar, Lunar and Planetary)*, Asian Educational Service, 2003.

[E] Teaching Learning Process

Merely translating will not be sufficient for proper understanding of inscriptions. Teachers should bring out the historical significance of the material available in the inscriptions. Visits to historically important sites, especially related to the inscriptions under-study, will be important.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment Method**I. Basic Structure of Question Paper & Division of Marks****75**

- | | |
|---|--------------|
| i. Long Questions -03 (1-6 Units) | 03x 10 = 30 |
| ii. Short notes- 04 (1-6 Units) | 04 x 5 = 20 |
| iii. Short Answer Type Questions - 9 (Limit 50 words) | |
| iv. (from all Units) | 09 x 02 = 18 |
| v. Sanskrit Question-1 | = 7 |

II . Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)**25**

Total Marks : (I+II) (75+25) = 100

[H] Keyword

Dharma-lipi, samaja, devanampriya, priyadarshi, mahamatra, sangha-bheda, kshatrapa,karmasachiva, matisachiva, svabhujarjitam, lila-mandira, karmajitavani, Hultzch, Princep, Bulher, J.F.Fleet, Asiatic Society of Bengal, G.H.Ojha, D.C.Sircar, C.S.Upasak, A.H.Dani

C-9
Modern Sanskrit Literature
(12131402)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60+ Tutorials 12

[A] Course Objectives:

The purpose of this course is to expose students to the rich & profoundly active tradition of modern creative writing in Sanskrit, enriched by new genres of writing.

[B] Course Learning Outcomes:

This course will enable the students to appreciate the Mahākāvya and Charitakāvya, Gadyakāvya, Rūpaka, Gītikāvya and Other genres and General Survey of Modern Sanskrit Literature. It will create an awareness of the modern historicity of the modern Sanskrit literature.

[C] Contents:

Unit: I Mahākāvya and Charitakāvya: Credits : 12

- Svātantryasambhavam (Revaprasada Dwivedi) Canto 2, Verses 1-45
- Bhīmāyanam (Prabha Shankar Joshi)
Canto X. Verses 20-29;
Canto - XI. Verses 13-20 & 40-46.

Unit: II Gadya and Rūpaka: Credits : 10

- Śataparvikā (Abhirāja Rajendra Mishra)
- Śārdūla-Śakatam (Virendra Kumar Bhattacharya) – Intensive study of first three acts and general understanding of the rest

Unit: III Gitikāvya : Credits : 12

- Bhatta Mathurna Nath Shastri (Kundaliyān),
- BacchuLal Avasthi Jñāna (Kā ete, Kva Yataste),
- Srinivasa Rath (Katamā Kavitā) etc.

Unit: IV Other genres: Credits : 10

- Hariram Acharya (Sankalpa Gitih);
- Pushpa Dikshit (Bruhi kosminYuge..)
- RadhaVallabh Tripathi (Dhivaragitih – Naukamiha saram saram...)
- Harshdev Madhava: Haiku - Snanagrihe, Vedanā, Mrityuh1, Mrtyuh 2; Khanih;
- Shatāvadhāni R. Ganesh (Kavi-Viśādah, Varṣāvibhūtiḥ –selected verses)

Unit: V General Survey: Credits: 10

Pandita Kshama Rao, P.K. Narayana Pillai, S. B. Varnekar, Parmanand Shastri, Reva Prasad Dwivedi, Janaki Vallabh Shastri, Ram Karan Sharma.

Unit: VI General Survey : Credits : 06

Jagannath Pathak, S. Sunderrajan, Shankar Dev Avatare
Haridas SiddhantaVagish, Mula Shankar M. Yajnika, Mahalinga Shastri, Leela Rao Dayal, Yatindra Vimal Chowdhury, Virendra Kumar Bhattacharya and their works.

[D] Suggested Books/Readings:

Compulsory Readings:

1. मिश्र अभिराज राजेन्द्र, कल्पवल्ली) समकालीनसंस्कृतकाव्यसंकलन—(साहित्य अकादमी, 2013
2. प्रभाशंकर जोशी, भीमायनम्, शारदा गौरव ग्रन्थमाला, पुणे
3. त्रिपाठी राधावल्लभ, नवस्पन्दः, मध्य प्रदेश हिन्दी ग्रन्थ अकादमी
4. त्रिपाठी राधावल्लभ, आयतिः, राष्ट्रिय संस्कृत संस्थान, दिल्ली.
5. पन्त, गिरीश चन्द्र) सम्पा०(, आधुनिकसंस्कृत-साहित्य-संचयन, विद्यानिधि प्रकाशन, दिल्ली, 2008.
6. श्रीनिवासरथ, तदेव गगनं सैव धरा)काव्यसंग्रह(, राष्ट्रिय संस्कृत संस्थान, दिल्ली.
7. मिश्र, अभिराज राजेन्द्र, विंशशताब्दी- संस्कृत-काव्यामृतम्,) संक० (भाग—1)

Additional Resources:

1. उपाध्याय, रामजी, आधुनिकसंस्कृतनाटक, चौखम्बासुरभारती प्रकाशन, वाराणसी, 1996.
2. त्रिपाठी, राधावल्लभ, संस्कृतसाहित्य : बीसवीं शताब्दी, राष्ट्रिय संस्कृत संस्थान, दिल्ली, 1999.
3. भार्गव, दयानन्द, आधुनिकसंस्कृतसाहित्य, राजस्थानी ग्रन्थागार, जोधपुर, 1987.
4. मीरा द्विवेदी, आधुनिक संस्कृत महिला नाटककार, परिमल पब्लिकेशन्स, दिल्ली, 2000.
5. रुचि कुलश्रेष्ठ, बीसवीं शताब्दी का संस्कृतलघुकथासाहित्य, राष्ट्रिय संस्कृतसंस्थान, दिल्ली, 2008.
6. कलानाथ शास्त्री, आधुनिक काल का संस्कृत गद्य—साहित्य, राष्ट्रिय संस्कृतसंस्थान, दिल्ली, 1995.
7. शुक्ल, हीरालाल, आधुनिकसंस्कृतसाहित्य, रचनाप्रकाशन, इलाहाबाद, 1971.
8. Joshi, K.R. & S.M. Ayachuit , *Post Independence Sanskrit Literature*, Nagpur, 1991.
9. Prajapati, Manibhai K., *Post Independence Sanskrit Literature: A Critical Survey*, Patna, 2005.
10. UshaSatyavrat *Sanskrit Dramas of the Twentieth Century*, Mehar Chand Lachmandas, Delhi, 1987.
11. Dwivedi, Rahas Bihari, *AdhunikMahakāvya Samikshanam*.
12. Tripathi, RadhaVallabh, *Sanskrit SahityaBeesaveenShatabdi* , 1999, Delhi
13. Musalgaonkar, Kesava Rao, *Adhunik Sanskrit KāvyaParampara*, 2004
14. Naranga, S.P., Kalidas Punarnava,

[E] Teaching Learning Process

1. Teachers must read aloud the Sanskrit text and the students should repeat.
2. Teachers must help students in disjoining all sandhis and dissolving all samāsas.
3. Teachers will arrange the words according to the prose order (anvaya) of verses.

4. Students will identify the grammatical structure of each word.
5. Teachers will guide students in translating each word and then the complete verse.
6. Teachers will discuss the social, political, cultural issues occurring in the text and their contemporary relevance.
7. Teachers may also analyze the text according to the principles of traditional Sanskrit poetics. A variety of approaches to teaching-learning process, including seminars, tutorials, workshops, peer teaching and learning, practicum and project-based learning, field-based learning, etc will be applied in this course.
8. The 6 E's and S (Engage, Explore, Explain, Elaborate, Evaluate, Extend, and Standards) should be used.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment Method

I.	Basic Structure of Question Paper & Division of Marks	75
i	Translation-4 (from unit-1 to 4)	04 x 05 = 20
ii.	Explanations-4, (from unit-1 to 4)	03 x 08 = 24
iii.	Questions 02 (Unit 1 to 4) <u>Or</u> short notes	10 x 02 = 20
iv.	Grammatical notes on underlined words of verses (from Unit s 1 to 4) = 4	4
v.	Sanskrit Question -1 (Comprehension or text based from 3 rd & 4 th Units)	7
II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25
	Total Marks : (I+II)	(75+25) = 100

[H] Keyword

Modern Sanskrit Literature, Mahākāvya, Gītikāvya, Kumārasambhavam, Raghuvamśam, Kirātārjunīyam, Nīṭisatakam, Modern Sanskrit Poetry, etc.

C-10
Sanskrit World Literature
(12131403)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60 + Tutorials 12

[A] Course Objectives:

This course aims to expose students to the spread & influence of Sanskrit literature and culture through the ages in various parts of the world.

[B] Course Learning Outcomes:

Scholars who pursue this course will learn about the cultural contacts between India on the one hand and Europe, West Asia and South East Asia on the other during different phases of history. They will also see how colonialism distorted India's achievements in knowledge production.

They will become aware of Indo European linguistic and cultural affinities, spread of Indian fables, the Upanishads, the Gita and Kalidasa's works in the west. They will be able to appreciate the close relation between Upanishadic thought and Sufism.

They will study how Sanskrit literature has impacted India's cultural ties with South East Asian countries.

[C] Contents :

Unit: I Survey of Sanskrit Literature in the World: Credits : 08

- Approaches in the west to Indian literature – Romanticism to the colonialist agenda
- Vedic elements in the Avesta and Greek and Roman religions
- Presence of Sanskrit words in Indo-European languages

Unit: II Upaniṣads and Gītā in the West: Credits : 10

- Dara Shikoh's Persian translation of the Upaniṣads and its influence on Sufism
- Impact of the Upaniṣads on western thought
- Translation of the Gītā in European languages and their impact on religious and philosophical thought of the west.

Unit: III Sanskrit Fables in World Literature: Credits : 14

- Translation of Pañcatantra in Eastern and Western Languages.
- Translation of Vetālapañcaviṃśatikā, Simhāsanadvātriṃśikā and Śukasaptati in Eastern countries.
- Illustrated Sanskrit texts in medieval India – Ramayana, Mahabharata, Gita Govinda, Suka saptati, Chaurapanchashika and others.

Unit: IV Rāmāyaṇa and Mahābhārata in South East Asia: Credits : 14

- RāmaKathā in South East Asia
- Rāmāyana and Mahābhārata in folk cultures of South East Asia

Unit: V Kālidāsa in the West Credits: 4

- English and German translations of Kālidāsa's works and their influence on western literature and theatre.

Unit: VI Sanskrit Studies across the World: Past and Present Credits : 10

- Sanskrit Studies in Asia (China and Japan)
- Sanskrit Studies in Europe (England, France and Germany)
- Sanskrit Studies in America (USA and Canada)

[D] Suggested Books/Readings:**Compulsory Readings:**

1. arisebharat.com/2011/10/22/impact-of-bhagvad-gita-on-west/
2. Mahulikar, Gauri, Effect of Ramayana On Various Cultures And Civilisations, Ramayana Institute.
3. Neria H. Hebber, Influence of Upaniṣads in the West, Boloji.com. Retrieved on : 2012-03-02.
4. Europe and India, Halbfass William, Motilal Banarasi Dass, Delhi, (free download available)
5. Video of London 2009 ICR Illustrated Lecture on the Westward Migration of Panchatantra from India.
6. Swami Tathagatananda, Journey of the Upanishads in the West,
7. Swami Tathagatananda, Light from the Orient
8. The Rāmāyana Tradition in Asia, Dr. V. Raghavan Ed.

Additional Resources:

1. Ben-Ami Scharfstein (1998), A Comparative History of World Philosophy: From the Upaniṣads to Kant, State University of New York Press, ISBN 978-0791436844, page 376.
2. Edgerton, Franklin (1924), *The Pañcatantra Reconstructed* (Vol.1: Text and Critical Apparatus, Vol.2 : Introduction and Translation), New Haven, Connecticut: American Oriental Series. Volumes 2-3.
3. Banarji, Suresh Chandra- 'Influence of Sanskrit outside India, A Companion to Sanskrit Literature, MLBD, 1971.
4. Excerpt from Wood's 2008 update of *Kalila and Dimna- Fables of Friendship and Betrayal*.
5. Falconer, Ion Keith (1885), *Kalilah and Dimnah or The Fables of Bidpai*, Cambridge University Press, Amsterdam, 1970.
6. Hertel, Johannes(1908-15), *The Pañcatantra : a collection of ancient Hindu tales, in the recension called Pañcākhyānaka*, and dated 1199 A.D., of the Jaina monk,

- Pūrṇabhadra, critically edited in the original Sanskrit, Harvard Oriental Series Volume 11,12,13, 14.
7. *History of Sanskrit Literature*, A Berriedale Keith, Motilal Banarsidas Publishers Pvt. Limited, India, 1993.
 8. *History of the Migration of Pañcatantra*.
 9. Ibn al- Muqaffa, Abd'allah, *Calila e Dimna*, Eds. Juan Manuel Cacho Bleuca and Maṛia Jesus Lacarra, Madrid: Editorial Castalia, 1984.
 10. Ibn al- Muqaffa, Abdallah, *Kalilah Et Dimnah*, Ed. P. Louis Cheiko. 3 ed. Beirut: Imprimerie Catholique, 1947.
 11. Jacobs, Joseph (1888), *The earliest English version o the Fables of Bidpai*, London.
 12. James A. Hijiya, "The Gita of Robert Oppenheimer" Proceeding of the American Philosophical Society, 144, no. 2 (Retrieved on 27 February 2011).
 13. The Bhagavad Gita and the West: The Esoteric Significance of the Bhagavad Gita and Its Relation to the Epistles of Paul", by Rudolf Steiner, p. 43.
 14. रमेश भारद्वाज — नवजागरण एवं स्वतन्त्रता आन्दोलन में उपनिषदों की भूमिका, विद्यानिधि, दिल्ली
 15. Kāśīnāth Pāṇḍuraṅga Paraba, ed. (1896), *The Pañcatantra of Viṣṇuśarma*, Tukārām Jāvajī, <http://books.google.com/-id=K71WAAAAYAAJ->, Google Books.
 16. Katchbull, Rev. Wyndham (1819), *Kalila and Dimna or The Fables of Bidpai*, Oxford, (Translated from Silvestre de Stacy's laborious 1816 collation of different Arabic manuscripts)
 17. Mark B. Woodhouse (1978), *Consciousness and Brahman-Atman*, *The Monist*, Vol. 61, No.1, Conceptions of the Self: East & West (January, 1978), pages 109-124.
 18. Olivelle, Patrick (2006), *The Five Discourses on Worldly Wisdom*, Clay Sanskrit Library.
 19. Pandit Guru Prasad Shastri (1935), *Pañcatantra with the commentary Abhinavarajalaxmi*, Benares: Bhargava Pustakalaya.
 20. Patrick Olivelle (2014), *The Early Upaniṣads*, Oxford University Press, ISBN 978-0195124354, page 12-14.
 21. Rajan, Chandra (trans.) (1993), *Viṣṇuśarma: The Pañcatantra*, London : Penguin Books, ISBN-9780140455205-(reprint : 1995) (also from the North Western Family text.
 22. Rohman, Todd (2009). "The Classical Period". In Watling, Gabrielle, Quay, Sara.
 23. S Radhakrishnan, *The Principal Upanishads* George Allen & Co., 1951, pages 22, Reprinted as ISBN 978-8172231248
 24. The Gita of J. Robert Oppenheimer" by JAMES A. HIJIYA, Professor of History, University of Massachusetts Dartmouth (PDF file)

Additional Resources:

25. कालिदास ग्रन्थावली, सम्पा. रेवा प्रसाद द्विवेदी, काशी हिन्दू विश्वविद्यालय, वाराणसी, 1986.
26. *The Pañcatantra*, Viṣṇuśarma, translated from Sanskrit with an Introduction by Chandra Rajan, Penguin Books, India, 1993.
27. *Pañcatantra*, <http://en.wikipedia.org/wiki/Panchatrantra>, retrieved on Feb 1, 2008.
28. Valmiki's Ramayana illustrated with Indian miniatures from the 16th to the 19th Century 2012, Editions Diane de Selliers, ISBN 9782903656168
29. Wilkinson (1930), *The Lights of Canopus described by J V S Wilkinson*, London: The studio.
30. Winternitz, M. *Some Problems of Indian Literature* –Munshiram Manoharlal, Delhi, 1978
31. Viṣṇuśarma, http://en.wikipedia.org/wiki/Vishnu_Sarma, retrieved on Feb 1, 2008.

32. [Bhagavad Gita - World Religions](#)
33. [AWAKENING - Google Books Result.](#)
34. <http://en.wikipedia.org/wiki/Panchatantra>".
35. <https://books.google.co.in/books?isbn=8184002483>
36. www.comparativereligion.com/Gita.html
37. [Impact of Bhagvad Gita on West | Arise Bharat](#)

[E] Teaching Learning Process

Multiple pedagogic techniques are to be used in imparting the knowledge of the topics.

- Lectures and Power-point presentations by teachers
- students should explore the internet for materials
- regular Quizzes
- Talks /workshops

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 2
- Week 3 – Unit 2
- Week 4 – Unit 3
- Week 5 – Unit 3
- Week 6 – Unit 4
- Week 7 – Unit 4
- Week 8 – Unit 4
- Week 9 – Unit 5
- Week 10 – Unit 5
- Week 11 – Unit 5
- Week 12 – Unit 6

[G] Assessment Method			
	I.	Basic Structure of Question Paper & Division of Marks	75
	i	Long Questions - 04 (1-5 Units)	04x 15= 60
	ii.	Short notes- 02 (1-6 Units) one of which shall be answered in Sanskrit	02 x 7.5 =15
	II	Internal Assessment (Project/Assignment/ Paper presentation/ Periodic quizzes	25
		Total Marks : (I+II)	(75+25) = 100

[H] Keywords

Sanskrit and World, Sanskrit literature in the World

C-11 Vedic Literature (12131501)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60+ Tutorials 12

[A] Course Objectives:

This course on Vedic literature aims to introduce three Vedic Saṁhitās and Vedic Grammar to Bachelor Degree students. Students will also be able to read and know about the contents of one famous Upaniṣad, namely, Muṇḍaka Upaniṣad, which propounds basic Vedānta-view. It will also facilitate the students to know about philosophical, moral, and scientific principles including the source of Indian Intellectual traditions of Vedic period .

[B] Course Learning Outcomes:

By reading these texts, students will have an impression of the depth of Vedic knowledge and will be able to realize that ideas of Vedic seers are based on philosophical, moral, and scientific principles.

By understanding them, students will be able to know and achieve some higher attributes from Vedic heritage about our culture, morals, and thoughts. Thus they may develop curiosity to know more about other Vedic texts and concepts as well.

After completing this course students will surely be able to communicate about some important Vedic verses with their meaning and teaching, and thus fundamentals of religious life of India will be revealed to them in its true form.

Students will understand the strength of Unity, power of mind, and will realize the importance of earth in their life. From the study of *Upaniṣad* they will know about philosophical and Psychological insights of our ancestors and can develop this learning further for the benefit of themselves in particular and society in general.

[C] Contents:

Unit: I Vedic Saṁhitās: Ṛgveda-

Credits : 12

- Agni Sūkta- 1.1,
- Uṣas Sūkta - 3.61,
- Akṣa Sūkta-10.34,
- Hiranyagarbha Sūkta - 10.121

Unit: II

Vedic Saṁhitās: Yajurveda

Credits : 12

	<ul style="list-style-type: none"> • Śivasamkalpa Sūkta - 34.1-6 	
Unit: III	Vedic Samhitās : Atharvaveda:	Credits : 12
	<ul style="list-style-type: none"> • Sāmmanasyam Sūkta- 3.30, • Bhūmi Sūkta - 12.1-12 	
Unit: IV	Muṇḍakopaniṣad:	Credits : 06
	<ul style="list-style-type: none"> • Muṇḍakopaniṣad - 1.1 to 2.1 	
Unit: V	Muṇḍakopaniṣad:	Credits: 06
	<ul style="list-style-type: none"> • Muṇḍakopaniṣad – 2.2 to 3.2 	
Unit: VI	Vedic Grammar:	Credits: 12
	<ul style="list-style-type: none"> • Śabdarūpa (Declensions), • Leṭ Lakāra (Subjunctive Mood), • Ktvārthaka (Gerunds), • Tumārthaka (Infinitives), • Vedic Svāra (Accent) and • Padapāṭha. 	

[D] Suggested Books/Readings:

Compulsory Readings:

1. ऋग्वेदसंहिता) सायणाचार्यकृत भाष्य एवं हिन्दी व्याख्या सहित(, रामगोविन्द त्रिवेदी, चौखम्बा संस्कृत प्रतिष्ठान, दिल्ली.
2. शुक्लयजुर्वेदसंहिता, (उव्वट-महीधर भाष्य संवलित (तत्त्वबोधिनीहिन्दी व्याख्या सहित, रामकृष्ण शास्त्री, चौखम्बा संस्कृत प्रतिष्ठान, दिल्ली.
3. मुण्डकोपनिषद्) शाङ्करभाष्य संवलित(, जिया लाल काम्बोज, ईस्टर्न बुक लिंकर्स, दिल्ली.
4. मुण्डकोपनिषद्) शाङ्करभाष्य समन्वित(, शशि तिवारी, मेहरचन्द लखमनदास पब्लिकेशन्स् ,नई दिल्ली,प्रथम संस्करण 1981
5. वैदिक संग्रह, कृष्णलाल, इन्दु प्रकाशन,दिल्ली,प्रथम संस्करण 1973.
6. Atharvaveda (Śaunakīya): (Ed.) Vishva Bandhu, VVRI, Hoshiharpur, 1960.
7. Śuklayajurveda-Samhitā, (Vājasaneyi-Mādhyandina), (Ed.) Jagadish Lal Shastri, MLBD, Delhi, 1978.

Additional Resources :-

1. शर्मा, उमाशंकर ऋषि, ऋक्सूक्तनिरः, , चौखम्बा ओरियण्टलिया, वाराणसी.
2. सूर्यकान्त (अनु.)-वैदिक देवशास्त्र, (ए.ए.मैकडनल(, , मेहरचन्द लछमनदास पब्लिकेशन्स ,नई दिल्ली,1962
3. शशि तिवारी, वेदव्याख्यापद्धतयः, प्रतिभा प्रकाशन, दिल्ली, 2014
4. Velankar,H.D., *Ṛksūktāvalī*, Vaidika Sanshodhana Mandala, Pune, 1965.
5. Velankar,H.D., *Ṛksūktavaijayantī*, Bharatiya Vidya Bhavan, Bombay, 1972.

[E] Teaching Learning Process

1. The teacher will recite the mantras and the students will then repeat.
2. In situations involving complex words, the mantra will be recited after disjoining or dividing the hard words.
3. After this, teachers will arrange them according to its meaning (Anvaya) and recite again.
4. After this the meaning of the mantras will be explained
5. Teachers shall apprise students about the various interpretations by leading Indian scholars.
6. Philosophical, ethical scientific, cultural values will be discussed while comparing them with current contexts.
7. The relevant grammatical and etymological aspects of mantras will be clarified.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment Method			
	I.	Basic Structure of Question Paper & Division of Marks	75
	i	Explanations –4 (from unit-1 to 5)	04 x 06 = 24
	ii.	Translation -3 (Unit 1 to 5)	03 x 4 = 12
	iii.	Long questions 02 (Unit 1 to 5)	02x 10 = 20
	iv.	Vedic Grammar (Unit -6) Padapatha = 01 Question = 01	1 x 5 = 5 1 x 7 = 7

		v.	Question/Explanation to be written in Sanskrit = 01	07
	II		Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25
			Total Marks : (I+II)	(75+25) = 100

[H] Keyword

Ṛgveda, Atharvaveda, Yajurveda, Upaniṣad, Sukta, Mantra, Vedic deities, Vedic Accents, Pada-patha etc.

C-12
Sanskrit Grammar: Laghusiddhāntkaumudī
(12131502)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60 + Tutorials 12

[A] Course Objectives:

Sanskrit is much known for a long tradition of grammatical and semantic analysis of the language. Panini's grammar has always been highly respected for providing the best model for structural and semantic studies. This course intends to introduce to students the basic structure of Sanskrit language through the the Laghusiddhantakaumudi , the premier text of Sanskrit grammar by Varadaraj.

[B] Course Learning Outcomes:

After completion of this course students will understand the basic structural nuances of Panini's grammar. They will become familiar with fundamental sandhi and compounding patterns. They will also understand some most important primary and secondary suffixes of Sanskrit. The practice of the application of the rules learnt from the reading of the texts will further enhance their knowledge of the structural patterns of Sanskrit language.

[C] Contents:

**Unit: I Saṁjñā and Sandhi Prakaraṇa
from Laghusiddhāntkaumudī:**

Credits : 12

- Sutra's of Saṁjñā
- Ach Sandhi:
(Dīrgha, Yaṇ, Guṇa, Ayādi, Vṛddhi, Pūrvarūpa, Pararūpa)

Unit: II Hal sandhi and visarga sandhi

Credits : 12

- Sutra's of Hal Sandhi and Visarga Sandhi:
(Ścutva, Śtutva, Anunāsikatva, Chatva, Jaśtva, Śatva, Utva, Lopa)

**Unit:III Practice of Applications of Sandhis in prescribed
texts literary texts**

Credits : 12

Unit: IV Samāsa Prakaraṇa from Laghusiddhāntkaumudī

Credits : 10

Major sutras used in formation of Avyayībhāva Samāsa and Tatpuruṣa Samāsa

Unit: V Dvandva and Bahubrihi Samāsa from

Laghusiddhāntakaumudī**Credits: 07**

Major Sutras for the formation of Dvandva and Bahubīhi Samāsa

Unit: VI Kṛdanta from Laghusiddhāntakaumudī**Credits : 07**

Major sutras for the formation of Taddhita words

(Aṇ, Iñ, Dhak, Tal, Aṇ, Vuñ, Yat, Cha, Mayaṭ, Tva, Tal, Imanic, Śyañ, Matup, In, Ṭhañ, Itac)

[D] Suggested Books/Readings:**Compulsory Readings:**

1. धरानन्द शास्त्री, लघुसिद्धान्तकौमुदी, मूल एवं हिन्दी व्याख्या, दिल्ली ।
2. भीमसेन शास्त्री, लघुसिद्धान्तकौमुदी भैमी व्याख्या) भाग-1), भैमी प्रकाशन, दिल्ली ।
3. चारुदेव शास्त्री, व्याकरण चन्द्रोदय) भाग-1,2 एवं 3), मोतीलाल बनारसीदास, दिल्ली ।
4. सत्यपाल सिंह) संपा(., लघुसिद्धान्तकौमुदी :प्रकाशिका हिन्दी व्याख्या सहिता, शिवालिक पब्लिकेशन, दिल्ली, 2014 ।
5. Kanschiram, Laghusiddhāntakaumudī (Vol. I), MLBD, Delhi, 2009.

Additional Resources:

1. Online Tools for Sanskrit Grammar developed by Computational Linguistics Group, Department of Sanskrit, University of Delhi: <http://sanskrit.du.ac.in>
2. M.R. Kale, Higher Sanskrit Grammar, MLBD, Delhi (Hindi Translation also available).
3. V.S. Apte, The Students' Guide to Sanskrit Composition, Chowkhamba Sanskrit Series, Varanasi (Hindi Translation also available).

[E] Teaching Learning Process

1. Teachers shall split each sutra and explain the structure of each component before giving the meaning of the entire sutra
2. Students will be encouraged to memorize all important sutras and teachers shall occasionally test them
3. Students must write the explanations of maximum number of sutras and attempt the siddhi of maximum words
4. Short periodic tests and quizzes must be held
5. Students will be encouraged to apply their theoretical knowledge of the rules of grammar to the literary texts they have already studied in earlier classes.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment Method

I.	Basic Structure of Question Paper & Division of Marks	75
i	Explanations of 6 sutras (Units 1,2,4,5,6)	06x 05 = 30
ii.	formation of 5 words (Units 1,2,4, 5,6)	05 x 5 = 25
iii.	Questions on applied grammar from prescribed texts (from Unit 2,4,5,6)	7 x 02 = 14
iv.	One explanation of a sutra to be written in Sanskrit	01x07 = 07
II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25
Total Marks : (I+II)		(75+25) = 100

[H] Keyword

Sanskrit Grammar, Laghusiddhantkaumudi etc.

C-13
Indian Ontology and Epistemology
(12131601)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60+ Tutorials 12

[A] Course Objectives:

This Course aims at to get the students acquainted with the cardinal principles of the Nyaya-Vaisesika Philosophy and to enable students to handle Philosophical texts like Tarkasangraha in Sanskrit. It also intends to give them an understanding of essential aspects of Indian Philosophy like Realism, Idealism, Monism, Dualism etc.

[B] Course Learning Outcomes:

Students will become familiar with primary and one of the most important and influential school of Indian Philosophy i.e. Nyaya-Vaisesika through its basic text the Tarkasangraha. They will also be introduced to essential problems in philosophy - Causation, Ontology and Epistemology. This will enable them to engage with other texts in Indian philosophy with some ease.

[C] Contents:

Unit: I Essentials of Indian Philosophy

Credits : 12

- Meaning and purpose of Darśana,
- General classification of philosophical schools in classical Indian philosophy,
- Yathārthavāda or Vastuvāda (Realism),
- Pratyayavāda (Idealism),
- Ekattvavāda (Monism),
- Dvaitavavāda (Dualism)
- Bahuttvavāda (Pluralism);
- Dharma (Property) Dharmi (Substratum)

Unit: II Kāryakāraṇavāda (Causation) :

Credits : 12

- Svabhāvavāda (Naturalism),
- Satkāryavāda (Doctrine of pre-existence of effect),
- Pariṇāmavāda (Doctrine of real transformation),
- Vivartavāda (Doctrine of illusory transformation),
- Asatkāryavāda and Ārambhavāda (doctrine of non-pre-existence of effect in cause)

Unit: III Ontology: Credits : 08

- Concept of Padārtha,
- Three Dharmas of Padārthas,
- Definition of Dravya, Sāmānya, Viśeṣa, Samavāya, Abhāva.

Unit: IV Ontology: Credits : 10

- Definitions of first seven dravyas and their examination; Ātma and its qualities, manas.
- Qualities (other than the qualities of the Ātman),
- Five types of Karma.

Unit: V Epistemology : Credits: 08

- Buddhi (Jñāna) – nature of Jñāna in Nyāya-Vaiśeṣika;
- Karaṇa and Kāraṇa,
- definitions and types of Pramā, Kartā-Kāraṇa-Vyāpāra-Phala, model,
- Pratyakṣa

Unit: VI Epistemology : Credits : 10

- Anumāna including Hetvābhāsa
- Upamāna and śabda Pramāṇa
- Types of Ayathārtha Anubhava

[D] Suggested Books/Readings:

Compulsory Readings:

1. Tarkasaṃgraha, Narendra Kumar, Hansa Prakashan, Jaipur.
2. Chatterjee, S. C. & D. M. Datta - *Introduction to Indian Philosophy*, Calcutta University, Calcutta, 1968 (Hindi Translation available).
3. Tarkasaṃgraha of Annambhaṭṭa (with Dīpikā & Nyāyabodhinī), (Ed. & Tr.) Athalye & Bodas, Mumbai, 1930.
4. Tarkasaṃgraha of Annambhaṭṭa (with Dīpikā & Nyāyabodhinī), (Ed. & Tr.) Virupakshananda, Sri Ramkrishna Nath, Madras, 1994.
5. Tarkasaṃgraha of Annambhaṭṭa (with Dīpikā and its Hindi Translation), (Ed.& Tr), Pankaj Kumar Mishra, Parimal Publication, Delhi-7. 2013.

Additional Resources:

1. Kuppaswami Shastri, *A Primer of Indian Logic*, , Madras, 1951.
2. Chatterjee, S. C., *The Nyāya Theory of Knowledge*, Calcutta, 1968.
3. Hiriyanna, M., *Outline of Indian Philosophy*, London, 1956 (also Hindi Translation).
4. Radhakrishnan, S., *Indian Philosophy*, Oxford University Press, Delhi, 1990.
5. Bhattacharya, Chandrodaya, *The Elements of Indian Logic and Epistemology*
6. Maitra, S.K., *Fundamental Questions of Indian Metaphysics & Logic*,

[E] Teaching Learning Process

Multiple pedagogic techniques are used in imparting the philosophical knowledge of the course. There are some such techniques which includes : • Lectures and explanation of the texts • Tutorials • Power- point presentations • Project work • Discussions, Quiz • Talks /workshops • Interaction with experts etc.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment Method

I	Basic Structure of Question Paper & Division of Marks	75
i	Long Questions -03 (1-6 Units)	03x 10 = 30
ii.	Short notes- 05 (1-6 Units)	05 x 05 = 25
iii.	Short Answer Type Questions -10(Limit1-2Lines) (from all Units)	13 x 01 = 13
iv.	Sanskrit Question-1	01 x 07 = 07
II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25
Total Marks : (I+II)		(75+25) = 100

[H] Keyword

Indian Philosophy, Realism, Idealism, Monism, Dualism, Dharma-dharmi, Padartha, Visheshha, Abhava, Karan, Anuman

C-14
Sanskrit Composition and Communication
(12131602)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 60+ Tutorials 12

[A] Course Objectives:

This paper aims at developing writing and speaking skills in Sanskrit. Students will learn also learn the art of translation from Sanskrit into Hindi and vice versa.

[B] Course Learning Outcomes:

This course will help the learners develop a critical, linguistic and scientific approach towards Sanskrit language. The practice of essay writing will make the students form ideas and express them in Sanskrit. This practice will also familiarise them with various shastric theories.

[C] Contents:

Unit: I	Vibhaktyartha, Voice & Kṛt	Credits : 8
	i. Vibhaktyartha Prakaraṇa of Laghusiddhāntakaumudī	
	ii. Voice (Kartṛ, Karma and Bhāva)	
Unit: II	Selections from Kṛt Prakaraṇa- from Laghusiddhāntakaumudī	
	Major Sūtras for the formation of Kṛdanta words	Credits : 10
	i. Tavyat, Tavya, Anīyar, Yat, Nyat, Nvul, Tṛc, Aṇ, Kta, Ktavatu, Śatṛ, Śānac, Tumun, Ktvā-Lyap, Lyuṭ, Ghañ, Ktin	
Unit: III	Translation and Communication :	Credits : 12
	i. Translation from Hindi/English to Sanskrit on the basis of cases, Compounds and kṛt suffixes.	
	ii. Translation from Sanskrit into Hindi/English	
Unit: IV	Communicative Sanskrit: Spoken Sanskrit.	Credits : 08
Unit: V	Essay	Credits: 12
	Essay (Traditional subjects) e.g. Veda, Upaniṣad, Sanskrit Language, Sanskriti, Rāmāyaṇa, Mahābhārata, Purāṇa, Gītā, prominent Sanskrit poets.	

Unit: VI Essay**Credits : 10**

Essay based on issues and topic related to modern subjects like entertainment, sports, national and international affairs and social problems.

[D] Suggested Books/Readings:**Compulsory Readings:**

1. शास्त्री, धरानन्द, लघुसिद्धान्तकौमुदी , मूल एवं हिन्दी व्याख्या, मोतीलाल बनारसीदास, दिल्ली.
2. नौटियाल, चक्रधर, बृहद्-अनुवाद-चन्द्रिका, मोतीलाल बनारसीदास, दिल्ली.
3. द्विवेदी, कपिलदेव, रचनानुवादकौमुदी, विश्वविद्यालय प्रकाशन, वाराणसी.
4. द्विवेदी, कपिलदेव, संस्कृतनिबन्धशतकम् विश्वविद्यालय प्रकाशन, वाराणसी
5. Kale, M.R, *Higher Sanskrit Grammar*, MLBD, Delhi (Hindi Translation also available).

Additional Resource :

1. शास्त्री, भीमसेन, लघुसिद्धान्तकौमुदी, भैमीव्याख्या) भाग-1), भैमीव्याख्या, दिल्ली.
2. पाण्डेय, राधामोहन, संस्कृत सहचर, स्टूडेंट्स फ्रेंड्स, पटना.
3. Apte, V.S. , *The Students' Guide to Sanskrit Composition*, Chowkhamba Sanskrit Series, Varanasi (Hindi Translation also available).
4. Kanshiram, *Laghusiddhāntakaumudī* (Vol.1), MLBD, Delhi, 2009.

[E] Teaching Learning Process

- Sutras – Teachers will split each sutra and explain the meaning of each word before explain the entire sutra.
- Students will be encouraged to memorize the sutras.
- Teachers will try to communicate with students in Sanskrit and encourage them to speak in Sanskrit.
- In the sections on essays, teachers shall encourage students to collect material from suggested sources and discuss points/issues in class.
- For essays and translations, students will make and read out their sentences in the class. They should write more in the class so that teachers can check their language.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4

Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment Method

I	Basic Structure of Question Paper & Division of Marks	75
i	Explanation of 3 Sutras (Unit-2)	03 x 03 = 09
ii.	formation of 3 words (Unit-2)	03 x 02 = 06
iii.	Translation (Sanskrit to Hindi/English)	2 x 5 = 10
iv.	Translation (Hindi/English to Sanskrit)	02x 10 = 20
v.	Essays - 2 (In Sanskrit)	02 x 15 = 30
II	Internal Assessment : Spoken Sanskrit, Practice sheets to be prepared by teachers, Periodic tests etc.	25
	Total Marks : (I+II)	(75+25) = 100

[H] Keyword

Sanskrit Grammar, Voice , Kṛdanta Composition, Essay, translation etc.

Discipline Specific Elective (DSE)
B.A. (Hons) Sanskrit

DSE-1 Indian System of Logic and Debate	DSE-2 Art of Balanced Living
DSE -3 Theatre & Dramaturgy	DSE-4 Sanskrit and Other Modern Indian Languages
DSE-5 Sanskrit Linguistics	DSE-6 Computational Linguistics for Sanskrit
DSE-7 Fundamentals of Ayurveda	DSE-8 Environmental Awareness in Sanskrit Literature

DSE-1**Indian System of Logic and Debate****(12137901)****[A] Course Objectives:**

This course aims to get the students acquainted with the Indian principles of debate and its applications, not just in philosophical dialogue, but in every sphere of knowledge.

[B] Course Learning Outcomes:

This course will provide knowledge of the principles of debate according to the Nyaya School. It will develop logical faculty of their minds and help them to perceive the world in a more rational way. They will develop the skill to present their arguments in a more structured manner and to see through fallacious arguments given by others.

[C] Content :**Unit 1****Credits - 6**

Science of inquiry (ānvīkṣikī) & its importance, Growth of ānvīkṣikī into art of debate, The council of debate (parīṣad) & its kinds, Discussant (vādī), Opponent (prativādī), Judge (madhyastha/prāśnika).

Unit 2**Credits 10**

The Method of debate (Sambhāṣāvidhi/Vādaavidhi) & its utility, Types of debate - congenial debate (anuloma sambhāṣā) & hostile debate (vighṛhya sambhāṣā), The expedience of debate (vāadopāya), The limits of debate (vādamaryādā).

Note : The definitions and concepts are to be taken only from the Nyāyasūtra, Nyāyakośa by Bhimacharya Jhalkikar and A History of Indian Logic by S. C. Vidyabhushan, Chapter III of Section I.

The illustrations and examples must be taken from day to day life and philosophical examples must be abandoned

Unit 3 Syllogistic Logic**Credits 18**

Inference (anumāna) & its key terms, viz. major term or probandum (sādhya), middle term or probans (hetu), minor term (pakṣa), illustration (sapakṣa), contrary-illustration (vipakṣa), basic understanding of invariable concomitance (vyāpti) & its types, establishing vyāpti by inductive method, Five components of argument (pañcāvayava) – proposition (pratijñā), reason (hetu), example (udāharana), application (upanaya) & conclusion (nigamana), the hetu – its nature and requirements– upādhi.

Unit 4**Credits 12**

Tarka, nature and types of tarka – vyāghāta, ātmāśraya, anyonyāśraya, chakraka, pratibandhi kalpanā, kalpanā gaurava, kalpanā lāghava, utsarga, apavāda, vaijātya

Note : The definitions and concepts are to be taken only from the Tarkasaṅgraha and The Nyāya Theory of Knowledge by S. C. Chatterjee, Chapters XI-XI

Unit 5 Theory of Debate**Credits 6**

Basic understanding of the following terms: Example (dṛṣṭānta), Tenet (siddhānta), Ascertainment (nirṇaya), Dialogue (kathā) and its kinds, Discussion (vāda), Wrangling (jalpa), Cavil (vitaṇḍā), Quibble (chala) & its kinds;

Unit 6**Credits 8**

Analogue (jāti) and its important kinds (only first four, i.e. sādharmyasama, vaidharmyasama, utkarṣasama & apakarṣasama);

Point of defeat (nigrahasthāna) & its kinds –Hurting the proposition (pratijñāhāni), Shifting of proposition (pratijñāntara), Opposing the proposition (pratijñāvirodha), Renouncing the proposition (pratijñāsannyāsa), Admission of an opinion (matānujñā).

Note : The definitions and concepts are to be taken only from the Nyāyasūtra, Nyāyakośa by Bhimacharya Jhalkikar and A History of Indian Logic by S. C. Vidyabhushan, Chapter II of Section II. The illustrations and examples must be taken from day to day life and philosophical examples must be abandoned.

[D] Suggested Books/ Readings :**Compulsory Reading**

1. Vidyabhushan, Satish Chandra, A History of Indian Logic, MLBD, Delhi, 1962. (Chapter III of Section I & Chapter II of Section II only)
2. Athalye & Bodas, Tarkasaṅgraha, Mumbai, 1920. (only introduction & exposition of anumāna)
3. Shastri, Kuppuswami, A Primer of Indian Logic, Madras, 1951 (only Introduction & exposition of anumāna)
4. Bagchi, S. S. – Inductive Logic : A Critical Study of Tarka & Its Role in Indian Logic, Darbhanga, 1951.
5. Chatterjee, S. C. & D. M. Datta - Introduction to Indian Philosophy, Calcutta University, Calcutta, 1968 (Hindi Translation also)
6. Chatterjee, S. C. – The Nyāya Theory of Knowledge, Calcutta, 1968.
7. Hirianna, M. - Outline of Indian Philosophy, London, 1956 (also Hindi Translation).
8. Jha, Harimohan – Bhāratīya Darśana Paricaya, Vol. I (Nyāya Darśana), Darbhanga.

Additional Resources:

1. Potter, Karl H., Encyclopedia of Indian Philosophies, Vol. II, Motilal Banarsidass, Delhi, 1977.
2. Jhalkikar, Bhimacharya, Nyāyakośaḥ, Bhandarkar Oriental Research Institute, Poona, 1997 (reprint of fourth edition)
3. Matilal, B. K. – The Character of Logic in India, Oxford, 1998.
4. Radhakrishnan, S. - Indian Philosophy, Oxford University Press, Delhi, 1990.

[E] Teaching Learning Process:

This course will require a careful reading of the relevant lines from the texts in the class. Teachers must explain the meaning of each line and explain each concept carefully. Mere translation and mere lectures on the topics will not be helpful.

It will be useful to make students memorize the definitions and teachers must test them frequently.

It will be necessary to give frequent tests to enable students to grasp the complexities of the text.

It will be necessary to create modern examples of Jati and nigrahasthana.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G]. Assessment Methods:

[G]	Assessment :				
	I.	Sr. No.	Basic structure of Question Paper	Division of Marks	Marks
		i.	Three long questions from all units	3 x 10 = 30	
		ii.	Six notes on technical terms/ definitions from all units	6 x 5 = 30	

		iii.	3 lakshanas from the text from all units	3 x 3 = 9	
		iv.	One note/question in Sanskrit from all units	1 x 6 = 6	
			Total Marks =		75
	II.		Internal Assessment – 1.Periodic tests from each unit; should have written and oral component including paper presentation and group discussion 2. End semester test from the whole syllabus. 3. Project		25
			Total Marks : (I+II)	75+25	100

[G] Keywords:

Logic, Debate, Nyaya, anaumana, Vyapti, vada, chala, jati, nigraha-sthana

DSE-2**Art of Balanced Living****(12137902)****[A] Course Objectives:**

The course aims to make students aware of the importance of balance in life and to make them aware of the theoretical and practical aspects of Balanced Living inherent in Sanskrit texts and apply them to live a better life. Graduates who read this course should be able to see that in order to bring balance in life, a proper understanding of one's life situation is necessary. For this understanding, shravana, manana and nididhyasana are important tools.

Graduates must know the true essence of listening (acquisition of information), manana (reflection) and nididhyasana (unflinching commitment). In this segment students can learn how to improve concentration. They will be able to identify the causes for indecisiveness and confusion and will learn how emotional stability can lead to clearer thinking. This section should help students to understand the importance of Ashtang yoga and Kriyayoga for the purification of mind. Team work and social cohesion require interpersonal skills. One needs to know that one's behaviour can create conflicts. Learners should know how to improve their behaviour through jnana, dhyana, karma and bhakti yoga. Students should learn how active engagement with action is most conducive to healthy and successful living. By reading this segment, learners should develop a more balanced approach to life.

[B] Course Learning Outcomes:

Graduates who read this course will acquire the necessary tools for a balanced life. They will know the true essence of listening (acquisition of information), manana (reflection) and nididhyasana (unflinching commitment). In this segment students can learn how to improve concentration. They will be able to identify the causes for indecisiveness and confusion and will learn how emotional stability can lead to clearer thinking.

This section will help students to understand the importance of Ashtang yoga and Kriyayoga for the purification of mind.

Team work and social cohesion require interpersonal skills. Here students will know how to improve their behaviour through jnana, dhyana, karma and bhakti yoga. Students will also understand how active engagement with action is most conducive to healthy and successful living.

[C] Contents**Unit: I****Credits 10**

Method of Self-presentation : Hearing (śravaṇa), Reflection (manana) & meditation (nididhyāsana) - (Bṛhadāraṇyakopaniṣad, 2.4.5) and Vedantasara

Unit: II**Credits 10**

Concentration : Concept of Yoga : (Yogasūtra, 1.2) ; Restriction of fluctuations by practice (abhyāsa) and passionlessness (vairāgya) : (Yogasūtra, 1.12-16)

Unit : III**Credits 10**

Eight aids to Yoga (aṣṭāṅgayoga): (Yogasūtra - 2.29, 30,32, 46, 49, 50; 3.1-4).

Unit IV :**Credits 10**

Yoga of action (kriyāyoga) : (Yogasūtra, 2.1)

Four distinct means of mental purity (cittaprasādana) leading to oneness : (Yogasūtra - 1.33)

Unit: V**Credit 10**

Refinement of Behaviour : Means of improving behaviour :

Jñāna-yoga – Gita Ch. II – 14,15,16,19, Ch XIII- 11,12,14,15,16,19,20,21,23,29,31,32

dhyāna-yoga – VI – 24 to 27, 30, 32,

Unit : VI**Credits 10**

bhakti-yoga – Gita Ch. IX – 17,22,23,27,29,34 ; Ch XI – 10,11,12, 13; Ch. - XII – 4, 6 to 12, 20

Karma : A natural impulse, essentials for life journey, harmony with the universe, an ideal duty and a metaphysical dictate - Gītā, Ch. – III 5, 8, 10-16, 20 & 21

[D] Suggested Books/Readings:

1. वेदान्तसार : राममूर्ति शर्मा, नैशनल पब्लिशिंगहाउस, दिल्ली
2. पातञ्जल योग दर्शन : सुरेश चन्द्र श्रीवास्तव, चौखंबा सुरभारती प्रकाशन, वाराणसी २००८
3. भगवद्गीता : गीताप्रेस, गोरखपुर
4. उपनिषद रहस्य , एकादश उपनिषद, महात्मा नारायण स्वामी, गोविन्द राम हासानन्द, दिल्ली

[E] Teaching Learning Process:

1. Teachers shall read aloud the relevant Sanskrit lines and help students understand the structure of each word, only then shall they translate words/ phrases and sentences. वाराणसी
2. Teachers shall explain all philosophical concepts and involve students in the discussion on the concepts to help them to develop a clearer understanding.
3. Lectures covering all the aspects of a topic will then be delivered.
4. While reading this course students must be encouraged to connect their study of theory with real life situations. Some contemporary problems (personal or social) could be taken up and solutions attempted.

[F] Weekly Plan

1. Week 1 – Unit 1
2. Week 2 – Unit 1
3. Week 3 – Unit 2
4. Week 4 – Unit 2
5. Week 5 – Unit 3
6. Week 6 – Unit 3
7. Week 7 – Unit 4
8. Week 8 – Unit 4
9. Week 9 – Unit 5
10. Week 10 – Unit 5
11. Week 11 – Unit 6
12. Week 12 – Unit 6

[G] Assessment :

[G] Assessment :					
	II.	Sr. No.	Basic structure of Question Paper	Division of Marks	Marks
		i.	3 long questions	3 x 12 = 36	
		ii.	5 notes on concepts	5 X 5 = 25	
		iii.	3 Lakshanas / definitions from prescribed texts (cite and translate)	3.5 x 2 = 7	
		iv.	1 note/ short question to be answered in Sanskrit	1 x 7 = 7	
			Total Marks =		75
	II.		Internal Assessment – 1.Periodic tests from each unit; should have written and oral component including paper presentation and group discussion 2. End semester test from the whole syllabus.		25
			Total Marks : (I+II)	75+25	100

Under the tutorial component -

1. Periodic tests from each unit; should have written and oral component including paper presentation and group discussion.
2. End semester test from the whole syllabus

[H] Keywords:

Yoga, Behaviour, Living, self presentation, concentration, jñāna, dhyāna, karma.

DSE-3**Theatre and Dramaturgy in Sanskrit****(12137903)****[A] Course Objectives:**

With its audio-visual characteristics, drama is considered to be the best amongst all forms of arts.. The history of theatre in India is very old, the glimpses of which can be traced in the hymns (saṁvādasūkta) of the Ṛgveda. The dramaturgy was later developed by the Bharatamuni. The objectives of this curriculum are to help students in identifying the richness of drama and to become aware of the classical aspects of Indian theatre.

[B] Course Learning Outcomes:

After going through this course students will be able to know about several theoretical aspects of theatrical performance and production. They will become aware of the many types of theatres, their design and construction and stage setting for various kinds of dramas in ancient India. Students will also become familiar with the main principle of theatre performance and appreciation.

[C] Contents Total 60**Unit: I****Credits 10****Theatre: Types and Designing**

Types of theatre: vikṛṣṭa (oblong), caturasra (square), tryasra (triangular), jyeṣṭha (big), madhyama (medium), avara (small). bhūmi-śodhana (Examining the land) and māpa (measurement of the site), mattavāraṇī (raising of pillars), raṅgapīṭha and rangaśīrṣa (stage), dārukarma (wood-work), nepathya -grha (green-house), prekṣkopaveśa (audience-hall), Doors for entrance & exit.

Unit: II**Credits 8**

Drama - vastu (subject-matter), netā (hero) and rasa

Definition of drama and its various names - dṛśya, rūpa, rūpaka

Abhinaya and its types: āṅgika (gestures), vācika(oral), sāttvika (representaion of the sattva), āhārya (dresses and make-up).

Unit: III**Credits - 8**

Traditional Characters : Netā: Four kinds of heroes, Three kinds of heroines, sūtradhāra (stage manager), pāripārśvika (assistant of sūtradhāra), vidūṣaka (jester), kañcukī (chamberlain), pratināyaka (villain).

Unit: IV**Credits 10**

Rasa: definition and constituents, ingredients of rasa-niṣpatti: - bhāva (emotions), vibhāva (determinant), anubhāva (consequent), sāttvikabhāva (involuntary state), sthāyībhāva (permanent states), vyabhicārībhāva (complementary psychological states), svāda (pleasure), Four kinds of mental levels : vikāsa (cheerfulness), vistāra (exaltation), kṣobha (agitation), vikṣepa (perturbation).

Unit: V**Credits - 10**

Development of plot : Vāstu: (subject-matter) : ādhikārika (principal), prāsaṅgika (subsidiary)

Five kinds of arthaprakṛti, kāryāvasthā (stages of action) and sandhi (story segments), arthopakṣepaka (interludes)

Dailogues : kinds of dialogue: 1. sarvaśrāvya or prakāśa (aloud) 2. aśrāvya or svagata (aside) 3. niyataśrāvya : janāntika (personal address), apavārta (confidential) 4. ākāśabhāṣita (conversation with imaginary person).

Unit: VI

Tradition and History of Indian Theatre

Credits 14

Origin and development of stage in different ages: pre-historic, Vedic age, epic-puranic age, court theatre, temple theatre, open theatre, modern theatre: folk theatre, commercial theatre, national and state level theatre.

[D] Suggested Books/Readings:**Compulsory Reading:**

1. Ghosh , M.M. - Nāṭyaśāstra of Bharatamuni, pp. 18-32.
2. झा सीताराम, 1982, नाटक और रंगमंच, बिहार राष्ट्रभाषा परिषद् पटना, पृ .171-175.
3. Hass , The Daśarūpa: A Treatise on Hindu Dramaturgy, kārika 7,8,11-24,30,36,43,48,57-65.
4. Hass , The Daśarūpa: A Treatise on Hindu Dramaturgy, kārikās 2/1-5,8,9,15.
5. Hass , The Daśarūpa: A Treatise on Hindu Dramaturgy, kārikās 4/1-8,43,44.
6. द्विवेदी, हजारी प्रसाद — नाट्यशास्त्र की भारतीय परंपरा और दशरूपक.
7. Farley P.Richmond, (2007),ed. Indian Theatre: traditions of performance, vol-I, Origins of Sanskrit Theatre, pp. 25-32.
8. झा सीताराम, (1982) नाटक और रंगमंच, पृ .161—211.

9. Farley P.Richmond, (ed) Indian Theatre: traditions of performance vol-I Delhi, MLBD. 2007, pp. 25-32.
10. Ghosh , M.M, Nāṭyaśāstra of Bharatamuni, vol-1, Manisha Granthalaya, Calcutta, 1967.
11. Hass, The Daśarūpaka : A Treatise on Hindu Dramaturgy, Columbia University, NewYork , 1912.
12. नागर, रविशंकर, नाट्यशास्त्र, अभिनवभारती टीका सहित, परिमल पब्लिकेशन दिल्ली.
13. द्विवेदी, हजारी प्रसाद, नाट्यशास्त्र की भारतीय परंपरा और दशरूपक, राजकमल प्रकाशन दिल्ली, 1963.
14. त्रिपाठी, राधावल्लभ — भारतीय नाट्यशास्त्र की परम्परा और विश्व रंगमंच, प्रतिभा प्रकाशन, दिल्ली, 1999.
15. त्रिपाठी, राधावल्लभ) सं०) संक्षिप्तनाट्यशास्त्र, वाणीप्रकाशन, दिल्ली, 2008.
16. झा, सीताराम, नाटक और रंगमंच, बिहार राष्ट्रभाषा परिषद्, पटना, 1981.
17. मिश्र, भारतेन्दु, भरतकालीन कलाएँ, प्रतिभा प्रकाशन, दिल्ली, 2004.
18. त्रिपाठी, राधावल्लभ, भारतीय नाट्यः स्वरूप और परंपरा, हरिसिंह गौर विश्वविद्यालय, सागर, 1988.
19. गैरोला, वाचस्पति — भारतीय नाट्यपरम्परा और अभिनयदर्पण, इलाहाबाद, 1967.

[E] Teaching Learning Process:

1. This course is theoretical but requires a lot of practical understanding for which sufficient teaching hours have been provided in the syllabus.
2. For the theoretical part, teachers shall read and explain each line and concept clearly.
3. They shall discuss the practical aspects with the help of slides/ sketches/ PPT presentations so that students can have a real feel of how theory gets translated into practice.
4. Videos of dramas in Sanskrit (and from traditional Indian theatre forms in other Indian languages) must be shown and discussed to teach the theory of drama.
5. Teachers must give illustrations from Sanskrit dramas
6. Aspects like types of dialogues can even be enacted by students.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of question paper -	Total Marks 75
1	3 long questions (illustrations from texts / performances required) – 3 x 12 marks	= 36
2	5 notes (illustrations from texts/ performances required)	05x 05 marks = 25
3	Definitions / Lakhsanas (cite and translate)	02 x 3.5 = 7
4	1 note/ question to be answered in Sanskrit -	7

Internal assessment : (Tutorial Component) – short periodic tests based on theory and assessment of videos/ performances

[H] Keywords:

Drama, Theatre, Vastu, Neta, Rasa, Natya griha

DSE–4**Sanskrit and Other Modern Indian Languages
(12135903)****[A] Course Objectives:**

This course aims to get students acquainted with the common linguistic and literary heritage of Sanskrit and Modern Indian Languages with focus on Punjabi, Oriya, Bangla, Tamil, Telugu, Marathi and Gujrati.

[B] Course Learning Outcomes:

With this course, students will be able to analyze languages in their different aspects- phonetic, semantic, syntactic and morphological. . On these structural levels they will be able to examine the interconnection of Sanskrit with other Indic languages and appreciate the linguistic unity of India and shed their linguistics chauvinism and see how all Indian languages are connected and related. They will become aware of the evolution of Indian languages from Sanskritic languages. They will also see Sanskrit literature as a source and instrument of enrichment of medieval and modern Indian literary traditions. It would also show the cultural and literary continuity of India.

[C] Contents**Unit: I Credits 10****Indo-Aryan Languages**

Stages of Indo-Aryan –from Vedic to Modern Indo-Aryan Languages
Old Indo-Aryan (Vedic) Middle Indo-Aryan (Pali, Prakrit and Apabhraṃśa)

Unit: II Credits 10

Phonetics of Sanskrit and prescribed Modern Indian Languages – changes in vowels, consonants and combine consonants.

Unit: III Credits 10

Morphology of Sanskrit and prescribed Modern Indian Languages – changes in gender, person, number and use of prepositions, cases, tenses, compounds and derivative words.

Unit: IV Credits 10

Syntax of Sanskrit and prescribed Modern Indian Languages – word-order, voice, gender in verbs, subject-verb-harmony.

Unit: V Credits 10

Influence of classical Sanskrit literature on the literature of modern Indian languages.

Unit: VI Credits 10

Enrichment of modern Sanskrit Literature through modern Indian Languages and Literatures.

[D] Suggested Books/Readings:**Compulsory Reading:**

1. Beames, John, A Comparative Grammar of the Modern Aryan Languages of India, Munshiram Manoharlal, Delhi, 1970.
2. Cardona, George and Jain Dhanesh (Ed.), The Indo-Aryan Languages, Routledge Language Family Series, London, 2003.
3. Chatterji, Suniti Kumar, Indo-Aryan and Hindi, Gujarat Vernacular Society, Ahmedabad, 1942.
4. Chatterji, Suniti Kumar, Origin and Development of the Bangali Language, Calcutta University Press Calcutta, 1926.
5. Turner, R.L., Indo-Aryan Linguistics, Diksha Publication, Delhi, 1985.
6. Coldwell, Robert, A comparative Grammar of Dravidian or South Indian Family of Languages, (3rd revised edn.) Munshiram Manoharlal, Delhi, 1970
7. नगेन्द्र, भारतीय साहित्य, प्रभात प्रकाशन, दिल्ली, 1987

[E] Teaching Learning Process:

This course is largely lecture based.

Teachers must supplement their lectures with PPT presentations, maps, charts and graphs

The special aspects which need to be highlighted are the perennial elements of Indian culture and their relevance in modern times.

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3
- Week 6 – Unit 3
- Week 7 – Unit 4
- Week 8 – Unit 4
- Week 9 – Unit 5
- Week 10 – Unit 5
- Week 11 – Unit 6
- Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of the question paper	Marks
1.	4 long answer type questions	4 x 12 = 60
2.	3 short notes x 5 = 15 (one of these has to be written in Sanskrit)	<u>3x5= 15</u>
	Total =	75

[H] Keywords:

Contemporary Social Needs, Indo-Aryan Languages, Indo-Iranian Languages, Shared heritage, Sanskrit undercurrent in language and literature.

.DSE-5
Sanskrit Linguistics
(12137905)

Course Objectives:

This course aims to provide knowledge about the linguistic features of Sanskrit and its close affinity with the Avestan and the Prakrits.

[B] Course Learning Outcomes:

Students will develop a scientific approach to the study of languages; they will become aware of the linguistic structure of Sanskrit and see its close relation with the Avestan and Prakrits.

[C] Contents

Unit: I

Credits 6

भाषा विज्ञान का स्वरूप, भाषाविज्ञान के मुख्य अङ्ग एवं उपादेयता
 भाषा की परिभाषा एवं स्वरूप- भाषा की विशेषताएँ - भावभिव्यक्ति के साधन एवं भाषा के अनेक रूप (बोली, भाषा, विभाषा)

Unit: II

Credits 6

संस्कृत के भाषावैज्ञानिक अध्ययन की प्राचीनता (यास्क पूर्वकाल, पाणिनिकाल, पाणिनि उत्तरकाल) का परिचय

Unit: III

Credits 12

संस्कृत की दृष्टि से ध्वनिविज्ञान - संस्कृत ध्वनियों का परिचय, ध्वनि परिवर्तन के कारण एवं दिशा
 पदविज्ञान - पद की परिभाषा, पद विभाग (नाम, आख्यात, उपसर्ग, निपात) व्याकरणिक कोटियाँ- समास, तद्धित, कृदन्त

Unit: IV

Credits 6

वाक्यविज्ञान - वाक्य की परिभाषा, वाक्य के अनिवार्य तत्व (आकांक्षा, योग्यता, आसत्ति) वाक्य के प्रकार (कर्तृ - कर्म - भाववाच्य), संस्कृत वाक्य विन्यास की विशेषताएँ

Unit: V

Credits 15

अर्थविज्ञान का सामान्य अवबोध - अर्थ के प्रकार (अभिधेय, लक्ष्य, व्यंग्य) अर्थ परिवर्तन की दिशाएँ, शब्दार्थ सम्बन्ध विषयक सिद्धान्त

Unit: VI

Credits 15

संस्कृत एवं भारोपीय भाषापरिवार – मूल भारोपीय भाषा की अवधारणा, भारोपीय भाषाओं के दो वर्ग, अवेस्ता के साथ वैदिक संस्कृत का संबंध, संस्कृत एवं प्राकृत का संबंध

[D] Suggested Books/ Readings :**Compulsory Reading:**

1. देवीदत्त शर्मा –संस्कृत का ऐतिहासिक एवं संरचनात्मक परिचय, हरियाणा साहित्य अकादमी, चण्डीगढ़
2. भाषिकी और संस्कृत भाषा - हरियाणा साहित्य अकादमी, चण्डीगढ़
व्यास, भोलाशंकर, संस्कृत का भाषाशास्त्रीय अध्ययन, चौखम्बा विद्याभवन, 1957.
3. द्विवेदी, कपिलदेव, भाषाविज्ञान एवं भाषाशास्त्र, विश्वविद्यालय प्रकाशन, वाराणसी, 2001.
4. सिद्धेश्वर वर्मा, भारतीय वैयाकरणों के ध्वनि वैज्ञानिक विचार, हरियाणा साहित्य अकादमी
5. Murti, M., An Introduction to Sanskrit Linguistics, D.K. Srimannarayana, Publication, Delhi, 1984.
6. Burrow, T., Sanskrit Language (also trans. into Hindi by Bholashankar Vyas), ChaukhambaVidyaBhawan, Varanasi, 1991.
7. Crystal, David, The Cambridge Encyclopedia of Language, Cambridge, 1997.

Additional Readings :

1. Ghosh, B.K., Linguistic Introduction to Sanskrit, Sanskrit Pustak Bhandar, Calcutta, 1977.
2. Gune, P.D., Introduction to Comparative Philology, Chaukhamba Sanskrit Pratisthan, Delhi, 2005.
3. Jespersen, Otto, Language: Its Nature, Development and Origin, George Allen & Unwin, London, 1954.
4. Taraporewala, Elements of the Science of Language, Calcutta University Press, Calcutta, 1962.
5. Verma, S.K., Modern Linguistics, Oxford University Press, Delhi,
6. Woolner, A.C., Introduction to Prakrit, Bhartiya Vidya Prakashan, Varanasi.
7. तिवारी, भोलानाथ , तुलनात्मक भाषाविज्ञान, मोतीलाल बनारसीदास, दिल्ली, 1974
8. तिवारी, भोलानाथ, भाषाविज्ञान, किताबमहल, इलाहाबाद, 1992.
9. शर्मा, देवेन्द्रनाथ, भाषाविज्ञान की भूमिका, राधाकृष्ण प्रकाशन, दिल्ली, 2014

[E] Teaching Learning Process:

Essentially lecture based approach

Teachers must make use of digital resources, PPTs, graphs and charts

They must refer to established theories of linguistic changes.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of the question paper	Maximum Marks - 75
1.	Three long questions –	12 x 3 = 36
2.	Two questions	2 x 8 = 16
3.	Two Notes	2 x 8 = 16
4.	One question/note to be answered in Sanskrit	= 7
	Total =	75

The question paper must have questions from all units

[H] Keywords:

भाषा, भाषाविज्ञान, ध्वनिविज्ञान, पद विज्ञान, अर्थविज्ञान, वाक्यविज्ञान, भारोपीय भाषा, अवेस्ता

DSE – 6

Computational Linguistics for Sanskrit (12137907)

[A] Course Objectives:

This course will introduce the modern technology in the field of computational linguistics and language technology and prepare the students for next level. After covering these topics in Computational Linguistics (CL), the students will learn the tools and techniques of CL and also do the detailed survey and learn various methodologies used in the field.

[B] Course Learning Outcomes:

The course-level learning outcomes that a student of this course is required to demonstrate are indicated below:

- Learn the basic concept of Theoretical Concepts of Computational Linguistics.
- Learn the basic concept various Applied Areas of Computational Linguistics e.g. Morphological Analyzer/Speech/Speaker Recognition, Speech Synthesis, Text to Speech, Language Analysis, Understanding, Generation, Natural Language Interface, Text Processing and Machine Translation etc.
- Learn the basic concept of databases for data Storage.
- Student also learn the Survey of Computational Linguistics.

[C] Contents for Each Course

Unit: I 10 Credits

Theoretical Concepts of Computational Linguistics:

Language and Communication, Levels of Language, Phonemes, Morphemes, POS, Lexicon, Syntax, Semantics, Discourse, Natural Language vs Artificial Language, Speech and Language, Grammars

Unit: II 10 Credits

Theoretical Concepts of Computational Linguistics:

Computer Intelligent Interaction (HCII), Human Processing of Languages vs Computer Processing of Natural Languages, Rule based vs Statistical Processing, Machine Learning, Annotation of Language, Standards, Unicode, and Language Resources.

Unit: III 15 Credits

Computational Linguistics Survey

Unit: IV 05 Credits

Applied Areas of Computational Linguistics

Morphological Analyzer
Speech/Speaker Recognition
Speech Synthesis,
Text to Speech

Unit: V**05 Credits****Applied Areas of Computational Linguistics**

Language Analysis
 Language Understanding
 Language Generation
 Natural Language Interface
 Text Processing
 Machine Translation

Unit: VI**15 Credits****Data Storage:**

An Introduction to Databases
 Databases and Database Systems,
 Architecture of Database Systems,
 Historical Perspective of Database Systems.
 Basics of MS SQL Database

Practical**[D] Suggested Books/Readings:****Compulsory Reading:**

1. Bharti A., R. Sangal, V. Chaitanya, "NL, Complexity Theory and Logic" in Foundations of Software Technology and Theoretical Computer Science, Springer, 1990.
2. Gazdar G. and C. Mellish, NLP in Prolog, Wokingham: Addison Wesley, 1989.
3. Gazdar, G. and C. Mellish, NLP in Lisp, Wokingham: Addison Wesley, 1989.
4. Grishman, R., Computational Linguistics: An introduction, Cambridge University Press, 1986.
5. Grosz, Barbara J. (et al.) Readings in NLP, (ed.) LA: Morgan Kaufmann, 1990
6. Kenneth A. Lambert, 2011, Fundamentals of Python: First Programs, Cengage Learning.
7. Nath Jha, Girish (ed.), 2010, Sanskrit Computational Linguistics, Springer. Verlag, Germany, 2010.
8. Ruslan Mitkov, Oxford handbook of computational linguistics, Oxford University Press, 2005.
9. Dan Jurafsky, James H. Martin, 2000, Speech and Natural Language Processing, Prentice Hall.
10. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems (5th Ed.), Pearson Education.

Additional Resources:

1. Chandra Subhash (March, 2017). मशीनी अनुवाद (Machine Translation) यूजीसी सीबीसीएस स्कीम के तहत बीए (संस्कृत) के आईईसी (AEEC)-3 के पाठ्यक्रम पर आधारित. Vidyanidhi Prakashana, New Delhi, India, ISBN: 9789385539527
2. Chandra, Subhash and Jha, GN. Computer Processing of Nominal Inflections in Sanskrit: Methods and Implementations, CSP, UK, 2012.

3. Sanskrit Computational Linguistics symposium 1-2: Springer Verlag LNCS 5402 G Huet, A Kulkarni and P Scharf (eds), Proceedings of the 1st and 2nd International Symposium, 2009.
4. Sanskrit Computational Linguistics symposium 3: Springer Verlag LNCS 5406 A Kulkarni, G Huet (eds), Proceedings of the 3rd International Symposium, Jan 15 - 17, 2009, Hyderabad.
5. Grishman, R., Computational Linguistics: An introduction, Cambridge University Press, 1986.

[E] Teaching Learning Process:

As a programme of study in Sanskrit is designed to encourage the acquisition of disciplinary/subject knowledge, understanding skills, academic and professional skills required for Sanskrit and language based professions and jobs, learning experiences should be designed and implemented to foster active/participate learning. Development of practical skills will constitute an important aspect of the teaching-learning process. A variety of approaches to teaching-learning process, including lectures, seminars, tutorials, workshops, peer teaching and learning and project-based learning, field-based learning, substantial laboratory-based practical component and experiments in this course, open-ended project work, games, technology-enabled learning, internship in industry and research establishments etc. will need to be adopted to achieve this. Lecture based Teaching Learning on the Basics of Tools and Techniques for Computing Sanskrit Language, Detailed Survey of Language Computing tools and Techniques for Background will be covered in this course. It will be very helpful to students to engage them in laboratory and practice basic tools and techniques of computer. The 6 E's and S (Engage, Explore, Explain, Elaborate, Evaluate, Extend, and Standards) lesson plan format may be developed by teachers based on a constructionist model of teaching.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

The assessment of students' achievement in Computational Linguistics for Sanskrit will be aligned with the course/programme learning outcomes and the academic and professional skills

that the programme is designed to develop. A variety of assessment methods that are appropriate within the disciplinary area of Computational Sanskrit will be used. Learning outcomes will be assessed using the following: oral and written examinations, problem-solving exercises, practical assignment, observation of practical skills, individual project reports, seminar presentation; viva-voce interviews; computerized adaptive testing, literature surveys and evaluations, outputs from collaborative work, portfolios on chemical activities undertaken etc.

Internal Assessment:

As an Internal Assessment the periodic tests from each unit; should have written and oral component including paper presentation and group discussion.

On the place of internal assessment, project on e-lexicon development, e-corpora creation, database for cultural heritage and search engine for Sanskrit text, digitizing Sanskrit text may be done for the testing the computational skill of the students.

Lab practice of database may be done time to time

End semester test from the whole syllabus.

Sr. No.	Structure of the question paper	Marks
	for end semester examination	
1.	Five long questions from the any five units	05 x 12 = 60
2.	Two short notes from the remaining unit	02 x 7.5 = 15
	Total	75 marks

[H] Keywords:

Computational Linguistics, Computational Linguistics for Sanskrit, Language Technology, Natural Language Processing etc.

DSE-7 Fundamentals of Āyurveda (12137908)

[A] Course Objectives:

Āyurveda is the most ancient but alive traditional healthcare system in India. Through the classroom lectures and discussions, this course will introduce students to the theory of Āyurveda. The major objective is to make them understand the basic principles and concepts of preventative and curative medicines, health maintenance, diet and nutrition, usage of commonly used spices and herbs and therapeutic procedures in Āyurveda

[B] Course Learning Outcomes:

Graduates who read this course should be able to know the ancient tradition of Indian Medicine system, which has focused not only to the physical health but a healthy lifestyle.

After reading this paper students will know the history of Āyurveda through original sources of ancient medicine system enshrined in Sanskrit texts like Charaka Saṁhitā, Śuśruta Saṁhitā, Aṣṭāṅga Hṛdaya etc. and they will also get the basic knowledge of eight departments of Āyurveda.

Second section of this paper is related to ancient physiology. In this section students will get acquainted with the basic concept of Trigūṇa, Pañcamahābhūtas, Tridoṣas, Saptadhātus, Trayadosāgni, Trimalas, SvasthaVṛtta etc. which will help students to develop Āyurvedic understanding of lifestyle and concepts of preventive medicine. Āyurveda prescribes different food habits in different seasons. After reading this section students will be able to understand seasonal regimen & social conduct and its effect on health. It will develop their understanding of Health and Disease as explained in Āyurveda, and the way of diagnosing the illness.

Taittirīyopaniṣad - Bhṛguvalli will be taught in the third section of this paper. Our Ṛṣis were not only concerned about the physical health of individuals but also about the holistic health i.e. including mental, social and spiritual well being. By reading this portion of Upaniṣad student would develop a more balanced approach towards life.

[C] Contents for each course

Unit: I

14 Credits

Introduction to Āyurveda

History of Indian Medicine in the pre-caraka period,

The two schools of Āyurveda: Dhanvantari and Punarvasu.

Main Ācāryas of Āyurveda – Caraka, Suśruta, Vāgbha□□a,

Mādhava, Sārṅgadhara and Bhāvamiśra. 08 Credits

Unit: II**Credits 6**

Eight branches of Āyurveda (aṣṭāṅga Āyurveda):

1. Kāyçikitsā (General Medicine)
2. Kaumārabhṛtya (Pediatrics)
3. śalyatantra (Surgery)
4. Śālākya-Tantra (Ent. and Ophthalmology)
5. Bhūta Vidyā (Psychiatry Medicine).
6. Viṣa Vijñāna (Toxicology).
7. Rasāyana (Rejuvenates).
8. Vajīkaraṇa (Aphrodisiac).

Unit III - Basic Principles of Āyurveda**12 Credits****The Trigūṇas:** Sattva, Rajas and Tamas.2. **The Pañcamahābhūtas:** Ākāśa (Space), Vāyu (Air), Teja or Agni (Fire), Jala (Water) and Pṛthivī (Earth).3. **The Tridoṣas:** Vāta, Pitta and Kapha.4. **The Saptadhātus:** Rasa (fluid), Rakta (blood), Māṁsa, Meda (fat), Asthi, Majjā and Śukra.5. **The Trayodosāgni:** Jatharāgni (gastric fire), Saptadhātvāgni and Pañcabhūtāgni.6. **The Trimalas:** Purīṣā (faeces), Mūtra (urine) and Sveda (sweat).**Unit IV - Lifestyle and Preventive Medicine:****15 Credits**

- (i) Understanding Health and Disease in Āyurveda,
- (ii) SvasthaVṛtta (Preventive Medicine): Seasonal regimen & Social Conduct and its effect on health.
- (iii) **Carakasamhitā – Sūtra-sthānam (Tasyāśītīyādhyāya)**
Regimen of Six Seasons (Ṛtucharyā) : Hemanta (Early Winter), Śiśira (Winter), Vasanta (Spring), Grīṣma (Summer), Varṣā (Rainy) and Śarada (Autumn).

Unit: V**Credits 6****Diagnosis of illness (Roga-Parīkṣā)**

Eight ways to diagnose illness-

Nāḍī (Pulse Examination), Mūtra (Urine Examination), Mala (Stool Examination), Jihvā (Tongue Examination), Śabda (Speech Examination), Sparśa (Touch Examination), Dṛk (Vision Examination), and Ākr̥ti (Appearance).

GRADUATE**Unit: VI****Credits 7****Pancha kosha** – the holistic concept of body in Indian Medicine

Based on Taittirīyopaniṣad - Bhṛguvallī, Anuvāka- (1- 6)

Compulsory Reading:

1. Singh R.H., Body, Mind, Spirit – Integrative Medicine in Ayurveda, Yoga and Nature Cure - Chowkhamba Surbharti Pratishthanam, Varanasi, I 2009
2. V.B. Athavale, Basic Principles of Āyurveda, ChaukhambaSanskrit Pratishthan New Delhi, 2005.
3. Āyurveda Kā Saṅkṣipta Itihāsa, Hindi Sahitya Sammelan, Allahabad.
4. Priya Vrat Sharma, Essentials of Āyurveda: Sodashangahṛdayam, MotilalBanarsidass Publishers, 1999

Additional Resources:

1. <https://www.theayurvedaexperience.com/blog/pancha-kosha-bliss-layer/>
2. <http://www.speakingtree.in/blog/medicinal-plants-from-ancient-ind>
- 3.
4. Bhagavan Dash, Vaidya, and Acarya Manfred M. Junius, A Handbook of Āyurveda, Concept Publishing Co., New Delhi, 1987.
5. Bhishagratna, Kaviraj Kunjalal, ed., translator. (2002). Sushruta Samhita Volumes I and II. Varanasi, India: Chowkhamba Sanskrit Series.
6. Charak Samhita E-text: <http://www.charakasamhita.com/>
7. http://www.tkdil.res.in/tkdil/langdefault/ayurveda/Ayu_Principles.asp?GL=#q1
8. K. R. Srikantha Murthy, Illustrated Susruta Samhita, ChaukhambaOrientalia, 2012
9. M.S. Valiathan, An Introduction to Āyurveda Paperback, Universities Press (India) Private Limited, 2013
10. M.S. Valiathan, The Legacy of Suśruta, Universities Press, 2007
11. Ravi DattaTripathi, Vāgbhaṭa's Aṣṭāṅg-saṅgraha, ChowkhambaSanskrit Pratishthanam, Delhi., 2011.
12. ShanthaGodagama, The Handbook of Āyurveda, North Atlantic Books, 2004
13. Sharma, Priyavrit V., ed., translator. (1981-1994). Charaka Samhita, Vols. 1 - 4, Chaukhamba Sanskrit Series, Varanasi, India: Varanasi, India: Chowkhamba SanskritSeries.
14. Sharma, Ram Karan and Bhagawan Dash, Vaidya, eds., translators (1992 – 2000). CharakaSamhita Vols. 1 – 6. Varanasi, India.Chaukhamba Sanskrit Series]
15. Srikrishnamurthy, K.R. Srikantha, translator. (1991-1992). Vagbhata, AstangaHridayamVols. 1 and 2. Varanasi, India: Krishnadas Academy
16. Srikrishnamurthy, K.R. Srikantha, translator. (2001). Sharangadhara Samhita: A treatise on Āyurveda. Varanasi, India: ChaukhambaOrientalia.
17. Susruta (Author), Kunja Lal Bhishagratna, An English Translation of the Sushruta Samhita, Based on Original Sanskrit Text. Edited and Published by KavirajKunja Lal Bhishagratna. with a Full ... Notes, Comperative Views, Index, Glossary, Nabu Press, 2012

[E] Teaching Learning Process:

Since this is a new area of study for most learners, teachers will have to clarify all concepts in the class. They will suggest blogs, articles and other digital and non – digital sources to students.

Talks by competent practitioners of Ayurveda may be organized.

While reading this paper students should be encouraged to do comparison between modern Medical system and Āyurveda, so that they can develop a scientific attitude towards ancient holistic medicinal system. They should be able to understand the preventive approach of Āyurveda, which is not in focus in modern systems.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

Sr. No.	Basic Structure of the Question Paper –	Marks 75
(i)	Three long questions from first three sections (with options) Note: <i>Student must attempt one long question from each section.</i>	15x3 = 45
(ii)	Four short questions /notes from three sections (with options)	5x4 = 20
(iii)	Two very short answer questions	5x2 = 10

[H] Keywords:

Ayurveda, Ancient Medicine system, holistic medicine,

DSE – 8**Environmental Awareness in Sanskrit literature
(12137906)****[A] Course Objectives:**

The main objective of this course is to make the students acquainted with the basic concept of Indian Environmental Science and salient features of environmental awareness as reflected in Vedic and Classical Sanskrit literature.

The National culture of every country depends on its environmental and climatic conditions and human behavior towards natural resources. Nature- friendly thoughts in Sanskrit Literature have benefited human race for long. Many religious practices were framed by ancient thinkers as a tool to protect nature and natural resources.

[B] Course Learning Outcomes:

After completing this course, students will realize that they are a part of nature and nature belongs to all creatures; therefore, they should be more careful about the utilization and preservation of natural resources. This will make them better citizens of the world.

[C] Contents for each course**Unit: I****Credits 10**

Science of Environment : Definition, Scope and Modern Crisis:

Role of Environment in human civilization; Meaning and definitions of The Environment; Various name for Science of Environment: 'Ecology', 'Paryāvaraṇa', 'Prakṛti Vijñāna'; Main components of Environment: living organisms (Jaiva Jagat) and non-living materials (Bhoutika Padārtha). Elementary factor of Environment Physical elements, Biological elements and Cultural elements.

Modern Challenges and Crisis of Environment: Global warming, Climate change, Ozone depletion, Explosively increase in Pollution, Decrease in underground water label, River pollution, Deforestation in large scale. Natural calamities such as flood, draft and earthquakes.

Unit: II**Credits 10**

Environmental Background of Sanskrit Literature : Importance of Sanskrit Literature from the view point of Science of environment ; Concept of ' Mother Earth' and worship of Rivers in Vedic literature; Brief survey of environmental issues such as protection and preservation of mother nature, planting trees in forests, and water preservation techniques as propounded in the Sanskrit Literature. Buddhist and Jain concepts of ecology, protection of trees, love for animals and birds.

Unit: III**Credits 10**

Environmental Issues and Eco-system in Vedic Literature: Divinity to Nature, Co-ordination between all natural powers of universe; Cosmic order 'ṛta' as the guiding force for environment of whole universe (Ṛgveda, 10.85.1); Equivalent words for Environment in Atharvaveda: 'Vṛtavṛtā'(12.1.52), 'Abhivārah,'(1.32.4.), 'Āvṛtāḥ' (10.1.30), 'Paṛivṛtā' (10.8.31); five basic elements of universe covered by environment : Earth, Water, Light, Air, and Ether. (Aitareya Upaniṣad 3.3); Three constituent elements of environment known as 'Chandānsi': Jala (water), Vāyu (air), and Oṣadhi (plants) (Atharvaveda, 18.1.17); Natural sources of water in five forms: rain water(Divyāḥ),natural spring(Sravanti), wells and canals (Khanitrimāḥ), lakes (Svayamjāḥ) and rivers(Samudrārthāḥ) - Ṛgveda, 7.49.2.

Unit: IV

Environment Preservation in Vedic Literature:

Credits 10

Five elementary sources of environment preservation: Parvata (mountain), Soma (water), Vayu (air), Parjanya (rain) and Agni (fire)-Atharvaveda, 3.21.10; Environment Protection from Sun (Ṛgveda,1.191.1-16,Atharvaveda,2.32.1-6, Yajurveda,4.4,10.6); Congenial atmosphere for the life created by the Union of herbs and plants with sun rays (Atharvaveda,5.28.5);Vedic concept of Ozone-layer Mahat-ulba'(Ṛgveda,10.51.1; Atharvaveda,4.2.8); Importance of plants and animals for preservation of global ecosystem; (Yajurveda ,13.37); Eco friendly environmental organism in Upaniṣads (Bṛhadāraṇyaka Upaniṣad, 3.9.28, Taittirīya Upaniṣad,5.101, Iśopaniṣad,1.1)

Unit: V**Credits 10**

Environmental Awareness and Tree plantation: Planting of Trees in Purāṇas as a pious activity (Matsya Purāṇa, 59.159;153.512 ; Varāha Purāṇa 172. 39), Various medicinal trees to be planted in forest by king (Sukranīti,4.58-62) Plantation of new trees and preservation of old trees as royal duty of king (Arthaśāstra, 2.1.20); Punishments for destroying trees and plants (Arthaśāstra,3.19), Plantation of trees for recharging underground water (Bṛhatsamhitā, 54.119). Environmental Awareness and Water management:

Various types of water canals 'Kulyā' for irrigation : canal originated from river 'Nādimatṛ mukha kulyā', canal originated from nearby mountain 'Parvataparsva vartini kulyā', canal originated from pond,'Hrdsarṭa kulyā, Preservation of water resources 'Vāpi –kūpa –taḍāga' (Agnipurāṇa, 209-2; Valmīki Ramayana, 2.80.10-11); Water Harvesting system in Arthaśāstra (2.1.20-21); Underground Water Hydrology in Bṛhatsamhitā (Dakāgalādhyāya, chapter-54).

Unit: VI**Credits 10**

Universal Environmental Issues in Literature of Kalidasa : Eight elements of Environment and concept of 'Aṣṭamūrti' Siva (Abhijñānaśākuntalam); Preservation of forest, water resources, natural resources; protection of animals, birds and plant in Kalidasa's works, Environmental awareness in Abhijñānaśākuntalam Drama, Eco- system of Indian monsoon in Meghdūta, Seasonal weather conditions of Indian sub-continent in Ṛusamhara, Himalayan ecology in Kumārasambhava,

[D] Suggested Books/Readings:**Compulsory Reading:**

1. ठाकुर, आद्यादत्त, वेदों में भारतीय संस्कृति, हिन्दी समिति, लखनऊ, 1967
2. तिवारी, शशि, संस्कृतपाठ्यसंकलन, (वैदिक वाङ्मय और पर्यावरण-प्रबन्धन ; पृष्ठ 205-235) विद्यानिधि प्रकाशन, दिल्ली, 2005
3. सहाय, शिवस्वरूप, प्राचीन भारत का सामाजिक एवं आर्थिक इतिहास, मोतीलाल बनारसीदास, दिल्ली, 2012
4. ओझा, डी.डी., विज्ञान और वेद, साइंटिफिक पब्लिशर्स, जोधपुर, 2005
5. द्विवेदी, कपिल देव, वेदों में विज्ञान, विख्याति अनुसंधान परिषद्, भदोई, 2004
6. पंडा, पी. के., कालिदास का साहित्य- आधुनिक परिप्रेक्ष्य में, विद्यानिधि प्रकाशन, दिल्ली , 2009
7. सेमवाल, श्री कृष्णा (स०), 'संस्कृत वाङ्मये कृषि विज्ञानम्' दिल्ली संस्कृत अकादमी, 2006

Additional Resources:

1. Das Gupta, S.P., Environmental Issues for the 21st Century, A Mittal Publications, New Delhi, 2003
2. Dwivedi, O.P., Tiwari B.H., Environmental Crisis and Hindu Religion, Gitanjali Publishing House, New Delhi, 1987

Teachers are also free to recommend any relevant books/articles/e-resource if needed.

[E] Teaching Learning Process:

Teachers should explain terminology used and or related to the inscriptions. Merely translating language is unjust to the students and the subject. It is more useful to take students to the historically important sites, especially related to the inscriptions under-study.

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3
- Week 6 – Unit 3
- Week 7 – Unit 4

Week 8 – Unit 4

Week 9 – Unit 5

Week 10 – Unit 5

Week 11 – Unit 6

Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of the question Paper	Marks
1.	3 Long questions	3 x 12 = 36
2.	5 short notes	5x 5 = 25
3.	1 vyakhya in Sanskrit	1 x 7 = 7
4.	1 question to be answered in Sanskrit	<u>1x7 = 7</u>
	Total =	75

Internal Assessment

The most important method is to examine the understanding of verses prescribed in syllabus through periodic written and oral test from each unit. Group discussion among peer groups should be organized. Studnets should be encouraged to read news papers and discuss contemporary issuses in the light of the principles studied in this paper.

[H] Keywords:

Ṛgveda, Atharvaveda, Yajurveda, Upaniṣad, Sūkta, Mantra, Vedic deities, Environmental awareness, Ecology ,Trees, Animals and birds, Nature, Climate, Natural Resources, Sanskrit Literature, Vedic Literature, Environmental awareness.

Generic Elective (GE)
(Any Four)
B.A. (Hons) Sanskrit

Semester: I/II/III/IV

GE-1 Basic Sanskrit	GE-2 Indian Culture and Social Issues
GE-3 Tools and Techniques for Computing Sanskrit Language	GE-4 Basic Principles of Indian Medicine System (Ayurveda)
GE-5 Indian Aesthetics	GE-6 Fundamentals of Indian Philosophy
GE-7 Ancient Indian Polity	GE-8 Indian Epigraphy & Paleography
GE-9 Computer Applications for Sanskrit	GE-10 Individual, Family and Community In Indian Social Thought
GE-11 Nationalism and Indian Literature	GE-12 Indian Architectural System

GE-1 Basic Sanskrit (12135901)

[A] Course Objectives:

This is an elementary course in Sanskrit language designed for students who wish to learn Sanskrit from the very beginning. Essential Sanskrit grammar will be introduced (without reference to Panini's sutras) through the multiple example method with emphasis on students constructing themselves sentences.

[B] Course Learning Outcomes:

Students will acquire basic knowledge of the Sanskrit language

They will be able to communicate in simple Sanskrit

They will develop an interest in Sanskrit and the Bhagwadgita and they will be motivated to study further.

[C] Contents

Total Credits 60

Unit: I

Credits 10

Grammar and Composition Part I:

Nominative forms of pronouns- asmad, yuṣmad, etat and tat in masculine, feminine and neuter.

Nominative forms of 'a' ending masculine and neuter gender nouns with paṭh, khād, likh and similar simple verbs in present, past and future. Objective forms of the above nouns and pronouns in singular with more simple verbs

Instrumental, dative, ablative forms of the above nouns and pronouns in singular, dual and plural instrumental, dative, ablative forms of all the words in this syllabus.

Unit: II

Credits 10

'ā' and 'ī' ending feminine words in nominative and accusative cases with loṭ lakāra (imperative).

'ā' and 'ī' ending feminine nouns in singular in Genitive/ possessive and locative cases, genitive and locative cases in singular in pronouns tat, etat, yat, kim

Unit: III

Credits 10

Masculine and Feminine nouns ending in 'i' and masculine nouns ending in 'u' in various cases in singular

Masculine nouns ending in consonants – bhavat, guṇin, ātman and Feminine nouns ending in consonants – vāk, Neuter nouns ending in consonants – jagat, manas

Unit: IV

Credits 10

Grammar and Composition Part II

Special Verb forms – in parasmaipada –past, present, future and imperative - kṛ, śrū

Special Verb forms – in parasmaipada –past, present, future and imperative jñā.
Special Verb forms – in parasmaipada –past, present, future and imperative dā.

Unit: V

Credits 10

ātmanepada – sev, labh
Phonetic changes – visarga sandhi
vowel sandhis.

Unit: VI

Credits 10

Pratyayas and the Bhagwadgita

Participles - śatṛ, śānac, ktavatu, kta.
Pratyayas – ktvā, lyap, tumun.
Active – passive structures in lakāras – (third person forms only) and pratyayas - kta, ktavatu Gītā Chapter XII

[D] Suggested Books/Readings:

Compulsory Reading:

1. Anuvada Chandrika
2. Apte's Guide to Sanskrit Composition
3. Rupa Chandrika
4. Kridanta Rupa Mala – Srijan Jha – App. available on Google Play Store

[E] Teaching Learning Process:

1. Teachers will introduce each element of grammar with several examples
2. They will make students repeat those examples
3. Teachers shall put words in phrases and sentences and repeat them with several variations
4. Students will make many sentences in the class singly and collectively, orally and in writing
5. Teachers will provide practice sheets to students for each section, which they will solve either in class or at home
6. Teachers must encourage students to speak in Sanskrit from the very beginning, making short sentences.

[F] Weekly Plan

Week 1 – Unit 1
Week 2 – Unit 1
Week 3 – Unit 2
Week 4 – Unit 2
Week 5 – Unit 3
Week 6 – Unit 3
Week 7 – Unit 4
Week 8 – Unit 4

Week 9 – Unit 5
Week 10 – Unit 5
Week 11 – Unit 6
Week 12 – Unit 6

[G] Assessment :

Teaching and learning a language requires sustained effort. Hence, practice sheets will form the basis of a continuous assessment.

Periodic tests and viva voce examination will be helpful.

[H] Keywords:

Sanskrit language, grammar, composition etc.

GE-2

Indian Culture and Social Issues (12135902)

[A] Course Objectives:

This paper is designed to introduce nuances of Indian culture to students and to show how cultural traditions have evolved. The paper also engages them in debates about certain significant socio-cultural issues.

[B] Course Learning Outcomes:

The first unit of this section aims at the basic understanding of culture and civilization at large dimensions, on the basis of which they will be able to evaluate Indian culture in modern terminologies.

The second unit deals with evolution of Indian culture through different ages from ancient times to the modern age with the symbiosis of alien elements e.g. Islamic and other foreign traditions.

The third unit aims at highlighting the undercurrent of Sanskrit-led culture in vernacular as well as urban shades of cultural life. By studying this course a student will be able to perceive India's various cultural identities as enriched by Sanskrit language and literature. In this section the student would be acquainted with the fundamental principles of indigenous law and statutes from original Sanskrit sources e.g. Mahabharata, Manusmriti, Yajñvalkyā Smṛiti etc. The student will also be able to understand the status and rights of women in ancient Indian society. They will be aware the elasticity and adaptability of Hindu code of conduct as its essential quality, with the change and demand of time. This section would inculcate among the students the capability of debating and ways of arousing valid questions within and to the tradition and find out the efficient answer to cope up with the modern problems.

[C] Contents

Total Credits 60

Unit: I

Credits 5

What is culture? Culture and Civilization
What is 'Indian' culture?
Culture in a multi-cultural society.

Unit: II

Credits 5

Vedic sabhyatā
Sindhu sabhyatā
Sanskrit in Indo-Islamic tradition – (Proceedings of the Sagar University seminar on 'Islāmikā Sanskrit paramparākoyogadāna')

Unit: III**Credit 15**

Pandavani,
 Versions of the Rāma legend in Sanskrit literature – Vālmīki's Rāmāyaṇa, Bhāsa's Pratimānāṭakam, Bhavabhūti's Uttarāmacaritam, Raghuvamśam of Kalidasa, Somadeva's Kathāsaritsāgara, Rāmāyaṇamañjari of Rājaśekhara etc.
 Ritusamhāra in folk music
 Sanskrit themes in traditional dance forms in Kerala
 Yakṣagan
 Gītagovinda and Odissi
 Major agricultural and seasonal festivals of India and the Indian calendar – Bihu, Holi, Pongal, Makar Saṁkrāntī, Lohari, Oṇam, Baisakhi, Śrāvaṇī Pūrṇimā

Unit: IV**Credit 15**

Law and change – Dharma as an ever evolving phenomenon
 Manusmṛti, Chapter 2, verses 6 and 12 (2.6, 12) with the commentary of Medhātithi ;
 Lingat, Robert : Classical Law of India, Chapter 1, pp 3-7; tradition – pp 9-14 ; good customs – 14-17.
 Mathur, A.D. : Medieval Hindu Law, Chapter I, pp 1-8
 Caste – Voices of challenge
 Traditional varṇahierarchy
 Vajrasūcī by Aśvaghoṣa

Unit: V**Credits 10**

Identity of women
 Draupadī's question– Mahābhārata, SabhāParva– DyūtaParva (sanskritdocuments.org)
 Chapter 66 - Duryodhana asks Draupadī to be brought to the court 1; Vidura's protest 2, 4 ; Chapter 67 – Duryodhana asks Pratikāmi to fetch Draupadī 2; Draupadī's refusal and question 5-10, 16 ;

Unit: VI**Credits 10**

Yudhiṣṭhira's response 39-41 ; Bhīṣma's response 47-49 ; Draupadi's Rejoinder 50-52 ; Vikarṇa's statement, chapter 68, verses 12-17 Karṇa to Vikarṇa – 27-31, 35.
 Struggle to secure women's right to property YājñavalkyaSmṛti, Vyavahārādhyāya: Verse 135 with Vijñāneśvara's commentary (section on patnī)

Practical**[D] Suggested Books/Readings:****Compulsory Reading:**

1. Bhagwadgita
2. उपाध्याय बलदेव, वैदिक साहित्य और संस्कृति, चौखम्बा विद्या भवन
3. मध्यप्रदेश हिन्दी अकादमी, प्राचीन भारतीय सामाजिक एवं आर्थिक संस्थायेँ भोपाल, 1976
4. पाण्डेय राजबली, हिन्दू संस्कार, चौखम्बा विद्या भवन
5. ज्ञानी शिवदत्त, भारतीय संस्कृति,
6. बाशम ए. ल. अद्भुत भारत
7. Basham A.L. . Wonder that was India
8. Bharadwaj, Ramesh: Vajrasūcī of Aśvaghoṣa (Varṇa-Jāti through the Ages), Vidyanidhi, Delhi

9. Mathur A.D., Medieval Hindu Law, Oxford University Press, New Delhi 2006
10. Sharma Braj Narain, Social Life in Northern India, New Delhi, 1966
11. **Pandey Raj Bali: Hindu Sanskara, (English) Delhi, 2nd Revised Edition 1969, Reprinted 1991**
12. Prabhu, P.H., Hindu Social Organisation, Popular Prakashan, Mumbai, 1998, pp. 257-283.

Additional Resources:

[E] Teaching Learning Process:

Largely discussion based teaching.

Teachers shall announce in advance the text to be discussed and the relevant secondary reading for it.

Students will read the translation of the relevant text and secondary reading, if any, in advance at home.

Teachers shall introduce the issues in class and invite students to give their inputs on the basis of their reading of the text.

It shall be important to connect issues in the texts with contemporary life.

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3
- Week 6 – Unit 3
- Week 7 – Unit 4
- Week 8 – Unit 4
- Week 9 – Unit 5
- Week 10 – Unit 5
- Week 11 – Unit 6
- Week 12 – Unit 6

[G] Assessment Methods:

Sr. No.	Structure of the question paper –	Total Marks 75
1.	Four long questions	4 x 15 = 60
2.	Two notes	2 x 7.5 = 15
Internal assessment : Group discussions, paper presentations, assignments		

[H] Keywords:

Indian Culture, Social Issues, Cultural Traditions, Cultural Roots, Symbiosis, Rights of Women, Ancient Indian Society, Modern Problems etc.

GE-3**Tools and Techniques for Computing Sanskrit Language
(12137904)****[A] Course Objectives:**

This course will introduce the current research and development in Sanskrit computing. Primary emphasis will be on tools and techniques developed under government and private funding and to explore new technologies for Sanskrit.

[B] Course Learning Outcomes:

The course-level learning outcomes that a student of this course is required to demonstrate are indicated below:

- Learn the basic concept of Sanskrit Phonology, Sanskrit Morphology, Syntax, Semantics, Lexicon and Corpora.
- Learn the origin and Development of Language Computing.
- Basic Introduction of Computing Sanskrit Language.
- Various methodologies used on Language Technology.
- Various tools developed for Sanskrit Language.
- Survey of Language Computing
- Evaluation and Challenges in Machine Translation

[C] Contents**Total Credits 60****Unit: I****10 Credits****Sanskrit Linguistics:**

Sanskrit Phonology
Sanskrit Morphology

Unit: II**10 Credits****Sanskrit Linguistics:**

Syntax
Semantics

Unit: III**10 Credits****Sanskrit Linguistics:**

Lexicon
Corpora

Unit: IV

Sanskrit Language Resources and Tools.

10 Credits**Unit: V****Language Computing Methodology:**

Rule Base

10 Credits

Statistical and Hybrid

Unit: VI

Language Computing Survey:
Language Computing Survey

10 Credits

Practical

[D] Suggested Books/Readings:

Compulsory Reading:

1. Chandra Subhash (March, 2017). मशीनी अनुवाद (Machine Translation) यूजीसी सीबीसीएस स्कीम के तहत बीए (संस्कृत) के एईईसी (AEEC)-3 के पाठ्यक्रम पर आधारित. Vidyanidhi Prakashana, New Delhi, India, ISBN: 9789385539527.
2. Akshar Bharati, Vineet Chaitanya and Rajeeva Sanghal, Natural Language Processing: A Paninian Prospective, Prentice Hall of India, New Delhi, 1995.
3. Girish Nath Jha, Madhav Gopal, Diwakar Mishra, Annotating Sanskrit Corpus: Adapting IL-POSTS, Human Language Technology. Challenges for Computer Science and Linguistics Lecture Notes in Computer Science Volume 6562, 2011, pp 371-379.
4. Tools developed by Computational Linguistics Group, Department of Sanskrit, University of Delhi, Delhi-110007 available at: <http://sanskrit.du.ac.in>

Additional Resources:

1. Daniel Jurafsky and James H. Martin, Speech and Language Processing, Prentice Hall; 2008
2. Chandra, Subhash and Jha, GN. Computer Processing of Nominal Inflections in Sanskrit: Methods and Implementations, CSP, UK, 2012.
3. Jha, Girish Nath, Morphology of Sanskrit Case Affixes: A Computational Analysis, M.Phil Dissertation, Centre of English and Linguistics, School of Language, Literature and Culture Studies, JNU, 1993.
4. Sanskrit Computational Linguistics symposium 1-2: Springer Verlag LNCS 5402 G Huet, A Kulkarni and P Scharf (eds), Proceedings of the 1st and 2nd International Symposium, 2009.
5. Sanskrit Computational Linguistics symposium 3: Springer Verlag LNCS 5406 A Kulkarni, G Huet (eds), Proceedings of the 3rd International Symposium, Jan 15 - 17, 2009, Hyderabad.
6. Grishman, R., Computational Linguistics: An introduction, Cambridge University Press, 1986.

[E] Teaching Learning Process:

Lecture based Teaching Learning on the Basics of Tools and Techniques for Computing Sanskrit Language, Detailed Survey of Language Computing tools and Techniques for Background will be covered in this course. It will be very helpful to students to engage them in laboratory and practice basic tools and techniques of computer.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

Learning outcomes will be assessed using the following: oral and written examinations, problem-solving exercises, practical assignment, observation of practical skills, individual project reports, seminar presentation; viva-voce interviews; computerized adaptive testing, literature surveys and evaluations, outputs from collaborative work, portfolios on chemical activities undertaken etc.

Internal Assessment:

As an Internal Assessment the periodic tests from each unit; should have written and oral component including paper presentation and group discussion.

On the place of internal assessment, project on e-lexicon development, e-corpora creation, database for cultural heritage and search engine for Sanskrit text, digitizing Sanskrit text may be done for the testing the computational skill of the students.

Assignment of any topic may be given to students.

End semester test from the whole syllabus.

Sr. No.	Structure of the question paper	Marks
	for end semester examination	
1.	Five long questions from the any five units	05 x 12 = 60
2.	Two short notes from the remaining unit	02 x 7.5 = 15
	Total	75 marks

[H] Keywords:

Computing Sanskrit Language, Tool and Techniques for Computing Sanskrit Language, Language Technology etc.

GE-4

Basic Principles of Indian Medicine System (Ayurveda) (12135904)

Credits 60

[A] Course Objectives:

Āyurveda is the most ancient but alive traditional healthcare system in India. Through the classroom lectures and discussions, this course will introduce students to the theory of Āyurveda. The major objective is to make them understand the basic principles and concepts of preventative and curative medicines, health maintenance, diet and nutrition, usage of commonly used spices and herbs and therapeutic procedures in Āyurveda

[B] Course Learning Outcomes:

Graduates who read this course should be able to know the ancient tradition of Indian Medicine system, which has focused not only to the physical health but a healthy lifestyle.

After reading this paper students will know the history of Āyurveda through original sources of ancient medicine system enshrined in Sanskrit texts like Charaka Saṁhitā, Śuśruta Saṁhitā, Aṣṭāṅga Hṛdaya etc. and they will also get the basic knowledge of eight departments of Āyurveda.

Second section of this paper is related to ancient physiology. In this section students will get acquainted with the basic concept of Trigūṇa, Pañcamahābhūtas, Tridoṣas, Saptadhātus, Trayadosāgni, Trimalas, SvasthaVṛtta etc. which will help students to develop Āyurvedic understanding of lifestyle and concepts of preventive medicine. Āyurveda prescribes different food habits in different seasons. After reading this section students will be able to understand seasonal regimen & social conduct and its effect on health. It will develop their understanding of Health and Disease as explained in Āyurveda, and the way of diagnosing the illness.

Third section of this paper is related to the Dietetics, Nutrition and Treatments in Āyurveda. Students will get to know the Āyurvedic point of view on nutrition and metabolism, Classification of Āhāra (compatible foods) according to Āyurveda and Viruddhāhāra (incompatible diet) & role of diet. After reading this section students will get the basic knowledge of Āyurvedic treatments, their method and classification of treatments, like Pañcakarma, Therapeutic vomiting (Vamana), Purgation Therapy (Virechana), Enema (Basti), Nasal Administration – Nāśya, Blood Letting (Raktamokṣaṇa) etc.

Last section of the paper is related to medicinal plants. Students will get equipped with the knowledge of some extremely important plants which are available in their surroundings like Tulsī, Haridrā, Ghṛtakumārī, Brāhmī, Āmalā, Aśwagandhā, Neema Plant etc. and will be able to use them in necessity.

[C] Contents**Total Credits 60****Unit: I****10 Credits****Introduction to Indian Medicine System: Āyurveda**

Definition of Āyurveda, Āyuh (Life), Śarīra (Body), Health, Aim of Āyurveda, Subject Matter of Āyurveda, Salient Features of Āyurveda.

History of Āyurveda, Atharvaveda as an early source for medicinal observations , Introduction to Major Texts (Suśruta Samhitā, Caraka Samhitā, Aṣṭāṅga Hṛdayam and Aṣṭāṅga Saṅgraha) and Thinkers (Suśruta, Caraka and Vāgbhaṭa.) and Aṣṭāṅga Hṛdayam and Aṣṭāṅga Saṅgraha of Vāgbhaṭa.

Unit: II**Credits 5+5****Eight Branches of Āyurveda (Aṣṭāṅga Āyurveda):**

1. Kāyçikitsā (General Medicine)
2. Kaumārabhr̥tya (Pediatrics)
3. Śālyā-Tantra (Surgery)
4. Śālākya-Tantra (Ent. and Ophthalmology)
5. Bhūta Vidyā (Psychiatry Medicine)
6. Viṣa Vijñāna (Toxicology)
7. Rasāyana (Rejuvenates)
8. Vajīkaraṇa (Aphrodisiac)

Basic Principles of Āyurveda

1. **The Trigūṇas:** Sattva, Rajas and Tamas.
2. **The Pañcamahābhūtas:** Ākāśa (Space), Vāyu (Air), Teja or Agni (Fire), Jala (Water) and Pṛthivī (Earth).
3. **The Tridoṣas:** Vāta, Pitta and Kapha.
 4. **The Saptadhātus:** Rasa (fluid), Rakta (blood), Māṁsa, Meda (fat), Asthi, Majjā and Śukra.
 5. **The Trayodosāgni:** Jatharāgni (gastric fire), Saptadhātvāgni and Pañcabhūtāgni.
 6. **The Trimalas:** Purīṣā (faeces), Mūtra (urine) and Sveda (sweat).

Unit: III**Credits 5 + 5****Lifestyle and preventive medicine:**

- (i) Understanding Health and Disease in Āyurveda,

- (ii) Concept of Dharī Pūraṣa (A person who is subjected to medical treatment),
- (iii) SvasthaVṛtta (Preventive Medicine): Seasonal regimen & Social Conduct and its effect on health.

Dietetics, Nutrition and Treatment - Āyurvedic understanding of Nutrition and Metabolism, Classification of Āhāra according to Āyurveda and Viruddhāhāra (Incompatible Diet) & Role of Diet to maintain the Health.

Unit: III Diagnosis of illness (Roga-Parīṣaṇa): Credits 8

Eight ways to diagnose illness-

Nāḍī (Pulse Examination), Mūtra (Urine Examination), Mala (Stool Examination), Jihvā (Tongue Examination), Śabda (Speech Examination), Sparśa (Touch Examination), Dṛk (Vision Examination), and Ākṛti (Appearance).

Unit IV Basic principles of Āyurvedic Pharmacology Credits 8
as prescribed in Śoḍaśānāhṛdayam: (Basic Concept of Dravya, Classification of Dravya, Some important Āyurvedic drugs: *Harītakī, Bibhītaka, Lavaṅga, Elā, Udumbara, Śiriṣa, Babbūla, Rudrākṣa, Aśoka, Pārijāta, Nārikela, Śatapuspā, Kumāri, Bhṛṅgarāja, Śaṁkhaṇḍī, Dūrvā*), Principles of Therapeutics.

Unit: V Principles of Treatment and Pañcakarma Therapy: Credits 8

1. Pūrvakarma (Preparatory procedures)
2. Pradhānakarma (Major main procedures)
 - (i) Vamana (Therapeutic vomiting)
 - (ii) Virechana (Purgation Therapy)
 - (iii) Anuvāsana
 - (iv) Āsthāpana Vasti
 - (v) Śirovirecana
3. Paścātkarma (Post therapy dietary management)

Unit VI : Credits 6
Important Medicinal Plants in Āyurveda

10 Medicinal Plants in Suśruta Saṁhitā: Tulsī, Haridrā, Sarpagandhā, Ghṛtakumārī, Guggulu, Brāhmī, Āmalā, Aśwagandhā, Arjun Tree, Neem tree

[D] Suggested Books/Readings :**Compulsory Reading:**

1. Acharya, Srinivas, Panchakarma Illustrated, Chaukhamba Sanskrit Pratishthana, Delhi, 2006.
2. V.B. Athavale, Basic Principles of Āyurveda, Chaukhamba Sanskrit Pratishthan New Delhi, 2005.
3. Āyurveda Kā Saṅkṣipta Itihāsa, Hindi Sahitya Sammelan, Allahabad.
4. Priya Vrat Sharma, Essentials of Āyurveda: Sodashanghṛdayam, Motilal Banarsidass Publishers, 1999
5. <http://www.speakingtree.in/blog/medicinal-plants-from-ancient-india>

Additional Resources:

1. Bhagavan Dash, Vaidya, and Acarya Manfred M. Junius, A Handbook of Āyurveda, Concept Publishing Co., New Delhi, 1987.
2. Bhishagratna, Kaviraj Kunjalal, ed., translator. (2002). Sushruta Samhita Volumes I and II. Varanasi, India: Chowkhamba Sanskrit Series.
3. Charak Samhita E-text: <http://www.charakasamhita.com/>
4. http://www.tkdil.res.in/tkdil/langdefault/ayurveda/Ayu_Principles.asp?GL=#q1
5. K. R. Srikantha Murthy, Illustrated Susruta Samhita, Chaukhamba Orientalia, 2012
6. M.S. Valiathan, An Introduction to Āyurveda Paperback, Universities Press (India) Private Limited, 2013
7. M.S. Valiathan, The Legacy of Suśruta, Universities Press, 2007
8. Ravi Datta Tripathi, Vāgbhaṭa's Aṣṭāṅg-saṅgraha, Chowkhamba Sanskrit Pratishthanam, Delhi., 2011.
9. Shantha Godagama, The Handbook of Āyurveda, North Atlantic Books, 2004
10. Sharma, Priyavrit V., ed., translator. (1981-1994). Charaka Samhita, Vols. 1 - 4, Chaukhamba Sanskrit Series, Varanasi, India: Varanasi, India: Chowkhamba Sanskrit Series.
11. Sharma, Ram Karan and Bhagawan Dash, Vaidya, eds., translators (1992 – 2000). Charaka Samhita Vols. 1 – 6. Varanasi, India. Chaukhamba Sanskrit Series]
12. Srikrishnamurthy, K.R. Srikantha, translator. (1991-1992). Vagbhata, Astanga Hridayam Vols. 1 and 2. Varanasi, India: Krishnadas Academy
13. Srikrishnamurthy, K.R. Srikantha, translator. (2001). Sharangadhara Samhita: A treatise on Āyurveda. Varanasi, India: Chaukhamba Orientalia.
14. Susruta (Author), Kunja Lal Bhishagratna, An English Translation of the Sushruta Samhita, Based on Original Sanskrit Text. Edited and Published by Kaviraj Kunja Lal Bhishagratna. with a Full ... Notes, Comparative Views, Index, Glossary, Nabu Press, 2012

[E] Teaching Learning Process:

While reading this paper students should be encouraged to do comparison between modern Medical system and Āyurveda, so that they can develop a scientific attitude towards ancient holistic medicine system. They should be able to understand preventive approach of Āyurveda which is not focused in modern systems.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :**Sr. No. Basic Structure of the Question Paper & Division of Marks (75 Marks):**

(i)	Three long questions from Units I to V	15x3 = 45
	Note: <i>Student must attempt only one long question from each section.</i>	
(ii)	Four short notes (with options) from Units I to V	5x4 = 20
(iii)	Two short notes from Unit VI	<u>5x2 = 10</u>
	Total Marks =	75

[H] Keywords:

Ayurveda, Ancient Medicine System, holistic medicine

GE-5 Indian Aesthetics (12135904)

[A] Course Objectives:

Indian aesthetics is a potent field for the study of literary criticism. It has developed as an independent discipline today, which deals with the historically determined essence of human values, their creation, perception, appreciation and assimilation. It is the science and philosophy of essential analysis of all the fine arts. Indian perception accepts poetry, drama, music, architecture, iconography and painting as independent Arts. The main objective of this paper is to give its brief overview with reference to major trends of Indian Aesthetics.

[B] Course Learning Outcomes:

This course will enable students to identify the real essence of Beauty propounded by Indian rhetoricians. After the completion of the course the learner will come across the Indian deliberation on aesthetic experience in the form of Rasa and its process. The participant will be able to appreciate the various artistic mods of expressions of Beauty in general and poetry in particular. The course will help the student peep into the historical evolution of the Indian science of aesthetics.

[C] Contents

Total Credits 60

Unit: I

Credits 8

Aesthetics (Saundaryaśāstra), its nature and components

Beauty (Saundarya): its definition, nature and components : vāya, rūpa, vacana, hāva, Discussion of synonyms of the term Beauty(Saundarya) : ramaṇīyatā, śucitā, lāvaṇya, cārutā, kānti, vicchitti, madhuratā, mugdhatā, manohāritā, śrī.

Unit: II

Credits 8

Aesthetic experience (Rasa)

Nature of rasa (Aesthetic experience) according to Sāhityadarpaṇa, aesthetic enjoyment – eternal bliss, the ultimate reality (ānandamayatā, alaukikatā)

Unit: III

The process of Aesthetic experience (Rasa)

Credits 12

Constituents of rasa: bhāva (human feelings and emotions) vibhāva (causes or determinants), anubhāva (voluntary gestures), sātṭvika bhāva (Involuntary gestures), vyabhicāri bhava (transitory states) and sthāyibhāva(basic mental states), saḥṛdaya / sāmājika (Connoisseur / Spectator). anukārya, anukartā, sādharmaṇīkaraṇa (Generalization), four mental stages of rasa realization: vikāsa (cheerfulness),

vistāra(exaltation), kṣobha (agitation), vikṣepa (perturbation). number of rasas according to Bharat.

Unit: IV

Credits 10

Aesthetic elements (saundarya - tattva)

Art as the mode of expression of saundarya –in fine arts (Architecture, Sculpture and Painting), Main aesthetic elements of literary arts (Poetry and Drama) : alaṅkāra, rīti, dhvani, vakrokti & aucitya.

Unit: V

Credits 16

Prominent thinkers of Indian Aesthetics

Bharata, Bhāmaha, Vāmana, Daṇḍī, Ānandavardhana Abhinavagupta, Kuntaka, Mahimabhaṭṭa, Kṣemendra, Vishvanātha and Jagannātha.

Unit: VI

Credits 6

Perception of beauty in Abhijñānaśākuntalam

Perception of beauty in Drama from cultural, social and aesthetical point of view in the context of Abhijñānaśākuntalam.

[D] Suggested Books/Readings:

Compulsory Reading:

1. Sāhityadarpaṇa of Vishvanatha, (Based on karikas 3/1-28).
2. Kane P.V., *History of Sanskrit Poetics* pp.352-391,
i. Upadhyaya, Baladeva, *Sanskrit Ālocanā* (for six schools)
3. Pandey, Kantichandra: *Comparative Aesthetics*, vol.1 Chowkhamba Sanskrit series office Varanasi, 2008
4. चतुर्वेदी ब्रजमोहन, भारतीय सौन्दर्यदर्शन, मध्यप्रदेश हिन्दी ग्रन्थ अकादमी, पृ० 5—12, 22—34.
5. चतुर्वेदी ब्रजमोहन, भारतीय सौन्दर्यदर्शन पृ० 42—60.
6. पाण्डेय कान्तिचन्द्र स्वतन्त्र कलाशास्त्र, प्रथम भाग पृ. 593—625.
7. चतुर्वेदी ब्रजमोहन, भारतीय सौन्दर्यदर्शन पृ० 37—42.
8. पाण्डेय कान्तिचन्द्र, स्वतन्त्र कलाशास्त्र, प्रथम भाग पृ. 593—625.
9. चतुर्वेदी ब्रजमोहन, भारतीय सौन्दर्यदर्शन पृ० 61—76.

Additional Resources:

10. Gnoli, R. : *The Aesthetic Experience according to Abhinavagupta*, Chowkhamba Sanskrit series office Varanasi.
11. उपाध्याय बलदेव संस्कृत—आलोचना, हिन्दी समिति, सूचना विभाग, उ. प्र., 1963.
12. कृष्णकुमार अलंकारशास्त्र का इतिहास, साहित्य भण्डार, मेरठ, 1998
13. Coomarswami A: *Introduction to Indian Art*, Theosophical Society, Adyar, 1956.
14. कृष्णकुमार अलंकारशास्त्र का इतिहास, साहित्य भण्डार, मेरठ, 1998
15. पाण्डेय, कान्तिचन्द्र स्वतन्त्र कलाशास्त्र, प्रथम तथा द्वितीय भाग, चौखम्भा संस्कृत सीरीज वाराणसी 1967, 1978.

[E] Teaching Learning Process:

The teaching-learning process for this paper will be theoretical as well as practical where each aspect needs to be analysed in a proper way. The students will be taught through highlighting salient features of various types of Sanskrit literature.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of the question paper –	Total marks - 75
1.	4 long questions	4x 15 = 60 marks
2.	2 notes	2x 7.5 marks – 15
	Total marks	- 75

The most important method is to examine the understanding of tradition of Sanskrit Poetics. This test should be of two natures-a written test and b.viva and group discussion among peer groups. 2. End semester test of the whole syllabus on both natures.

[H] Keywords:

Aesthetics, Saundaryaśāstra, vāya,rūpa, vacana, hāva, ramaṇīyatā, śucitā, lāvaṇya, cārutā, kānti, vicchitti, madhuratā, mugdhatā, manohāritā, śrī, Aesthetic experience, Rasa, Sāhityadarpaṇa, ānandamayātā, alaukikatā, bhāva, vibhāva, anubhāva, sāttvika bhāva, vyabhicāri bhāva, sthāyibhāva, saḥṛdaya, anukārya, anukartā, sādharmaṇīkaraṇa, Rasa, alaṅkāra, rīti, dhvani,vakrokti & aucitya,Bharata, Bhāmaha, Vāmana, Daṇḍī, Ānandavardhana Abhinavagupta, Kuntaka, Mahimabhaṭṭa, Kṣemendra, Panditaraja Jagannātha.

GE-6
Fundamentals of Indian Philosophy
(12135906)

[A] Course Objectives:

The objective of the Syllabus is to study the basic issues in Indian Philosophy.

[B] Course Learning Outcomes:

Indian Philosophy teaches critical thinking, close reading, clear writing, and logical analysis. It develops the tools of logic and reason to analyze the ways in which the individual experiences the Universe. It guides the student to understand the language we use to describe the world, and our place within it. Different areas of philosophy are distinguished by the questions they ask. The most important reason to study philosophy is that it is of enormous and enduring interest. Philosophy is important, but it is also enormously enjoyable in which students are provided with the tools and the opportunity to develop and express their own philosophical views.

2.2. Content

Total Credits 60

Unit: I Fundamentals of Philosophy

Credits 10

Darśana - concept and aims, Classification of Indian Philosophical schools,
 Fundamental issues in Indian Philosophy - Epistemology : Six Pramanas

Unit II

Credits 10

Metaphysics: Realism, Idealism, Causation – Satkaryavada, Asatkaryavada, Parinamavada, Vivartavada, Svabhavavada, Consciousness and matter, theories of self
 Ethics: Karma & Punarjanma theory, Liberation

Unit – III

Credits 10

Schools of Indian Philosophy

Heterodox Schools - Cārvāka – General introduction with emphasis on Challenge to Veda, Rejection of Transcendental Entities, Ethics (Based on Sarvadarshansamgrah)

Jainism – General introduction with emphasis on Anekāntavāda, Syādvāda, Saptabhaṅginīyāya, Triratna

Buddhism- General introduction with emphasis on Four Noble Truths

Unit - IV

Credits 10

Sāṃkhya – General Introduction with emphasis on Prakṛti, three Guṇas & Puruṣa

(Based on Sāṃkhyakārikā)

Yoga - Eight fold path of Yoga (Based on Yogasūtra Sādhana-pāda and Yogabhāṣya thereon)

Unit: V

Credits 10

Nyāya Vaiśeṣika - General Introduction with emphasis on Tarkasamgraha – seven padarthas (overview only)

Mīmāṃsā - Svataḥ Prāmāṇyavāda

Unit: VI

Credits 10

Advaita Vedānta – General Introduction with emphasis on Brahman, Māyā, Jīva and Jagat (Based on Vedāntasāra)

Bhakti Schools of Vedānta – General introduction with emphasis on God, Īśvara & Nature of Bhakti

[D] Suggested Books/Readings:

Compulsory Reading:

1. Bhartiya, Mahesh - *Bhāratīya Darśana Kī Pramukha Samasyāḥ*, Ghaziabad, 1999.
2. Chatterjee, S. C. & D. M. Datta - *Introduction to Indian Philosophy*, Calcutta University, Calcutta, 1968 (Hindi Translation also).
3. Hirianna, M. - *Outline of Indian Philosophy*, London, 1956 (also Hindi Translation).
4. Shastri, Kuppaswami, *A Primer of Indian Logic*, 1951 (only introduction).
5. Bhartiya, Mahesh - *Causation in Indian Philosophy*, Ghaziabad, 1975.
6. Pandey, Ram Chandra - *Panorama of Indian Philosophy* (also Hindi version), M.L.B.D., Delhi, 1966.
7. Raja, Kuhn - *Some Fundamental Problems in Indian Philosophy*, MLBD, Delhi, 1974.
8. Rishi, Uma Shankar (Ed.), *Sarva-Darshana Samgraha*, Chowkhamba Vidyabhawan, Varansi, 1984.

Additional Resources:

1. Hirianna, M. - *Outline of Indian Philosophy*, London, 1956 (also Hindi Translation).
2. Shastri, Kuppaswami, *A Primer of Indian Logic*, 1951 (only introduction).
3. Bhartiya, Mahesh - *Causation in Indian Philosophy*, Ghaziabad, 1975.
4. O'Flaherty, Wendy Doniger – *Karma and Rebirth in Classical Indian Tradition*, MLBD, Delhi, 1983.
5. Pandey, Ram Chandra - *Panorama of Indian Philosophy* (also Hindi version), M.L.B.D., Delhi, 1966.
6. Radhakrishnan, S. - *Indian Philosophy*, Oxford University Press, Delhi, 1990.
7. Raja, Kuhn - *Some Fundamental Problems in Indian Philosophy*, MLBD, Delhi, 1974.

8. Chatterjee, S. C. – *The Nyāya Theory of Knowledge*, Calcutta, 1968.
9. Radhakrishnan, S. - *Indian Philosophy*, Oxford University Press, Delhi, 1990.

[E] Teaching Learning Process:

While reading this course students must be encouraged to connect their study of theory. Reading and proper understanding of theme and theory, discussion on important themes occurring in the syllabus, connect themes and ideas of the text with contemporary debating system. Some contemporary issues could be developed and solved by the group discussion.

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3
- Week 6 – Unit 3
- Week 7 – Unit 4
- Week 8 – Unit 4
- Week 9 – Unit 5
- Week 10 – Unit 5
- Week 11 – Unit 6
- Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of the question paper	Marks
1.	5 questions –	5 x 12 = 60
2.	3 notes –	3 x 5 = 15

Tutorial component-

1. Periodic tests from each unit; should have written and oral component including paper presentation and group discussion.
2. End semester test from the whole syllabus.
3. Project

[H] Keywords:

Darsana, Heterodox, Charvaka, Transcendental Entities, Anekandvada, Triratna, Prakriti, Gunatraya, Maya, Jiva, Jagat

GE-7
Ancient Indian Polity
(12135906)

[A] Course Objectives:

The aim of this course is to make students acquainted with various aspects of Political institutions and Indian polity as propounded in ancient Sanskrit texts from vedic samhitās to later texts in the dharma śāstra and artha śāstra traditions.

[B] Course Learning Outcomes:

Learning Outcome : This course is designed for UG students who are from disciplines other than main Sanskrit discipline . It should be a great opportunity for these students to understand the nature of ancient Indian polity from original Sanskrit sources from Vedic texts to Dharma shastra and Niti texts.

In this section students will be able to understand various types of states in ancient India. They should know that despite of monarchy as prime form of governance, there was also a parallel republican system. With the study of the Saptanga theory of ancient Indian polity, students will be able to learn how the state is an organic entity and how optimum functioning of each organ is necessary for the smooth functioning of the whole.

Upon reading this section, students are expected to appreciate the well designed administrative structure of ancient India. They should be able compare ancient and contemporary models. They will know that despite a monarchical system, sovereign was not autocratic. He was well controlled by his subordinates.

This section deals with internal and external security and financial growth of the state. Students will be able to understand various aspects of ancient law, justice, taxation and diplomacy.

The study of these sections must enable students to connect this theoretical model with contemporary governance issues in India. The shadguna and mandala theories provide a practical and pragmatic understanding of foreign relations and tell how international diplomacy is to be conducted.

[C] Contents

Total Credits 60

Unit: I

Credits 12

Names for the science of polity and their significance : Daṇḍanīti,
 Dharmaśāstra, Nītiśāstra;
 Scope of Indian Polity: Relation with Dharma, Artha and Nīti;

Sources : Vedic Literature, Purāṇas,
 Rāmāyaṇa, Mahābhārata, Dharmaśāstra,

Kautilya's Arthaśāstra and Nīti –śāstra

Origin of State :Mātsyanyāya- Theory - (Arthaśāstra1.1.3, Mahābhārata, Śānti parva, 67.17-28, Manusmṛti,7.20)

Nature of the State :

With special reference to Saptānga-Theory : 1.

Svāmī, 2. Amātya, 3. Janapada, 4. Pura, 5.

Kośa, 6. Daṇḍa and 7. Mitra

Unit II

Credits 12

Divinity of the King'Rājā' – (Arthaśāstra,1.9, Mahābhārata, Śāntiparva,67.43-48, Manusmṛti,7.4-7)

King as a Public Servant - (Sukranīti,4.2.130,137)

King as a Trustee - (Arthaśāstra,10.3),

King as Upholder of the Moral Order (Mahābhārata, Śānti parva, 120.1-35; Manusmṛti, 7.1-35);

Republics in Buddhist Literature

(Dighnikāya, MahāparinibbānaSūta,

Anguttaranikāya,1.213;4.252,256)

Unit: III

Credits 10

Kingship and Council of Ministers

Council of Ministers: Ratni

Council in Vedic age Śatapathabrāhmaṇa, 5.2.5.1);

Council of Ministers in Kautilya's Arthaśāstra (1.4,1.5,1.11) and Śukranīti,(2.70-72)

Kingship :Royal Succession, Coronation

Ceremony

Unit: IV

Taxation Policy of State:

Reasonable and EquitableTaxation Policy Śāstranīta' permitted by Dharmaśāstra (Mahābhārata, Śānti parva,71.10-25, Manusmṛti, 7.127, 144) ;

Criticism of unlawful taxation policy in Mahābhārata, Śānti parva (87.19-18-22,88. 4-7)

TwoTypes of Tax Sources in Arthaśāstra -1.'Ayasarira' and 2'Aya-mukha'(Altekar, A.S , State and Government in Ancient India, pp.262 267 and

Sahay, Shiva Swarup, , Prachin Bharaa ka Samajika evam Arthika Itihas,pp.456-458)

Unit: V

Inter-State Relations of State:

Brief survey of 'Maṇḍala' Theory of Inter-State Relations;

Principles and means of Diplomacy : 1.Sāma 2.Dāma,3 Daṇḍa.4.Bheda;

Diplomacy of War and Peace – ‘Śāḍguṇya theory: 1.Sandhi, 2.Vigraha, 3. Yāna, 4.Āsana, 5.Sanśraya and, 6.Dvaidhībhāva

Source : (Altekar, A.S , State and Government in Ancient India, pp.291- 308; Satyaketu Vidyalankar, Prachin Bharatiya Shasana Vyavastha aur Rajashastra, pp.363-376)

Unit VI

Nature and Sources of Law ‘Dharma’:

Four types of Source of Law ‘Dharma’ :1.’Dharma’,2. Vyavahāra’, 3.’Caritra’ and 4.’Rājaśāsana’;

Four types of Enforcement of Law: 1. Rules of Castes ‘Jatidharma’, 2. Local Customs ‘Janapadadharma’, 3. Bye-laws of Guilds ‘Śreṇīdharmā’ and 4. Family Traditions ‘Kuladharma’

Judicial administration and Courts:

King as Head and Fountain Sources of all Justice, Qualities of Chief Justice- ‘Pradvivak’and members of Jury- ‘Sabhāsadaḥ (Shukraniti, 4.5.69-196)

Two types of Royal

Courts ‘Dharmasthīya’ and ‘Kāṇṭhakaśodhana’ in

Arthaśāstra (3.1-20)

Social and local Courts situated in Villages- ‘Kula’ and ‘Puga’, ‘Dharmaśāsana’.

[D] Suggested Books/Readings:

Compulsory Reading:

1. काणे, पी.वी.—धर्मशास्त्र का इतिहास (1—4 भाग) अनु० अर्जुन चौबे काश्यप, हिन्दी समिति, लखनऊ, 1966—73.
2. तिवारी, शशि— संस्कृत साहित्य में राष्ट्रवाद और भारतीय राजशास्त्र, विद्यानिधि प्रकाशन, दिल्ली, 2013.
3. दीक्षित, प्रेमकुमारी— प्राचीन भारत में अन्तर्राष्ट्रीय सम्बन्ध, उत्तर प्रदेश, हिन्दी ग्रन्थ अकादमी, लखनऊ, 1977.
4. नाटानी, प्रकाश नारायण — प्राचीन भारत के राजनीतिक विचारक, पोइन्टर पब्लिशर्स, जयपुर, 2002.
5. मोहनचन्द— जैन संस्कृत महाकाव्यों में भारतीय समाज, ईस्टर्न बुक लिंकर्स, दिल्ली, 1989.
6. वाजपेयी, अम्बिका प्रसाद — हिन्दू राज्य शास्त्र, प्रयाग, संवत् 2006.
7. विद्यालंकार, सत्यकेतु — प्राचीन भारतीय शासनव्यवस्था और राजशास्त्र, सरस्वती सदन, मसूरी, 1968.
8. सिन्हा विनोद एवं सिन्हा रेखा— प्राचीन भारतीय इतिहास एवं राजनैतिक चिन्तन, राधा पब्लिकेशन्स, दिल्ली, 1989
9. Altekar, A.S — State and Government in Ancient India, Motilal Banarsidass, Delhi, 2001.
10. Ghosal, U.N. — A History of Indian Political Ideas, Bombay, 1959.
11. Jayaswal, K.P.— Hindu Polity, Bangalore, 1967.
12. Law, N. S.— Aspect of Ancient Indian Polity, Calcutta, 1960.
13. Maheshwari, S. R. — Local Government in India, Orient Longman, New Delhi,
14. Prasad, Beni — Theory of Government in Ancient India, Allahabad, 1968.
15. Saletore, B.A. — Ancient Indian Political Thought and Institutions, Bombay, 1963.
16. Sharma, R. S.— Aspects of Political Ideas and Institutions in Ancient India, Motilal Banarsidass, Delhi, 1996.
17. Sinha, K.N.— Sovereignty in Ancient Indian Polity, London, 1938.
18. Verma, V.P.— Studies in Hindu Political Thought and its Metaphysical Foundations, Delhi, 1954.

Additional Resources:

1. Arthashastra of Kautilya—(ed.) Kangale, R.P. Delhi, Motilal Banarasidas 1965
- 2 Atharvaveda samhita— (Trans.) R.T.H. Griffith, Banaras, 1896-97, rept.(2 Vols) 1968.
- 3 Mahabharata (7 Vols)— (Eng. Tr.) H.P. Shastri, London, 1952-59.
- 4 Manu's Code of Law—(ed. & trans.) : Olivelle, P. (A Critical Edition and Translation of the Mānava- Dharmaśāstra), OUP, New Delhi, 2006.
- 5 Ramayana of Valmiki — (Eng. Tr.) H.P. Shastri, London, 1952-59. (3 Vols)
- 6 Rgveda samhita (6 Vols)— (Eng. Tr.) H.H. Wilson, Bangalore Printing &Publishing Co., Bangalore, 1946.
- 7 Satapatha brahmana— (with Eng. trans. ed.) Jeet Ram Bhatt, Eastern (3 Vols) Book Linkers, Delhi, 2009.
- 8 अंगुतर निकाय (1—4 भाग) बनारसक्व1980
- 9 कौटिलीय अर्थशास्त्र —हिन्दी अनुवाद —उदयवीर शास्त्री, मेहरचन्द लछमनदास, दिल्ली,1968.
- 10 दीघनिकाय (1—2 भाग) सम्पा० जे० कश्यप बिहार, 1958
- 11 महाभारत (1—6 भाग) — हिन्दी अनुवाद सहित, (अनु०) रामनारायण दत्त शास्त्री पाण्डेय, गीताप्रेस, गोरखपुर.
- 12 मनुस्मृति (1—13 भाग) — (सम्पा० एवं व्या०) उर्मिला रुस्तगी, जे.पी. पब्लिशिंग हाउस, दिल्ली, 2005
- 13 शतपथब्राह्मण (1—5 भाग) (माध्यन्दिनीय शाखा) — सायणाचार्य एवं हरिस्वामी टीकासहित, दिल्ली, 1987.
- 14 शुक्रनीति — हिन्दी अनुवाद, ब्रह्मशंकर मिश्र, चौखम्बा संस्कृत सीरीज, वाराणसी, 1968.
- 15 श्रीमद्वाल्मीकिरामायण — हिन्दी अनुवाद सहित, (सम्पा०) जानकी नाथ शर्मा, (1 —2 भाग) गीताप्रेस, गोरखपुर.

[E] Teaching Learning Process:

While reading these sections students must be encouraged to connect their study of theory with contemporary issues in government, taxation and international diplomacy, particularly in India's neighbourhood. A case study based approach may be encouraged. News items, articles and opeds on foreign policy and governance issues must be studied as a part of the course and examination questions should require a thorough reading of these articles. Talks and lectures of scholars may be organised.

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3
- Week 6 – Unit 3
- Week 7 – Unit 4
- Week 8 – Unit 4
- Week 9 – Unit 5
- Week 10 – Unit 5
- Week 11 – Unit 6
- Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of the question paper	Total Marks - 75
1.	4 long questions	4x 15 = 60
2.	2 short notes	2x 7.5 = 15
		Total Marks - 75

Internal assessment

1. Periodic tests from each unit; should have written and oral component including paper presentation and group discussion.
2. End semester test from the whole syllabus.
3. Project

[H] Keywords:

Indian Polity, king, Minister, taxation, foreign affairs, diplomacy, law, courts

GE-8**Indian Epigraphy & Paleography
(12135908)****[A] Course Objectives:**

This course known as the Indian Epigraphy and Palaeography provides background and basis of Indian history of ancient period. Students with no knowledge of Sanskrit but interested in acquiring historical facts direct from their source can be benefitted with this course. It is extremely helpful for those who are willing to involve in archaeological studies.

This course provides basics covered in ancient Indian inscriptions. Some of the terminologies available in inscriptions are introduced here. Unit II of this section provides historical facts through the inscriptions.

It introduces background of the Indian epigraphical study. Importance of inscriptions on the basis of contents, their impact and reflections of society, economy, religious, political instances can also be understood here. It helps to understand about prevailing theories of the origin of the Brahmi script. Development of the letters of this script in different regions in a span of time is introduced. Their causes of change are also made clear to illustrate different forms in the script. Unit III provides the history of study of inscriptions in India. A number of Indian and foreign scholars made attempts in this field. Students are made aware about some prominent scholars who made valuable efforts in this field.

[B] Course Learning Outcomes:

Contents of this course are related to formation of history of ancient India, so it is an inter-disciplinary course within Sanskrit. Students of Sanskrit can understand how important role Sanskrit based inscriptions play in preparing history, and their knowledge of the language can help historians to make a perfect history, undoubtedly. Similarly students of History will find themselves on the positive ground and direct in touch with material related to history of ancient India.

[C] Contents for each course**Total Credits 60****Unit: I****Credits 10**

1. Aśokan edicts & moral values:
 - a) Samāja b) Suśrūsā c) Āikitsā
 - d) Stryadhyakṣamahāmātrā
2. Dhamma - according to Aśoka
3. Aśokan edicts administrative officers
 - a) rajjuka b) yukta c) dharma- mahāmātra
4. Welfare state: repair of dam, mati-saśiva, karma-saśiva in Junagadh Inscription of Rudradāman.

Unit: II

Credits 10

1. Eraṇ Pillar Inscription:
Status of Samudragupta
2. Meharauli Iron Pillar Inscription of Āndra:
 - Reaction of sub-ordinate rulers after the death of Samudragupta
 - Mighty Āndragupta (II)
3. Influence of the Āhmāna ruler, Vīśaladeva as depicted in the Delhi-Topra Pillar Inscription

Unit: III

Credits 10

1. Antiquity of writing in India
 - a) Observations from foreign scholars
 - b) Literary evidences
 - c) Observations made by Indian Epigraphists.
2. Importance of the study of Inscriptions.
 - a) Geographical description b) Historical evidences c) Society
 - d) Religion
 - e) Literature f) Economic Conditions g) Administration

Unit: IV

Credits 10

1. Types of Inscriptions:
 - a) Praśasti b) Religious
 - c) Donations d) Grants
2. Writing material:
 - a) Rocks b) Pillars c) Metal Plates d) Statues e) Pen, Brush, Chisel, Stylus, Paint/Colour

Unit: V

- Origin of the Brāhmī Script
- a) Foreign Origin b) Indian Origin
 - a.1. Greek origin a.2. Phoenician origin
 - b.1. Theory of South Indian Origin b.2. Theory of Aryan Origin.
- Development of the script upto 700 A.D.
Varieties of the Brāhmī script.

Unit: VI

- History of reading of Indian Inscriptions.
Contribution of Epigraphists: G.H. Ojha, Fleet, Princep, D.C. Sircar, Cunningham, Buhler.
System of dating and use of eras:
Vikram Era, Śaka Era, Gupta Era, Harśa Era.

[D] Suggested Books/Readings:

Compulsory Reading:

1. Bhandarkar, D.R., Aśoka (Hindi)
2. Buhler, G, On the origin of the Indian alphabet & numerals.
3. Dani, A. H, Indian Paleography

4. Ojha, G. H, Bhāratīya Prācīna Lipimāla (Hindi)
5. Pandey, R.B, Aśoka ke Abhilekha (Hindi), Bhāratīya Purālīpi (Hindi)
6. Rana, S.S., Bhāratīya Abhilekha
7. Sircar, D.C., Indian Epigraphy, Select Inscriptions (Part - I)
8. Upadhyay, V., Prācīna Bhāratīya Abhilekha (Hindi)
9. Thapar, Romila, Asoka tathā Maurya Sāmrājya Ka Patana (Hindi)

Additional Resources:

1. Classical Age by Altekar, Majumdar, Sircar
2. श्रेष्ठ-युग (हिंदी अनुवाद) : अल्लेकर, मजुमदार, सरकार
3. Ashoka by D.C.Sircar
4. गुप्त-सम्राट और उनका काल : उदित नारायण राय

[E] Teaching Learning Process:

Teachers must help students to read the inscriptions in translation in the class.

They must highlight the historically significant elements.

They must refer to other relevant sources for the study of kings under study

Teachers may organize trips to places where inscriptions understudy are found.

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3
- Week 6 – Unit 3
- Week 7 – Unit 4
- Week 8 – Unit 4
- Week 9 – Unit 5
- Week 10 – Unit 5
- Week 11 – Unit 6
- Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of the question paper	Total Marks 75
1.	Long questions	5 x 12 = 60
2.	Short notes	3 x 5 = 15

Internal Assessment

Study tours to local historical places; visit to the museums for broader understanding of artifacts; Group discussions at the very point of evidence/sites

Paper presentation/ essay writing

Tutorials

[H] Keywords:

Archaeology	dharma-mahamatra	kara-vishti
excavation	(sindhoh)saptamukhani	bali-shulka
writing material	margo-lokaviruddha	prashasti

GE-9 Computer Applications for Sanskrit (12135909)

[A] Course Objectives:

This course will introduce the current research and development in Sanskrit computing. Primary emphasis will be on tools and techniques developed under government and private funding and to explore new technologies for Sanskrit. Special focus will be on e-learning and interacting tools, web application for Sanskrit, Unicode Devanagari typing tools and language computing. HTML will be taught for web application.

[B] Course Learning Outcomes:

The course-level learning outcomes that a student of this course is required to demonstrate are indicated below:

- Learn the basic Interactive Sanskrit Teaching Learning Tools.
- Learn the Basics of Multimedia, Web based tools development
- Working knowledge of HTML and web page development
- Working with Unicode Typing in Devanagari Scripts.
- Learn the Various Typing Tools and Software for Devanagari Unicode.
- Learn the Text preservation techniques and web publishing.
- Student also learn the Optical Character Reader (OCR), Applications of OCR for Sanskrit and Indian Languages, Tool and Techniques, Survey of the OCR.

[C] Contents

Total Credits 60

Unit: I

12 Credits

Interactive Sanskrit Teaching Learning Tools:

Interactive Sanskrit Learning Tools, Introduction, Why Interactive Tools for Sanskrit? E-learning, Basics of Multimedia, Web based tools development.

Unit: II

13 Credits

Hypertext Markup Language (HTML):

Basics of HTML

Unit: III

12 Credits

Standard for Indian Languages (Unicode)

Unicode Typing in Devanagari Scripts, Various Typing Tools and Software for Devanagari Script: Baraha, Google Input Tools, Google Assistant

Unit: IV

05 Credits

Text Processing and Preservation Tools:

Text Processing, Preservation, Techniques, Text Processing and Preservation, Tools and Techniques

Unit: V**10 Credits**

Survey of Computational Applications for Sanskrit

Unit: VI**08 Credits****Optical Character Reader:**

Optical Character Reader (OCR), Applications of OCR for Sanskrit and Indian Languages, Tool and Techniques, Survey

Practical**[D] Suggested Books/Readings:****Compulsory Reading:**

1. Bharti A., R. Sangal, V. Chaitanya, "NL, Complexity Theory and Logic" in Foundations of Software Technology and Theoretical Computer Science, Springer, 1990.
2. E-Content suggested by Teacher
3. Tools developed by Computational Linguistics Group, Department of Sanskrit, University of Delhi, Delhi-110007 available at: <http://sanskrit.du.ac.in>
4. Basic concept and issues of multimedia: <http://www.newagepublishers.com/samplechapter/001697.pdf>
5. Content creation and E-learning in Indian languages: a model: http://eprints.rclis.org/7189/1/vijayakumarjk_01.pdf
6. HTML Tutorial - W3Schools: www.w3schools.com/html
7. The Unicode Consortium: <http://unicode.org>

Additional Resources:

1. http://baraha.com/v10/help/Keyboards/kan_phonetic.htm
2. <https://www.google.co.in/inputtools/try/>

[E] Teaching Learning Process:

Lecture based Teaching Learning on the Basics of Tools and Techniques of Computer Applications for Sanskrit, Data storage and publishing web application development in HTML and E-Learning tools will be covered in this course

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3
- Week 6 – Unit 3
- Week 7 – Unit 4
- Week 8 – Unit 4
- Week 9 – Unit 5
- Week 10 – Unit 5
- Week 11 – Unit 6
- Week 12 – Unit 6

[G] Assessment :

Learning outcomes will be assessed using the following: oral and written examinations, problem-solving exercises, practical assignment, observation of practical skills, individual project reports, seminar presentation; viva-voce interviews; computerized adaptive testing, literature surveys and evaluations, outputs from collaborative work, portfolios on chemical activities undertaken etc.

Internal Assessment:

As an Internal Assessment the periodic tests from each unit; should have written and oral component including paper presentation and group discussion.

On the place of internal assessment, project on e-lexicon development, e-corpora creation, database for cultural heritage and search engine for Sanskrit text, digitizing Sanskrit text may be done for the testing the HTML, CSS and Database skill of the students.

Lab practice of the HTML, CSS and database must be done time to time

End semester test from the whole syllabus.

Sr. No.	Structure of the question paper for end semester examination	Marks
1.	Five long questions from the any five units	05 x 12 = 60
2.	Two short notes from the remaining unit	02 x 7.5 = 15
Total		75 marks

[H] Keywords:

Basic Computer, Devanagari Typing in Unicode, HTML, Unicode, E-Learning, OCR etc.

GE-10

Individual, Family and Community in Indian Social Thought (12135910)

[A] Course Objectives:

This course will introduce to students Indian thoughts which enable a person to have a balance and harmony in life and avoid conflict with the society.

[B] Course Learning Outcomes:

Students will learn about important ethical and philosophical issues concerning relations between the individual and society. They will learn about the metaphysical background in which ethical solutions are offered.

It will also expose them to controversial social issues and allow them to develop the sensitivity required to handle social tensions.

This course will also help learners to develop a positive approach towards nature.

[C] Contents

Total Credits 60

Unit: I

Credits 15

Individual:

- Idea of a person (Gītā 6/5) ; Functions of the indrīyas, buddhi, manas and the ātmā – (Gītā 3/42, 15/7, 15/9, 3/34, 2/58, 2/59, 3/6-7, 5/8, 2/ 64)
- Three guṇas and their impact on the individual (Gītā 14/5-13, 14/17, 3/36-38, 18/30-32,
- Managing the mind-body mechanism according to the Gītā –
- (i) yoga of action, (2/47-48, 3/8, 3/ 4, 3/19, 3/25)
- (ii) yoga of bhakti – 7/1, 8/7, 9/14, 9/27, 12/11, 12/ 13-19) (iii)
- yoga of knowledge, (4/38-39, 4/42, 18/63)
- (iv) yoga of meditation (16/34, 16/12, 16/26, 16/25)

Unit: II

Credits 10

Individual:

- Saṁskāras – Growth of the individual in society (From : Importance of saṁskāras in Hindu Saṁskāra by Rajabali Pandey)
- Aim of life: Four Puruṣārtha

Unit: III

Credits 15

Family

- Joint family (Sāmanasyam Sūkta – Atharvaveda 3/30)
- Symbolism in marriage rituals
- Reference:
- (i) (Chapter 9, Hindu Saṁskāra – Rajabali Pandey, III Edition, 1978)
- Sītā's banishment in the Vālīmiki Rāmāyaṇa
- Reference:

- (i) (www.sanskritdocuments.org Yuddha-kanda Sarga 102, verses 21 to 36 ; sarga 103 ; Uttara kāṇḍa sarga 44 and 47
(ii) Kishwar Madhu : Yes to Sita, No to Ram
(http://www.infinityfoundation.com/mandala/s_es/s_es_kishw_sitaram_frameset.htm)

Unit: IV

Community:

Credits 8

Functioning of community bodies (samvid vyatikrama / samaya-anapakarma);

Reference : (i) History of Dharma śāstra Vol. II (ii) Dharmakoṣa Vyavahāra kāṇḍa (Vivādapadāni)

Unit: V

Credits 8

Harmony between man and nature in Sanskrit literature (with special reference to Kālidāsa)

Unit: VI

Credits 4

Dāna, iṣṭa-āpūrta , pañca mahāyajña

[D] Suggested Books/Readings:

Compulsory Reading:

1. Kāṇḍe PV : History of Dharma Śāstra, Bhandarkar Oriental Research Institute, Pune
2. Pandey Rajbali: Hindu, Samskara, Motilal Banarasi Das, Delhi
3. काणे पांडुरंग वामन – धर्मशास्त्र का इतिहास, अनुवादक अर्जुन चौहान, उत्तर प्रदेश हिंदी संस्थान
4. पाण्डेय राजबलि – हिन्दू संस्कार – चौखम्बा विद्याभवन, वाराणसी 1978
5. जोशी लक्ष्मण शास्त्री – धर्मकोष, व्यवहारकाण्ड, विवादपदानि (प्रथम भाग) प्राज्ञ पाठशाला, वाई, सतारा, महाराष्ट्र

Additional Resources:

[E] Teaching Learning Process:

1. Students shall read the relevant sections in translation in advance
2. Teachers shall explain the principal points from the text
3. They shall pose issues for discussion and monitor group discussions
4. Debates within the class around issues can be organized
5. Students and teachers shall take into view current social problems and views while discussing their texts.
6. The purpose is to enable students to develop healthy views in consonance with our constitutional values.

[F] Weekly Plan

- Week 1 – Unit 1
Week 2 – Unit 1
Week 3 – Unit 2
Week 4 – Unit 2
Week 5 – Unit 3
Week 6 – Unit 3

Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of the question paper	Marks
1.	Long critical questions	4 x 15 = 60
2.	<u>Short notes</u>	<u>2 x 7.5 = 15</u>
Total Marks =		75

[H] Keywords:

Familiy, Indvisulas, Social Issues etc.

GE-11**Nationalism and Indian Literature
(12135911)****[A] Course Objectives:**

The aim of this course is to make the students acquainted with the broad streams of Indian Nationalistic trends as propounded in the ancient, classical and modern Sanskrit literature. The course tries to highlight the struggle of Indian people against colonialism in nineteenth century by focusing the nationalistic ideologies of prominent national leaders with special reference to Mahatma Gandhi on the basis of modern Sanskrit works. The course also focuses the nationalistic thought of modern Sanskrit, Hindi and Urdu poetry. This course will provide opportunity to understand basic features of Indian political thoughts propounded by our ancestors and modern thinkers, and hence students will be able to analyze them in present global perspective. National pride is always related with the glory of national ideas.

[B] Course Learning Outcomes:

After completing this course, students will realize about the importance of Nation in their upbringing. They will have admiration for their Nation and will like to know more and more about the National heritage. Socio-Religious Nationalist thoughts of our seers, freedom fighters, and modern thinkers will give them wider vision to understand Nationalism. The study of important and famous poems of Sanskrit, Hindi, and Urdu poets will create new interest and social harmony in students.

2.2. Content**Total Credits 60****Unit: I****Credits 4****Concepts and Basic Features of Indian Nationalism:**

Definition of Indian Nation, Nature and Elements
Meaning of Nation, Definitions in the light of Modern Political Science; Western Concept of Nation, Origin and Development of Nationalism in West; Constituent Elements of Nation; Different views regarding Nation and State; Indian Concept of Nation, Meaning, Etymology and Fundamental Elements in the light of Sanskrit Literature

Unit: II**Credits 6**

Definition of Nationality, Nature and National Symbols:
Meaning of Nationality, Definitions and Constituent Elements of Nationality; Essential Factors of Nationality: 1. National Integration, 2. Patriotism, 3. Freedom, 4. Religious Tolerance, 5. National Pride, 6. National Consciousness, 7. Citizenship.
National Symbols of India : 1. National Anthem-‘Jana Gana Mana’ 2. National Song ‘Vande Mātaram’ 3..National Flag of India, 4. National Emblem ‘Ashok Chakra’.

Unit: III**Credits 10**

Origin, Development and Concept of ‘ Rāṣṭra’ in Sanskrit Literature; Concept and Nature of Vedic ‘Rāṣṭra’ (Atharvaveda,11.9.17;12.1,1-12; Sukla-Yajurveda, 22.22); Five Elements of Vedic ‘Rāṣṭra’ (Atharvaveda,12.1,1); Coronation Ceremony of Vedic

King and its relation with Nation State 'Rāṣṭra' Śatapathabrāhmaṇa, 51.1.8-13; 9.4.1.1-5); 'Rāṣṭra' in the Context of 'Saptāṅga' Theory of State (Kautilya's Arthaśāstra, 6.1, Mahābhārata, Śāntiparva, 56.5, Śukranīti, 1.61-62)

Unit: IV**Credits 6**

Name, Geography and Features of 'Bhāratavarṣa' in Sanskrit Literature; Different Views regarding Name of 'Bhāratavarṣa' in Vedic and Paurāṇika Literature; Geography and Salient Features of 'Bhāratavarṣa' in Viṣṇu Purāṇa (2.3); Diversity and Geographical Unity of 'Bhāratavarṣa' (Vālmīki Rāmāyaṇa, Kiṣkindhākāṇḍa, chapters-46,47,48; Raghuvamśa of Kalidasa (fourth canto).

Unit: V**Credits 14****Rise of Indian Nationalism and Modern Indian Literature**

Rise of Indian Nationalism and Freedom Struggle Movement : Major Factors which led to the Rise of Nationalist Sentiments in Modern Period with special reference to: 1. Western thought and education, 2. Rediscovery of India's past, 3. Socio-religious reform movements, 4. Impact of contemporary National movements worldwide. Socio-Religious Nationalist thoughts of: 1. Swami Dayanand Saraswati, 2. Swami Vivekanand, 3. Bankim Chandra Chattopadhyay, 4. Mahatma Gandhi, 5. Dr. B. R. Ambedkar and 6. Vir Savarkar. Freedom struggle movement and relevance of Gandhian thought in modern period with special reference to 'Grāma Svarāja', 'Satyāgraha', 'Ahimsā' and 'Svadeśī' movement.

Unit: VI**Credits 20****Nationalism in Sanskrit Literature and Modern Indian Poetry**

Nationalist Trends of Modern Sanskrit Literature with special reference to: 1. 'Satyāgrahagītā' of Panditā Kṣamārāva; 2. 'Bhāratavijayanāṭakam' of Mathura Prashad Dikshita; 3. 'Gāndhīcaritam' of Charudeva Shastri; 4. 'Srisvāmivivekānandacaritam' of Tryambaka Sharma Bhandarkar. (Ref. Book : Tiwari, Shashi, Rashtriyata evam Bharatiya Sahitya, pp.113-139)

Nationalistic thought in Modern Hindi Poetry: 1. Bhartendu Harishchandra, 2. Ramdhari Singh 'Dinkar', 3. Jayashankar Prasad, 4. Maithili Sharan Gupta, 5. Makhanlal Chaturvedi, 6. Subhadra Kumari Chauhan. (Ref. Book : Tiwari, Shashi, Rashtriyata evam Bharatiya Sahitya, pp.140-219)

[D] Suggested Books/Readings:**Compulsory Reading:**

1. कपूर, अनूप चन्द, राजनीतिविज्ञान के सिद्धान्त, प्रीमियर पब्लिशिंग हाउस, दिल्ली, 1967.
2. गोस्वामी, योगेन्द्र (सम्पा०), राष्ट्रीय एकता और भारतीय साहित्य, काशी अधिवेशन स्मृति ग्रन्थ, 2001.
3. टंडन, कुमुद, महात्मागांधीपरक संस्कृत काव्य, ईस्टर्न बुक लिंकर्स, दिल्ली, 1991.

4 तिवारी, शशि, राष्ट्रीयता एवं भारतीय साहित्य, विद्यानिधि प्रकाशन, दिल्ली, 2007.

5 तिवारी, शशि, संस्कृत साहित्य में राष्ट्रवाद और भारतीय राजशास्त्र, विद्यानिधि प्रकाशन, दिल्ली, 2013.

6 दीक्षित, हरिनारायण, संस्कृत साहित्य में राष्ट्रिय भावना, ईस्टर्न बुक लिंकर्स, दिल्ली, 2006.

7 Pradhan, R., *Raj to Swaraj*, Macmillan, New Delhi, 2008.

8 Sharma, J., *Hindutva: Exploring the Idea of Hindu Nationalism*, Penguin, 2003

9 Shukla, Hira lal, *Modern Sanskrit Literature*, Delhi, 2002

[E] Teaching Learning Process:

Teachers shall encourage students to read their prescribed texts in advance

Teachers shall discuss and explain the contents of the text in class

They shall involve students in discussion and debate in the class

Students shall memorize Sanskrit verses and Hindi and Urdu poetry relevant to the syllabus; they may be encouraged to read and study works not prescribed here.

[F] Weekly Plan

Week 1 – Unit 1

Week 2 – Unit 1

Week 3 – Unit 2

Week 4 – Unit 2

Week 5 – Unit 3

Week 6 – Unit 3

Week 7 – Unit 4

Week 8 – Unit 4

Week 9 – Unit 5

Week 10 – Unit 5

Week 11 – Unit 6

Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of the question paper –	Total marks 75
1.	Long questions	4 x 15 = 60
2.	Short questions	2 x 7.5 = 15

Total marks 75

[H] Keywords:

Nation, Nationalism, Rashtra, Bharatavarsha

GE-12

Indian Architectural System (12135912)

[A] Course Objectives:

This course aims to get the students acquainted with the basic principles of Indian Architecture. It also intends to give an elementary understanding of Vastuvidya, and to enable students to learn the town planning and construction of residential houses in Sanskrit texts on Vastu.

[B] Course Learning Outcomes:

This section deals with the fundamental principles of the science of Architecture (Vastushastra). The students will become aware of the synchronization of five elements (Mahabhutas) in constructions.

[C] Contents

Credits 60

Unit: I

Credits 10

Importance of Architecture:

The fundamental truth in mind that Brahma, before creating the world, created

Visnu. Visvakarma is the heavenly Architect भोज - समराङ्गणसूत्रधार (विश्वकर्मणः पुत्रसंवाद-2- 1to 6),

प्रश्नाध्याय (1-8) = 14

पञ्चमहाभूतों की सृष्टि - भोज - समराङ्गणसूत्रधार

(महदादिसर्ग4- 4 to 19 & 28 to 37) = 24 verses

Man in the Company of Gods भोज - समराङ्गणसूत्रधार (सहदेवाधिकारः 6- 1 to 5) = 05 verses

भोज - समराङ्गणसूत्रधार (44th Chapter) = 22 verses वर्णाश्रम धर्म और गृहस्थ आश्रम की महत्ता –(वास्तुरत्नाकर - भूपरिग्रहप्रकरण[4 to 8)= 04 verses गृहनिर्माण का महत्त्व – वास्तुरत्नाकर –(भूपरिग्रहप्रकरण9 to 11)= 03 verses

Unit: II

Credits 10

Types of Architecture

वास्तुपुरुष का स्वरूप –(बृहत्संहिता - वास्तुविद्याध्याय 2 to 3) = 02 verses रचना के आधार पर वास्तु के प्रकार - सर्वतोभद्रा नन्द्यावर्ता वर्धमाना स्वस्तिका रुचका हिरण्य और त्रिशाल (बृहत्संहिता – वास्तुविद्याध्याय 31 to 38)

भूमि के प्लवत्व के आधार पर वास्तु के प्रकार - पितामहवास्तु। सुपथवास्तु। दीर्घायु वास्तु। पुण्यकवास्तु। अपथवास्तु। रोगकरवास्तु। अर्गलावास्तु (बृहद्वास्तुमाला1 – 47-53)

Unit: III

Selection of land and Construction

भूमिचयन व भूमिपरीक्षा –(बृहद्वास्तुमाला 1 – 13 to 17)

भूमि के लक्षण –(बृहद्वास्तुमाला 1 – 27, 28, 29 & 32)

भूमि के प्रकार - गजपृष्ठ। कूर्मपृष्ठ। दैत्यपृष्ठ व नागपृष्ठ (बृहद्वास्तुमाला 1 – 82 to 89)

भूमि के प्लवत्वानुसार नामकरण - गोवीथी। जलवीथी। यमवीथी। गजवीथी। भूतवीथी। नागवीथी। वैश्वानरी और धनवीथी (बृहद्वास्तुमाला 1 – 41-46) = 07 verses प्रशस्त भूमि –(बृहद्वास्तुमाला 1 – 61-68 & 77-79) = 11 verses वासयोग्यभूमि – (बृहद्वास्तुमाला 1 – 93) & (बृहत्संहिता - वास्तुविद्याध्याय- 88) = 02 verses जीवितभूमि का ज्ञान –(बृहद्वास्तुमाला 1 – 99-101)

Unit: IV

भूमिसंशोधन –(बृहद्वास्तुमाला 1 – 106-111) = 06 verses गृहारम्भ - भूमिपूजा (बृहद्वास्तुमाला 1 – 116-117), प्रथम विधान –(बृहत्संहिता - वास्तुविद्याध्याय 98 to 100)

शिलान्यासविधि –(बृहद्वास्तुमाला 1 – 124), स्तम्भस्थापन –(बृहद्वास्तुमाला 1 – 125- 127), ग्राह्य व त्याज्य काष्ठ – (बृहद्वास्तुमाला 1 – 130-139), गृहविभाग –(बृहद्वास्तुमाला 1 – 150-156), दिक्ज्ञान –(बृहद्वास्तुमाला 2 – 7-10), वास्तुनिवेशन व कालशुद्धि –(बृहद्वास्तुमाला 3 – 46 -50, 65-73), द्वारनिर्णय –(बृहद्वास्तुमाला 3 – 149, 152 – 158 & 162-166),

Unit V

Decoration of House

द्वारसज्जा –(बृहद्वास्तुमाला 3– 159) निषिद्ध आलेख्यकर्म –(बृहद्वास्तुमाला 5-8, पशुगृहनिर्माण –(बृहद्वास्तुमाला 5-1 तक 2. ग्राह्य व निषिद्ध वृक्ष –(बृहद्वास्तुमाला 5-12 तक 20-24-25. जलयन्त्रनिर्माण –(बृहद्वास्तुमाला 5– 35- 39, कूपनिर्माण – (बृहद्वास्तुमाला 5– 115 माङ्गलिक वृक्षारोपण –(बृहद्वास्तुमाला 6– 3 तक 5। 12, प्रवेशकालिक गृह का स्वरूप –(बृहत्संहिता - वास्तुविद्याध्याय 66, 124 & 125)

Unit: VI

Credits 10

Sanskrit works on Architecture – Artha shastra (Janapada sannivesha), Maansaara, Samarangan sutra dhara, Puranas, Mayamatam, Manasollasa, Vasturatnakara Period, authorship, contents –analysis

[D] Suggested Books/Readings:

Compulsory Reading:

1. बृहद्वास्तुमाला रामनिहोरद्विवेदी द्वारा संगृहीत तथा हिन्दी भाषा में अनूदित। ब्रह्मानन्द पं० - त्रिपाठी द्वारा संशोधित व सम्पादित। चौखम्बा सुरभारती प्रकाशन। वाराणसी। १९८७
2. वास्तुरत्नाकर (अहिबलचक्र सहित श्री विन्ध्येश्वरी प्रसाद द्विवेदी। चौखम्बा संस्कृत सीरीज ऑफिस - वाराणसी। १९९७
3. बृहत्संहिता श्री अच्युतानन्द झा। चौखम्बा विद्याभवन। पं० - आचार्य वराहमिहिर। व्याख्याकार - वाराणसी। १९८३
4. समराङ्गणसूत्रधारश्री भोजदेव कृत - :, (in two vols.), Edited with English Introduction by Prof. Pushpendra Kumar, New Bharatiya Book Corporation, 2004
5. Brhāt Samhitā – Varāhamihir, (in two vols.) Edited with English Translation by M. Ramakrishna Bhat, Motilal Banarasidass, Delhi, 1995

6. Shukla, D.N. – Vāstu-śāstra, Hindu Science of Architecture (in two vols.), Shukla Printing Press, Lucknow, 1960
7. An Encyclopaedia of Hindu Architecture, 615-59. Vol. VII. Mansara Series VII. Oxford University Press, 1946.
8. शुक्ल। द्विजेन्द्रनाथ भारतीय वास्तुशास्त्र और प्रतिमा विज्ञान। लखनऊ। १९६७ -
9. चतुर्वेदी। शुकदेव भारतीय वास्तुशास्त्र -(वर्तमान सन्दर्भ में समग्र परिशीलन
10. श्री लालबहादुरशास्त्री राष्ट्रीय संस्कृत विद्यापीठ ग्रन्थमाला। पुष्प॥ ६६। नई दिल्ली। २००४

[E] Teaching Learning Process:

Since this course is meant for students from disciplines other than Sanskrit, teachers shall explain the texts in the class in detail.

Teachers shall use digital resources like PPTs

Students shall be encouraged to write their assignments regularly.

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3
- Week 6 – Unit 3
- Week 7 – Unit 4
- Week 8 – Unit 4
- Week 9 – Unit 5
- Week 10 – Unit 5
- Week 11 – Unit 6
- Week 12 – Unit 6

[G] Assessment :

Sr. No.	Structure of the question paper – Total Marks 75
1.	Long questions 4 x 12 = 48
2.	Short questions 2 x 6 = 12
3.	Notes 3 x 5 = 15

Total Marks 75

Internal Assessment Oral and written examinations, closed-book and open-book tests; problem-solving exercises, practical assignment, observation of practical skills, individual project reports, seminar presentation; viva-voce exams

[H] Keywords:

Architecture, Selection of land and Construction, Decoration of House etc.

<p align="center">Ability Enhancement Elective Course (AEEC) (Any Two) Skill Based B.A. (Hons) Sanskrit</p>	
<p align="center">Semester: III/IV</p>	
<p align="center">AEEC-1 Acting & Script Writing</p>	<p align="center">AEEC -2 Reading skills in Brāhmī Scripts</p>
<p align="center">AEEC-3 Machine Translation: Tools and Techniques</p>	<p align="center">AEEC-4 Evolution of Indian scripts</p>
<p align="center">AEEC-5 Sanskrit Meters and Music</p>	

AEEC-1 Acting and Script Writing (12133901)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 24+ Tutorials 12

[A] Course Objectives:

The acting is connected with the practical aspects of the play works. It portrays a close relationship of the scriptwriter with the society he lives in. This paper aims at teaching the theoretical aspects of this art. The practice of composition and performance of drama can further enhance one's natural talent. This paper deals with the rules of performance of play (acting) and dramatic composition (script writing) and aims at sharpening the dramatic talent of the students.

[B] Course Learning Outcomes:

After studying this course the students will be able to know about the performance aspect of the arts in Indian context. They will learn the skills of developing a story or an incident into writing of the script of the play. The Students will also be inspired and encouraged to prepare the scripts as well as perform it on the stage.

[C] Contents:

Unit: I

Acting

Credit : 04

- a. Persons competent for presentation (acting) :
kuśāla (skilful), vidagdha (learned), pragalbha (bold in speech), jitaśramī (inured to hard-work).
- b. Lokadharmī and Nāṭyadharmī Abhinaya.
- c. Nāṭya-prayoktā-gaṇa (members of theatrical group) : sūtradhāra (director), nāṭyakāra (playwrighter), naṭa (actor) kuśīlava (musician), bharata, nartaka (dancer), vidūṣaka (jester) etc.

Unit: II

Definition ,Assignment and Kinds of Roles

Credits : 04

- i. Assignment of role :
 - a. general principles of distribution
 - b. role of minor characters
 - c. role of women characters
 - d. special cases of assigning of role
- ii. kinds of roles:
 - a. anurūpa (natural), virūpa (unnatural), rūpānusariṇī (imitative)
 - b. Definition of abhinaya and its types:
 - Āṅgika (gestures): aṅga, upāṅga and pratyaṅga

- Vācika(oral): svara, sthāna, varṇa, kāku, bhāṣā .
- Sāttvika (representation of the Involuntary gestures)
- Āhārya: pusta, alaṅkāra, aṅgaracanā, sañjiva (dresses and make-up)

Unit: III

Types and Nature of Plot

Credits : 04

- a. Types of dramatic production: sukhmāra (delicate), āviddha (energetic).
- b. Nature of plot (vastu):
 - Ādhikārika (principal),
 - Prāsaṅika (subsidiary),
 - Dṛśya (presentable),
 - Sūchya (restricted scenes)

Unit: IV

Development of plot

Credits : 04

- i. Division of Plot
 - a. Source of plot:
 - Prakhyāta (legendary), Utpādyā (invented), Miśra (mixed);
 - b. Objectives of plot-
 - Kārya (dharma, artha, kāma);
 - c. Elements of plot-
 - Five kinds of Arthaprakṛtis (caustations),
 - Kāryāvasthā (stages of the action of actor);
 - Sandhi (junctures) and their sub-divisions (segments)
 - d. Five kinds of Arthopakṣepaka (interludes);

Unit: V

Dialogue writing

Credits: 04

- a. kinds of saṁvāda(dialogue)
 - Sarvaśrāvya or Prakāśa (aloud)
 - Aśrāvya or Svagata (aside)
 - Niyataśrāvya :
 - Janāntika (personal address), Apavārita (confidential)
 - Ākāśabhāṣita (conversation with imaginary person).

**Unit: VI Arrangement of a play and analysis of
Abhijñānaśākuntalam**

Credits :04

i. Arrangement of a play

- Duration of play
- Three Unities : Time, Actions and place.

ii. Starting of a play :

- Pūrvaraṅga
 - Raṅgadvāra,
 - Nāndī,
 - Prastāvanā,
 - Prarocanā.

iii. Analysis of acting, plot and dialogue in the context of Abhijñānaśākuntalam.

[D] Suggested Books/Readings:

1. Ghosh, M.M.: *Nāṭyaśāstra*, Bharata, vol-1, Manisha Granthalaya, Calcutta, 1967. Hass, The Daśarūpaka : A Treatise on Hindu Dramaturgy, Columbia University, NewYork, 1912.
2. Adyarangachrya, *Introduction to Bharata's Nāṭyaśāstra*, Popular Prakashan Bombay, 1966.
3. मीरा द्विवेदी, संस्कृत नाट्य : अभिनय एवं पटकथा लेखन, परिमल पब्लिकेशन्स, दिल्ली, 2018
4. द्विवेदी, हजारी प्रसाद, नाट्यशास्त्र की भारतीय परंपरा और दशरूपक, राजकमल प्रकाशन दिल्ली, 1963.

Additional Resources:

1. सीताराम, झा, नाटक और रंगमंच, बिहार राष्ट्रभाषा परिषद्, पटना, 1981.
2. राधावल्लभ, त्रिपाठी, भारतीय नाट्य: स्वरूप और परंपरा, हरिसिंह गौर विश्वविद्यालय, सागर, 1988.
3. वाचस्पति, गैरोला — भारतीय नाट्यपरम्परा और अभिनयदर्पण, इलाहाबाद, 1967.
4. त्रिपाठी, राधावल्लभ, भारतीय नाट्यशास्त्र की परम्परा और विश्व रंगमंच, प्रतिभा प्रकाशन, दिल्ली, 1999.

[E] Teaching Learning Process

- 1 The specific terminology will be explained unit-wise.
- 2 The terminology will be applied with regard to the drama of Abhijñānaśākuntalam and explained with the contents thereof.
- 3 Students will exercise creating dramatic plots of contemporary events.

[F] Weekly Plan

Week 1 – Unit 1
Week 2 – Unit 1
Week 3 – Unit 2

Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :				
	I.		Basic Structure of Question Paper & Division of Marks	75
		i	Long Questions -03 (All Units)	03x 10 = 30
		ii.	Short notes- 05 (All Units)	05 x 5 = 25
		iii.	Short Answer Type Questions -10(Limit1-2Lines) (from all Units)	13 x 1 = 13
		iv.	Sanskrit Question-1	7

II Internal Assessment
 (Project/Discussion/Assignment/paper presentation/ Periodic tests etc.) **25**

[H] Keywords :

Drama, Role, Acting, **Dialogue** Abhijñānaśākuntalam ,etc.

AEEC-2
Reading skills in Brāhmī Scripts
(12133902)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 24+ Tutorials 12

[A] Course Objectives:

Course of Epigraphy & script is an inter-disciplinary course within Sanskrit. The Brahmi script used in Indian inscriptions was developed into all modern Indian scripts like Tamil, Malayalam, Oriya, Bangali, Gurmukhi, among others. Study of inscriptions written mostly in Sanskrit languages, helps in preparation of ancient history.

It will provide introduction to the earlier forms of the Brahmi script, found in the Ashokan epigraphs, widely used all over India. Writing style, writing material and method of writing which led to variations and transformation in the Brahmi script will be studied to help students to interpret the causes that paved way to changes in it in different times and places. Students will acquaint with earlier examples of variations in the Brahmi script which developed into modern Indian scripts. More-over most of the South-East Asian countries also have a clear impact of the developed form of the Brahmi script, especially of the Grantha form of it.

[B] Course Learning Outcomes:

This course is helpful for students to investigate how actually Brahmi script developed and transformed into a wide variety at a time when mode and means of transport and communication were extremely slow. After acquiring knowledge of its variation, it will certainly be helpful in ascertaining to understand period of an inscription whose date is uncertain. This course is highly helpful for the students willing to adopt archaeology as their occupation with a background of Sanskrit.

[C] Contents:

Unit: I

Credits:04

Early Brāhmī alphabet - Aśokan period

Unit: II

Credits : 04

Translation to variations - upto 4th century C.E.

Unit: III

Credits : 04

North Indian

Unit: IV

Credits : 04

South Indian

Unit: V

Credits: 04

East Indian

Unit: VI

Credits : 04

West Indian, Vakatak Variety

[D] Suggested Books/Readings:

1. Dani, A.H. : Indian Paleography, 1963
2. Upasak, C.S. : History & Paleography of Mauryan Brāhmī Script, 1960
3. Verma, T.P. : Paleography of Brāhmī script in North India, 1971
4. ओझा, गौ. ही. : भारतीय प्राचीन लिपिमाला
5. पाण्डेय, राजबली : अशोक के अभिलेख, 1967

[E] Teaching Learning Process

1. Teachers are supposed to illustrate variations of the Brahmi script through different charts. These charts are easily available in the books written by Buhler and G.H.Ojha. Students should be taken to the museums, as such charts are available there.
2. The kutila variety may also be introduced to the students as it paved way for different styles especially in North India.
3. A variety of approaches to teaching-learning process, including lectures, seminars, tutorials, workshops, peer teaching and learning, practicum and project-based learning, field-based learning in this course. Problem-solving skills and higher-order skills of reasoning and analysis will be encouraged through teaching strategies. Lecture based Teaching Learning on the Sanskrit literature will be covered in this course.

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3

Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

II.	Basic Structure of Question Paper & Division of Marks	75
i	Long Questions -03 (All Units)	03x 10 = 30
ii.	Short notes- 05(All Units)	05 x 5 = 25
iii.	Short Answer Type Questions -13(Limit1-2Lines) (from all Units)	13x 1 = 13
iv.	Sanskrit Question-1	7
II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25

[H] Keywords :

sign, symbol, pictograph, ideo-pictography, hieroglyphics, boustrophon script. etc.

AEEC-3

Machine Translation: Tools and Techniques (12133903)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 24+ Tutorials 12

[A] Course Objectives:

This course will introduce the theory and practice of computer based translations and expose the students to the internal processes and inter module interactions in a typical Machine Translation (MT) system

[B] Course Learning Outcomes:

The course-level learning outcomes that a student of this course will be able to demonstrate are indicated below:

- Learn the origin and Development of Machine Translation
- Basic Introduction of Machine Translation
- Human vs Machine Translation
- Concepts to ideal various methodologies used on Machine Translation System.
- Using guidelines of the Machine Translation system : Google and Bing
- Evaluation and Challenges in Machine Translation

[C] Contents:

Unit: I	Theoretical Concepts of Machine Translation•	Credits : 04
	<ul style="list-style-type: none"> • Human vs Computer translation of languages. • Basics of Machine Translation • Tools and Techniques of Machine TranslationSource vs Target Language 	
Unit: II	Survey of Machine Translation:	Credits : 04
	<ul style="list-style-type: none"> • Survey of Machine Translation Systems • List of Major MT System for Indian Languages: Google Translate, Bing by Microsoft. • List of research laboratories for machine translation 	
Unit: III	MT System for Indian Languages:	Credits : 04
	<ul style="list-style-type: none"> • List of Major MT System for Indian Languages: Google Translate, Bing by Microsoft. • List of research laboratories for machine translation. 	

Unit: IV	Machine Translation (MT) Approaches	Credits : 04
	<ul style="list-style-type: none"> • Rule Base MT • Transfer-based, • Interlingual and Dictionary Based • Statistical MT • Example Based MT • Hybrid MT 	
Unit: V	Evaluation of MT:	Credits: 04
Unit: VI	Challenges in Machine Translation: Ambiguity and Acceptability	Credits : 04

[D] Suggested Books/Readings:

Compulsory Reading:

1. Chandra, Subhash मशीनी अनुवाद (Machine Translation) यूजीसी सीबीसीएस स्कीम के तहत बीए (संस्कृत) के एईईसी (AEEC)-3 के पाठ्यक्रम पर आधारित. Vidyanidhi Prakashana, New Delhi, India, ISBN: 9789385539527.
2. Sergei Nirenburg, H. L. Somers, Readings in Machine Translation, MIT Press (MA)
3. Philipp Koehn, Statistical Machine Translation, Cambridge University Press.
4. Sergei Nirenburg, Jaime Carbonell, Masaru Tomita, Editors: Kenneth Goodman, Machine Translation: A Knowledge-Based Approach, Morgan Kaufmann Publishers Inc. San Francisco, CA, USA, 1994
5. Amba Kulkarli, Machine translation activities in India: A survey, In proceedings of workshop on survey on Research and Development of Machine Translation in Asian Countries, Thailand, May 13-14, 2002.

Additional Resources:

1. Chandra, Subhash and Jha, GN. Computer Processing of Nominal Inflections in Sanskrit: Methods and Implementations, CSP, UK, 2012.
2. Dan Jurafsky, James H. Martin, 2000, Speech and Natural Language Processing, Prentice Hall.
3. Sanskrit Computational Linguistics symposium 1-2: Springer Verlag LNCS 5402 G Huet, A Kulkarni and P Scharf (eds), Proceedings of the 1st and 2nd International Symposium, 2009.
4. Sanskrit Computational Linguistics symposium 3: Springer Verlag LNCS 5406 A Kulkarni, G Huet (eds), Proceedings of the 3rd International Symposium, Jan 15 - 17, 2009, Hyderabad.
5. Grishman, R., Computational Linguistics: An introduction, Cambridge University Press, 1986.
6. Sergei Nirenburg, Harold L. Somers and Yorick A. Wilks, "Readings in Machine Translation" MIT Press. 2003.

[E] Teaching Learning Process

A variety of approaches to teaching-learning process, including lectures, seminars, tutorials, workshops, peer teaching and learning, practicum and project-based learning, substantial laboratory-based practical component and experiments in this course, open-ended project work, games, technology-enabled learning, etc. will need to be adopted to achieve this.

Lecture based Teaching Learning on the Basics of Machine Translation, Detailed Survey of MT tools and Techniques for Background will be covered in this course.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

II.	Basic Structure of Question Paper & Division of Marks	75
i	Long Questions -03 (All Units)	03x 10 = 30
ii.	Short notes- 05(All Units)	05 x 5 = 25
iii.	Short Answer Type Questions -13(Limit1-2Lines) (from all Units)	13x 1 = 13
iv.	Sanskrit Question-1	7
II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25

[H] Keywords :

E-Learning, Multimedia based Learning, Web based Learning, Online Learning etc.

AEEC-4
Evolution of Indian scripts
(12133904)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 24 + Tutorials 12

[A] Course Objectives:

This course aims to acquaint students with the myth that Indians lacked knowledge of writing in ancient period. Available sources suggest that writing was mostly practiced on perishable material, so limited evidences are available to prove that practice of writing in India was widely known. Despite that Indians had relation with foreign countries there was a sleek chance that they borrowed any scripts from them.

A script develops from various types of symbols used to express writing. Indus valley script, a picto-ideographic script may have been developed as a grammatically perfect script in India. This section suggests to undergo research in linking proto Indian & ancient Indian Brahmi and Kharoshthi scripts.

Impact of time and space led the Brahmi to undergo variations. Their causes in changes in writing will be studied.

[B] Course Learning Outcomes:

Students willing to engage in archaeology can be enlightened about the importance and background of written material and utilize it in future.

Study of scripts are useful to evaluate and understand believes of prevailing contemporary multiple contents. After undergoing this course Students will be able utilize relevant information to develop capability to fix a date of an unknown writing, incidents, etc., with co-relating it to the available similar writing, and somewhat continuing incidents. Thus, it becomes helpful and useful for the students who are interested in pursuing advance study in archaeology.

[C] Contents:

Unit: I	Introduction to script	Credit : 06
	<ul style="list-style-type: none"> • Antiquity of writing in India • Sign & symbols - pre-scripts 	
Unit: II	<ul style="list-style-type: none"> • Early Brāhmī and Kharoshthi Scripts 	Credits : 04
Unit: III	<ul style="list-style-type: none"> • Indus Valley script - Introduction 	Credits : 04
Unit: IV	Types/Kinds of the Brāhmī script by 400 A.D.	Credits : 02

Unit: V

- Transition to early modern Indian scripts
- Causes of variation in the Brāhmī script

Credits: 04**Credits : 04****[D] Suggested Books/Readings:****Compulsory Reading:**

1. Buhler, G. : Indian Paleography, 1959
i. : On the origin of the Indian alphabet & numerals
2. Burnell, A.C. : Elements of South Indian Paleography, 1878.
3. Dani, A.H. : Indian Paleography, 1963
4. Verma, T.P. : Paleography of Brāhmī script in North India, 1971.

Additional Resources:.

1. गौ .ही .ओझा : भारतीय प्राचीन लिपिमाला
2. राजबली पाण्डेय : अशोक के अभिलेख, 1967
3. Diringer, David : The Alphabet (Reprint) 1962
4. Gelb, I. J. : A study of writing, 1963
5. Sircar, D.C. : Indian Epigraphy, 1965
6. Upasak, C.S. : History & Paleography of Mauryan Brāhmī script, 1960

[E] Teaching Learning Process

1. A variety of approaches to teaching-learning process, including lectures, seminars, tutorials, workshops, peer learning ,Group discussion, paper presentation, practicum and project-based learning, field-based learning in this course.
2. Visits to the museums for direct interaction with the script through charts will also be useful.
3. Teachers should explain terminology used and or related to the inscriptions. Merely translating language is unjust to the students and the subject. It is more useful to take students to the historically important sites, especially related to the inscriptions under-study.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 1
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

I.	Basic Structure of Question Paper & Division of Marks	75
i	Long Questions -03 (All Units)	03x 10 = 30
ii.	Short notes- 05(All Units)	05 x 5 = 25
iii.	Short Answer Type Questions -13(Limit1-2Lines) (from all Units)	13x 1 = 13
iv.	Sanskrit Question-1	7
II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25

[H] Keywords :

Bāṇa, Kadambari, Śukanāsopadeśa, Daṇḍin, Dashakumarcharit, Viśrutacaritam,
 Subandhu, Ambikādatta, Hitopadeśa, Vetālapañcaviṃśatikā, Simhāsanadvātrimśikā,
 Puruṣaparīkṣā, Śukasaptati etc.

AEEC-5
Sanskrit Meter and Music
(12133905)

Max. Marks : (75+ 25 = 100)

Credits : Lectures 24+ Tutorials 12

[A] Course Objectives:

The objective of this course is to equip the student with the knowledge of Sanskrit meters and their lyrical techniques. Students will get the complete information regarding the selected Vedic and Classical meters with their lyrical techniques. To inculcate capability enhancement in the students to co-relate with other texts in their course and to write meters of their own.

[B] Course Learning Outcomes:

After studying this course the students will be able to understand the origin and development of Indian Prosody and various conceptual elements of Sanskrit classical meters. They will be able to apply their knowledge in other Sanskrit courses like classical Sanskrit drama and poetry as well as identify the meters used by various poets in their poetry works. They will be able to appreciate their lyrics while reciting them and will be inspired to translate their emotions and feelings in to metrical Sanskrit writings.

[C] Contents:

Unit: I	Brief Introduction to Chhandaḥśāstra	Credit : 02
	<ul style="list-style-type: none"> Brief Introduction to Chhandaḥśāstra 	
Unit: II	Classification and Elements of Sanskrit Meter	Credits : 03
	<ul style="list-style-type: none"> Syllabic verse (akṣaravṛtta): Syllabo-quantitative verse (varṇavṛtta) Quantitative verse (mātrāvṛtta) samavrutta, vishamavrutta &ardhasamavritta 	
Unit: III	Elements of Sanskrit Meter	Credits :1
	<ul style="list-style-type: none"> Syllables: laghu and guru, Gaṇa, Feet, yati, 	
Unit: IV	Analysis of Selected Vedic Meter and their Lyrical Methods (गान-पद्धति)	Credits :6
	<ul style="list-style-type: none"> Definition, Example, Analysis and Lyrical Methods of following vedic Meters: <p><i>Gayatri , ushnika, anushtup,, brhati, pankti, Trishtupp and jagati</i></p>	

Unit: V	Analysis of Selected Classical Meter and their Lyrical Methods (गान-पद्धति)	Credits:6
	<ul style="list-style-type: none"> Definition, Example, Analysis and Lyrical Methods of following Meters: 	
Unit: VI	Analysis of Selected Classical Meter and their Lyrical Methods (गान-पद्धति)	Credits :6
	<ul style="list-style-type: none"> Definition, Example, Analysis and Lyrical Methods of following Meters: 	

[D] Suggested Books/Readings:

1. धरानन्द शास्त्री (संपा.), केदारभट्ट विरचित वृत्तरत्नाकर, मोतीलाल बनारसीदास, दिल्ली, 2004
2. Brown, Charles Philip (1869). Sanskrit Prosody and Numerical Symbols Explained. London: Trübner & Co.
3. Deo, Ashwini. S (2007). The Metrical Organization of Classical Sanskrit Verse, (PDF). Journal of Linguistics 43 (01): 63–114. doi:10.1017/s0022226706004452.

Additional Resources:

1. Recordings of recitation: H. V. Nagaraja Rao (ORI, Mysore), Ashwini Deo, Ram Karan Sharma, Arvind Kolhatkar.
2. Online Tools for Sanskrit Meter developed by Computational Linguistics Group, Department of Sanskrit, University of Delhi: <http://sanskrit.du.ac.in>

[E] Teaching Learning Process

1. Terminology related to meters and prosody will be specified.
2. The structure of prescribed verses will be identified by means of examples.
3. Appropriate rhythmic structure will be elaborately explained with their recitation keeping mind the caesuras for prescribed verses.

Multiple approaches to teaching-learning process, including seminars, tutorials, Power-point presentations, workshops, peer teaching and learning, practicum, Interaction with experts and project-based learning, field-based learning, etc will be applied in this course.

[F] Weekly Plan

- Week 1 – Unit 1
- Week 2 – Unit 1
- Week 3 – Unit 2
- Week 4 – Unit 2
- Week 5 – Unit 3
- Week 6 – Unit 3
- Week 7 – Unit 4
- Week 8 – Unit 4
- Week 9 – Unit 5
- Week 10 – Unit 5
- Week 11 – Unit 6

Week 12 – Unit 6

[G] Assessment :

IV.	Basic Structure of Question Paper & Division of Marks	75
i	Definition 7 (from unit-3 to 6)	7x 5 = 35
ii.	short notes (from unit-3 to 6)	5x 05 =25
iii.	Recognition of Channdas	4 x 02 = 08
iv.	Sanskrit Question	07
II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25

[H] Keywords :

Lyrics, Music, Meter etc.

**Ability Enhancement Course
Compulsory (AECC)
(Any Two)
MIL**

B.A. (Hons Sanskrit)/B.Sc. (Hons)/B.Sc./B.Com. (Hons)/B.Com

Semester: I/II

AECC-1

Sanskrit as MIL: A (Advance)

Sanskrit Literature

AECC-2

Sanskrit as MIL: B (Intermediate)

Upaniṣad and Bhagawad Gītā

AECC-3

Sanskrit as MIL:C (Introductory)

Niti Literature

Sanskrit as MIL A1, AECC-1, Advance))**Sanskrit Literature****(72132801)****Max. Marks : (75+ 25 = 100)****Credits : 24****[A] Course Objectives:**

This course aims at making the students acquainted with general outline of Sanskrit literature. This course will help the learners be familiar with the tradition of Prose literature with some focus on individual contributors of Sanskrit prose writing.

[B] Course Learning Outcomes:

The students will learn the advance form of Sanskrit language as one of the modern Indian Language through the practice of simple Sanskrit writings. The stories and verses prescribed in the course will help the learners develop an understanding of the moral and ethical values that will be useful in their day to day life situations. They will be familiar with the rich history of Sanskrit Literature. This course will enhance their skills of chaste Sanskrit pronunciation as well as competence and performance of the language. This will help them translate and explain the prescribed Sanskrit texts in their native language.

[C] Contents:**Unit: I****Hitopadesha****Credit : 04**

Foreword (प्रस्तावना), First Story, Verses:1-35

(Translation, Explanation and Grammar).

Unit: II**Hitopadesha****Credits : 04**

Second Story, Verses: 36-62.

(Translation, Explanation and Grammar)

Unit: III**Cāṇakyanīti****Credits : 04**

Cāṇakyanīti (Verses: 1-50)

(Translation, Explanation and Grammar)

Unit: IV **Survey of Prose and Nitikavya** **Credits : 04**

Origin and development of Prose and Nītikāvya.

Unit: V **Cāṇakyanīti** **Credits: 04**

Subandhu, Daṇḍin, Bāṇa, Ambikāḍatta Vyāsa.

Unit: VI **Cāṇakyanīti** **Credits : 04**

Kathāsaritsāgara, Pañcatantra, Hitopadeśa, Cāṇakyanīti

[D] Suggested Books/Readings:

Compulsory Reading:

1. पण्डित जीवानन्द विद्यासागर, हितोपदेश, सरस्वती प्रेस कलकत्ता।
2. श्रीलाल उपाध्याय) अनुवादक (चाणक्यनीतिदर्पण, बैजनाथ प्रसाद बुकसेलर, बनारस, 1952।
3. प्रीतिप्रभा गोयल, संस्कृत साहित्य का इतिहास, राजस्थानी ग्रन्थागार, जोधपुर।
4. उमाशंकर शर्मा ऋषि, संस्कृत साहित्य का इतिहास, चौखम्बा भारती अकादमी, वाराणसी ।
5. A.B. Keith, History of Sanskrit Literature (हिन्दी अनुवाद, मंगलदेव शास्त्री, मोतीलाल बनारसीदास, दिल्ली.)
6. .Gaurinath Shastri, A Concise History of Sanskrit Literature, MLBD, Delhi.

Additional resources:

1. राधावल्लभ त्रिपाठी, संस्कृत साहित्य का अभिनव इतिहास, विश्वविद्यालय प्रकाशन, वाराणसी।
2. बलदेव उपाध्याय, संस्कृत साहित्य का इतिहास, शारदा निकेतन, वाराणसी ।
3. Krishnamachariar, History of Classical Sanskrit Literature, MLBD, Delhi.

[E] Teaching Learning Process

8. The teacher will pronounce/recite/ read the Sanskrit text and the students will then repeat.
9. In situations involving difficult words, the text will be recited after disjoining or dividing the same. Teacher will then arrange them according to their meaning (Anvaya) and recite again. After this the meaning of the verses or of specific parts will be explained.
10. Reflected social, political, cultural features, etc. in the related section will be clarified while comparing them with current contexts.
11. Analysis of the text with highlighting the specific qualities of the characters will also be made.
12. The related grammar and poetic beauty will be clarified.

13. Regarding the introductory knowledge related to concerned poet and his poetic style will be discussed.
14. A variety of approaches to teaching-learning process, including seminars, tutorials, workshops, peer teaching and learning, practicum and project-based learning, field-based learning, etc will be applied in this course.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

V.	Basic Structure of Question Paper & Division of Marks	75
i	Translation-4 (from unit-1 to 4)	05 x 04 = 20
ii.	Explanations-4 (from unit-1 to 4)	08 x 03 = 24
iii.	questions 02 (Unit 1 to 4) Or short notes	10 x 02 = 20
iv.	Grammatical notes on underlined words of verses (from Unit s 1 to 4) = 4	04
v.	sanskrit Question	07
II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25

[H] Keywords :

Hitopadeśa, Mitralabha, Sanskrit Story, Cāṇakyanīti, Sanskrit Prose, Nītikavaya, Subandhu, Daṇḍin, Bāṇa, Ambikādatta Vyāsa, Kathāsaritsāgara, Pañcatantra

(Sanskrit as MIL B1, AECC-2, Intermediate)
Upaniṣad and Bhagawad Gītā
(72132802)

Max. Marks : (75+ 25 = 100)

Credits : 24

Course Objectives

[A]

The general objective of this course is to give the students basic idea of Philosophy of the Upaniṣads and the Bhagawad Gītā, which are recognised as representative texts of Indian thought.

[B] Course Learning Outcomes:

The Students will be able to peep into understand the spiritual depth of the intellectual wisdom of Indian seers. The Ishopanishad teaches the art of harmonising materialism and spiritualism. The subject matter of the Bhagawad Gita II comprising of the concepts of Niṣkāṁ karmyoga, Self and Sthita Prajña (the ideal human being) will enable learners to attain a proper balance between intellectual and emotional faculties.

After the completion of this paper the students will be aware of the solutions of many modern day conflicts available in the upanishadic literature and Bhagavad Geeta. They will get to know the spiritual aspects of Indian traditions separated from the religious tradition.

[C] Contents:

Unit: I Ishavasyopnisad

Credit : 04

Introduction to Ishavasyopnisad
Text Reading of Ishavasyopnisad

Unit: II Ishavasyopnisad

Credits: 04

Text Reading of Ishavasyopnisad

Unit: III

Bhagavadgita

Credits: 04

Text Introduction: Chapter Two
Text Reading: Chapter Two, Verse: 01-25.

Unit: IV

Bhagavadgita

Credits: 04

Text Reading Chapter Two, Verse: 26-72.

Unit: V

Introduction to Upanisadic Philosophy:

Credits: 04

General Introduction to Upanisadic Philosophy:

Unit: VI

Introduction to Upanisadic Philosophy:

Credits :04

Atman, brahman, Isvara, karma, srishti.

[D] Suggested Books/Readings:**Compulsory Reading:**

1. हनुमान प्रसाद पोद्दार) सम्पादक(, ईशावास्योपनिषद्, गीताप्रेस गोरखपुर ।
2. शिवनारायण शास्त्री) व्या(, ईशावास्योपनिषद्, परिमल प्रकाशन, दिल्ली, 1996 ।
3. शशि तिवारी) व्या(, ईशावास्योपनिषद् :भूमिका एवं व्याख्या, भारतीय विद्या प्रकाशन, दिल्ली, 1997 ।
4. हनुमान प्रसाद पोद्दार) सम्पादक(, श्रीमद्भगवद्गीता, गीताप्रेस गोरखपुर ।
5. उमाशंकर शर्मा ऋषि : संस्कृत साहित्य का इतिहास, चौखम्बा भारती अकादमी, वाराणसी ।
6. रमेश भारद्वाज, नवजागरण एवं स्वतन्त्रता आंदोलन में उपनिषदों की भूमिका, विद्यानिधि प्रकाशन, दिल्ली ।
7. Śrīmadbhagavadgītā - English commentary by Jayadaya Goyandka, Tattvavivecinī Gītā Press, Gorakhpur, 1997.
8. Isha Upanishad, The Complete Works Of Sri Aurobindo, Sri Aurobindo Ashram Trust, Pondicherry 2003
9. **Gaurinath Shastri, A Concise History of Sanskrit Literature, MLBD, Delhi.**

Additional Resources:

10. बलदेव उपाध्याय, वैदिक साहित्य और संस्कृति, वाराणसी ।
11. बलदेव उपाध्याय, संस्कृत साहित्य का इतिहास, शारदा निकेतन, वाराणसी ।
12. प्रीतिप्रभा गोयल, संस्कृत साहित्य का इतिहास, राजस्थानी ग्रन्थागार, जोधपुर।
13. राधावल्लभ त्रिपाठी, संस्कृत साहित्य का अभिनव इतिहास, विश्वविद्यालय प्रकाशन, वाराणसी ।
14. **Keith, A.B. : History of Sanskrit Literature, also Hindi translation, MLBD, Delhi (हिन्दी अनुवाद, मंगलदेव शास्त्री, मोतीलाल बनारसीदास,दिल्ली ।)**
15. **Krishnamachariar,History of Classical Sanskrit Literature, MLBD, Delhi.**
16. **Winternitz Maurice, Indian Literature (Vol. I-III), also Hindi Translation, MLBD, Delhi.**
17. Gita super site

[E] Teaching Learning Process

1. The teacher will pronounce/recite/ read the Sanskrit text and the students will then repeat.
2. In situations involving hard words, the text will be recited after disjoining or dividing the hard words.
3. After division/ disjoining of hard words teacher will arrange them according to its meaning (Anvaya) and recite again.
4. After this the meaning of the verses or of specific parts will be explained.
5. Reflected social, political, cultural features, etc. in the related section will be clarified while comparing them with current contexts.
6. Analysis of the text with highlighting the specific qualities of the characters will also be made.
7. The related grammar and poetic beauty will be clarified.
8. Regarding the introductory knowledge related to concerned poet and his poetic style will be discussed.

9. A variety of approaches to teaching-learning process, including seminars, tutorials, workshops, peer teaching and learning, practicum and project-based learning, field-based learning, etc will be applied in this course.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

I.	Basic Structure of Question Paper & Division of Marks	75
I	Translation-4 (from unit-1 to 4)	05 x 04 = 20
ii.	Explanations-4 (from unit-1 to 4)	08 x 03 = 24
iii.	questions 02 (Unit 1 to 4) <u>Or</u> short notes	10 x 02 = 20
iv.	Grammatical notes on underlined words of verses (from Unit s 1 to 4) = 4	4
v.	Sanskrit Question	07
II	Internal Assessment (Project/Discussion/Assignment/ paper presentation/ Periodic tests etc.)	25

[H] Keywords :

Atman, Brahman, Ishwar, Karma , Sristi

(Sanskrit as MIL C1, AECC-3, Introductory)
Niti Literature
(72132803)

Max. Marks : (75+ 25 = 100)

Credits :20

[A] Course Objectives:

This course aims to get the students acquainted with the outline of Sanskrit Nīti literature through texts Pañcatantram and Nītiśatakam with the General Introduction to Sanskrit Literature

[B] Course Learning Outcomes:

The students will learn the essence of the ways of life depicted and enjoined in the Niti Literature of Sanskrit language. They will also learn various aspects and forms of Sanskrit as one of the modern Indian Languages through the practice of easy and simple Sanskrit texts of Niti Literature. The storylines and the study and verses from the prescribed texts will instill in the students the moral and ethical values that will be an asset in the lived lives. They will be familiar with the general history of Sanskrit Literature and with the style and contents of the works of eminent literary figures like Bhasa, Kalidas, Bhavabhuti and Banabhatta etc. This course will enhance the skill of chaste Sanskrit pronunciation as well as competence and performance of language. This will help them translate, explain the prescribed Sanskrit texts in their native language.

[C] Contents:

Unit: I

Pañcatantra

Credit : 04

**ksapanakakatha, sinha-karaka-murkhabrahmana
katha**
(क्षपणककथा, सिंह-कारक-मूर्खब्राह्मणकथा)

Unit: II

Pañcatantra

Credits : 04

**Text Introduction of the following:
murkhapandita-katha, vanara-magaramaccha-
katha and gangadattamanduka katha**
(मूर्खपण्डित-कथा, वानर-मकरमच्छ-कथा तथा गंगदत्तमण्डूककथा)

Unit: III

Nītiśatakam

Credits : 04

Introduction to nitishatakam
Text reading of nitishatakam from verses: 01-10.
(According to Savitri Gupta, Vidyanidhi Prakashan, 2015).

Unit: IV Nītiśatakam**Credits : 04**

Text reading of nitishatakam from verses: 11-30
(According to Savitri Gupta, Vidyanidhi Prakashan, 2015).

Unit: V**Introduction to Sanskrit Mahakavyas and Prose****Credits: 06**

Mahakavya- (Kalidasa and Bharavi)
Prose -(Banabhatta and Dandin)

Unit: VI**Introduction to Sanskrit Drama****Credits : 04**

Drama- (Bhasa, Kalidasa and Bhavabhuti)

[D] Suggested Books/Readings:

1. श्यामाचरण पाण्डेय) व्या(., पञ्चतन्त्रम्) विष्णु शर्मा(, मोतीलाल बनारसीदास, दिल्ली, 1975 ।
2. M.R. Kale, Pancatantram(ed. and trans.), Motilal Banarasidass, Delhi, 1999.
3. सावित्री गुप्ता) 2015), नीतिशतक, विद्यानिधि प्रकाशन, दिल्ली ।
4. उमाशंकर शर्मा ऋषि : संस्कृत साहित्य का इतिहास, चौखम्बा भारती अकादमी, वाराणसी ।
5. भोलाशंकर व्यास, संस्कृतकविदर्शन, चौखम्बा विद्याभवन, वाराणसी ।
6. Dasgupta, S.N., A History of Sanskrit Literature: Classical Period, University of Calcutta, 1977.

Additional Resources: .

1. Chandra Rajan, Pancatantram(trans.) Penguin Classics, Penguin Books.
2. बाबूराम त्रिपाठी, नीतिशतकम्) भर्तृहरि (महालक्ष्मी प्रकाशन, आगरा, 1986 ।
3. रमाशंकर त्रिपाठी, संस्कृत साहित्य का प्रामाणिक इतिहास, कृष्णदास अकादमी, वाराणसी ।
4. राधावल्लभ त्रिपाठी, संस्कृत साहित्य का अभिनव इतिहास, विश्वविद्यालय प्रकाशन वाराणसी ।
5. A Collection of Ancient Hindu Tales (ed.) Franklin Edgerton, Johannes Hertel, 1908.
6. Keith, Arthur Berriedale, A History of Sanskrit Literature, MLBD, Delhi.
7. Krishnamachariar M, Classical Sanskrit Literature,MLBD, Delhi.

[E] Teaching Learning Process

1. The teacher will pronounce/recite/ read the Sanskrit text and the students will then repeat.
2. In situations involving hard words, the text will be recited after disjoining or dividing the hard words.
3. After division/ disjoining of hard words teacher will arrange them according to its meaning (Anvaya) and recite again.
4. After this the meaning of the verses or of specific parts will be explained.
5. Reflected social, political, cultural features, etc. in the related section will be clarified while comparing them with current contexts.
6. Analysis of the text with highlighting the specific qualities of the characters will also be made.
7. The related grammar and poetic beauty will be clarified.

8. Regarding the introductory knowledge related to concerned poet and his poetic style will be discussed.

A variety of approaches to teaching-learning process, including seminars, tutorials, workshops, peer teaching and learning, practicum and project-based learning, field-based learning, etc will be applied in this course.

[F] Weekly Plan

Week 1 – Unit 1
 Week 2 – Unit 1
 Week 3 – Unit 2
 Week 4 – Unit 2
 Week 5 – Unit 3
 Week 6 – Unit 3
 Week 7 – Unit 4
 Week 8 – Unit 4
 Week 9 – Unit 5
 Week 10 – Unit 5
 Week 11 – Unit 6
 Week 12 – Unit 6

[G] Assessment :

I. Basic Structure of Question Paper & Division of Marks		75
i	Translation-4 (from unit-1 to 4)	05 x 04 = 20
ii.	Explanations-4 (from unit-1 to 4)	08 x 03 = 24
iii.	questions 02 (Unit 1 to 4) <u>Or</u> short notes	10 x 02 = 20
iv.	Grammatical notes on underlined words of verses (from Unit s 1 to 4) = 4	4
v.	Sanskrit Question	07
II	Internal Assessment (Project/Discussion/Assignment/paper presentation/ Periodic tests etc.)	25

[H] Keywords :

Ksapanaka, katha, Niti, Mahakavya, Prose, Drama