

Skill Enhancement Paper

SEC-2: Mathematical Typesetting System: LaTeX

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 help you begin using LaTeX, a mathematical typesetting system designed for the creation of beautiful books – and especially for books that contain a lot of mathematics, complicated symbols and formatting.

Course Learning Outcomes: This course will enable the students to:

- i) Learn to 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.

Unit 1: Getting Started with LaTeX

Introduction to TeX and LaTeX, Creating and typesetting a simple LaTeX document, Adding basic information to documents, Environments, Footnotes, Sectioning, Displayed material.

Unit 2: Mathematical Typesetting

Accents and symbols; Mathematical typesetting (elementary and advanced): Subscript/Superscript, Fractions, Roots, Ellipsis, Mathematical symbols, Arrays, Delimiters, Multiline formulas, Putting one thing above another, Spacing and changing style in math mode.

Unit 3: Graphics and PSTricks

Pictures and graphics in LaTeX, Simple pictures using PSTricks, Plotting of functions.

Unit 4: Getting Started with Beamer

Beamer, Frames, Setting up beamer document, Enhancing beamer presentation.

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 Reading:

- i. Dongen, M. R. C. van (2012). *LaTeX and Friends*. Springer-Verlag.

Practicals to be done in the Computer Lab using a suitable LaTeX Editor:

[1] Chapter 9 (Exercises 4 to 10), Chapter 10 (Exercises 1, 3, 4, and 6 to 9), and Chapter 11 (Exercises 1, 3, 4, 5).

Teaching Plan (Theory of SEC-2: Mathematical Typesetting System: LaTeX):

Weeks 1 to 3: Introduction to TeX and LaTeX, Creating and typesetting a simple LaTeX document, adding basic information to documents, Environments, Footnotes, Sectioning, Displayed material.

[1] Chapter 9 (Sections 9.1 to 9.5).

[2] Chapter 2 (Sections 2.1 to 2.5).

Weeks 4 to 7: Accents and symbols; Mathematical typesetting (elementary and advanced): Subscript/Superscript, Fractions, Roots, Ellipsis, Mathematical symbols, Arrays, Delimiters, Multiline formulas, Putting one thing above another, Spacing and changing style in math mode.

[1] Chapter 9 (Sections 9.6, and 9.7).

[2] Chapter 3 (Sections 3.1 to 3.3).

Weeks 8 to 11: Pictures and Graphics in LaTeX, Simple pictures using PS Tricks, Plotting of functions.

[1] Chapter 9 (Section 9.8), and Chapter 10 (Sections 10.1 to 10.3).

[2] Chapter 7 (Sections 7.1, and 7.2).

Weeks 12 to 14: Beamer, Frames, Setting up beamer document, Enhancing beamer presentation.

[1] Chapter 11 (Sections 11.1 to 11.4).

Facilitating the Achievement of Course Learning Outcomes

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1.	Learn to create and typeset a LaTeX document.	(i) Topics to be explained using LaTeX editor.	• Presentations and class discussions.
2.	Typeset a mathematical document using LaTeX.	(ii) Students to be given homework/assignments.	• Assignments and class tests.
3.	Learn about pictures and graphics in LaTeX.	(iii) Students to be encouraged to look for new applications.	• Mid-term examinations.
4.	Create beamer presentations.		• Practical examinations.
			• End-term examinations.

Keywords: LaTeX, Mathematical typesetting, PSTricks, Beamer.