

NIRMA UNIVERSITY
SCHOOL OF TECHNOLOGY, INSTITUTE OF TECHNOLOGY
Electronics and Communication Engineering

OPEN ELECTIVE

L	T	P	C
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Course Code	2ECO76
Course Title	MATLAB for Engineers

Course Outcomes (COs):

At the end of the course, the students will be able to

1. Utilize a methodical approach to identify, formulate, and solve computational problems.
2. Comprehend MATLAB basics, branching and looping.
3. Apply MATLAB in solving algebra calculus problems.
4. Apply various techniques to solve and visualize engineering-related computational problems using MATLAB.

Syllabus:

Teaching Hours:30

UNIT I: Introduction	02
Importance of MATLAB, MATLAB environment, various toolboxes, using MATLAB as a calculator	
UNIT II: MATLAB Basics	05
Variables and arrays, operations on variables and arrays, matrix operations, displaying output data, introduction to plotting, data files, built-in MATLAB functions, user-defined function	
UNIT III: Branching and Loops	05
Relational and logic operators, branches, WHILE loops FOR loops, SWITCH, BREAK, CONTINUE, vectorization, MATLAB profiler	
UNIT IV: 2D/3D Plots	03
2D plots, 3D plots, data distribution plots, polar plots, contour plots, surface plots	
UNIT V: Numerical Methods	04
Linear algebra and vector analysis, newton and bisection methods, numerical solution to ordinary differential equations, curve fitting, interpolation, least squares regression	
UNIT VI: Cell Arrays, Structures, Importing Data	05
Cell Arrays, structure arrays, string, sorting & searching, importing data into MATLAB, file Input / Output functions, working with the spreadsheet and low-level data file	
UNIT VII: Advanced Features	03
Graphical User Interfaces and GUIDE, application development, Simulink, MATLAB with cross-language platforms	
UNIT VIII: Applications	03
Optimization methods, Signal processing, image processing, machine learning, system-level modeling	

Self-Study:

The self-study content will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study content.

Laboratory Work:

Laboratory work will be based on the above syllabus with a minimum of 10 experiments to be incorporated.

Suggested Readings:

1. MATLAB Programming with Applications for Engineers, Stephen J. Chapman, Brooks/Cole Publishing Co.

2. Jamal T. Manassah, Elementary Mathematical and Computational Tools for Electrical and Computer Engineers Using MATLAB, CRC Press
3. Rudra Pratap, Getting Started with MATLAB, Oxford University Press
4. Stormy Attaway, MATLAB: A Practical Introduction to Programming and Problem Solving, Butterworth-Heinemann Publishers

L = Lecture, T = Tutorial, P = Practical, C = Credit