EC6T6FE1   **Introduction to MATLAB**   **Credits: 3**

Lecture: 3 periods/week   **Internal assessment: 30 marks**
Tutorial: 1 period /week   **Semester end examination: 70 marks**

Course Objectives:

- To learn basics of MATLAB programming
- To learn the basic skills in MATLAB to develop Algorithms for various applications
- To learn the skills in MATLAB to design, simulate and analyze behaviour of Engineering systems
- To learn MATLAB programming for designing real time engineering systems

Course Outcomes:

Students will be able to
- Write programs for basic applications in Engineering
- Model Engineering systems
- Design and Simulate Engineering systems
- Develop code for various real time applications in Engineering and Technology

UNIT- I

Introduction: Starting MATLAB, Working in command window, Arithmetic operations, Display formats, Elementary Math Built-in functions, Defining scalar variables, useful commands for managing variables, Script files, Examples of MATLAB applications

UNIT- II

Creating arrays and Mathematical operations with arrays: Creating 1-dimensional and 2-dimensional arrays, The Transpose operator, Array addressing, using a colon: in addressing arrays, Adding elements to existing variables, Deleting elements, Built in functions for handling arrays, Strings and strings as variables, Addition and Subtraction, Array Multiplication and Division, Element-by-Element operations, using arrays in MATLAB built-in math functions, Built in functions for analysing arrays, Generation of Random Numbers, Examples of MATLAB applications

UNIT- III

Two Dimensional and Three Dimensional Plots:plot, fplot commands, Formatting a plot, plots with logarithmic axes, error bars, special graphics, Histograms, Polar plots, putting multiple plots on the same page, Multiple figure windows, Examples, Line plots, Mesh and surface plots, plots with special graphics, The view command, Examples of MATLAB applications

UNIT- IV

Programming in MATLAB: Relational and Logical operators, conditional statements, The switch-case statement, Loops, Nested Loops and Nested conditional statements, The break and continue commands, creating a function file, structure of a function file, Local and Global variables, saving a function file, using a User-defined function, Examples of simple User-defined functions, comparison between script files and function files, Anonymous and Inline functions, Function functions, sub functions, and Nested functions

UNIT- V

Polynomial, Curve-fitting, Interpolation, Numerical Analysis and Symbolic Math: Polynomials, curve fitting, Interpolation, The Basic fitting interface, Examples, solving equation of one variable, Finding minimum or maximum of a function, Numerical integration, ordinary differential equations, Symbolic objects and symbolic expressions, changing the form of an existing symbolic expression, solving algebraic equations, Differentiation, Integration, plotting symbolic expressions, Numerical calculations with symbolic expressions

Learning Resources

Text Books:

1. MATLAB: An Introduction with applications – Amos Gilat, Wiley India Pvt. Ltd, 4th Ed., 2012.

References:

1. Getting started with MATLAB – Rudra Pratap, Oxford University Press, 2010
2. MATLAB and SIMULINK for Engineers – Agam Kumar Tyagi, Oxford University Press, 2012.