VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mathematical Programming for Engineers

(General Pool: Open Elective - I)

SYLLABUS FOR B.E. III – SEMESTER (Civil, CSE, AI&ML, EEE, IT, Mechanical)

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: **U24OE310EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To introduce the basic environment and interface of MATLAB, including its windows, file types, and built-in help system. 2. To develop proficiency in MATLAB basics such as variables, arrays, vectors, matrices, and script/function file creation and execution. 3. To build programming skills using MATLAB, including understanding data types, control structures, loops, and debugging techniques. 4. To enable students to generate 2D and 3D plots and visualizations, using MATLAB's wide range of graphic functions and solving mathematical and engineering problems such as numerical integration, linear algebra, interpolation, and root finding.	On completion of the course, students will be able to 1. Demonstrate familiarity with the MATLAB environment, file handling, and basic operations including help utilities. 2. Create and manipulate matrices, vectors, and arrays using built-in functions and scripts in MATLAB. 3. Write and debug MATLAB programs using control structures, loops, and logical operations. 4. Generate and customize 2D and 3D plots for data visualization and analysis and solve mathematical problems using MATLAB, including linear and nonlinear equations, interpolation, differentiation, and numerical integration.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1			3									2	3
CO2		2			3									2	3
CO3	1	1	2	2	3									2	3
CO4	1	2			3									2	3

UNIT - I : Introduction:
Basics of MATLAB, MATLAB windows, Advantages of MATLAB, on-line help, file types.

MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file.

Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions
Script Files, Function Files, Debugging methods in MATLAB.

Graphics: Basic 2D plots: Printing labels- grid and axes box- Entering text in a box- Axis control-Style options-Multiple plots-subplots-specialized 2D plots: stem-,bar, hist, pi, stairs, loglog, semilog, polar, comet 3D plots: Mesh, Contour, Surf, Stem3, ezplot.

UNIT - III : Numerical Methods Using MATLAB
Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, MATLAB functions for integration.

Linear Equations- Linear algebra in MATLAB, Solving a linear system, Gauss Elimination, Finding eigen values and eigen vectors, Matrix factorizations.

UNIT - IV : Nonlinear Equations
System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation.

Solution of Ordinary differential Equations (ODEs)-ODE Solvers in MATLAB, Solving First-order equations using ODE23 and ODE45.

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by Rudra Pratap, Oxford publications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt. Ltd.
3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition-Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Math works.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siauw Alexandre Bayen, Elsevier-18th April 2014.
5. https://nptel.ac.in/courses/103106118/2
6. https://www.udemy.com/numerical-methods/

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2. No. of Assignments	: 2	Max. Marks for each Assignment	:	5
3. No. of Quizzes	: 2	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes