

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**MATHEMATICAL PROGRAMMING FOR NUMERICAL COMPUTATION (Open Elective-IV)**

SYLLABUS FOR B.E. VI SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: <b>U21OE610EE</b>
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
The course will enable the students to:	On completion of the course, students will be able to
To provide fundamental knowledge of programming language for solving problems.	On completion of the course, students will be able to 1. Generate arrays and matrices for numerical problems solving. 2. Represent data and solution in graphical display. 3. Write scripts and functions to easily execute series of tasks in problem solving. 4. Use arrays, matrices and functions in Engineering applications 5. Design GUI for basic mathematical applications.

**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, Simpson’s 1/3 Rule for Numerical Integration. MATLAB functions for integration.

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

**UNIT - IV : Nonlinear Equations**

System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation- Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions ployval and polyfit , cubic fit using least square method. Finding roots of a polynomial - roots function, Newton-Raphson Method.

**UNIT - V :**

**Solution of Ordinary differential Equations(ODEs)-**The 4<sup>th</sup> order Runge-kutta Method, ODE Solvers in MATLAB, Solving First – order equations using ODE23 and ODE45.

**Structures and Graphical user interface(GUI):** Advanced data Objects, How a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

**Learning Resources:**

1. Getting started with MATLAB "A quick introduction for scientist and engineers by RudraPratap, Oxfordpublications.
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 Mathworks.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition byTimmy SiauAlexandreBayen,Elsevier-18th April2014.
5. <https://nptel.ac.in/courses/103106118/2>

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

1.	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2.	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3.	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests :90 Minutes