AIT 324 DATA ANALYSIS WITH MATLAB 3(2+1)

Objective(s)

After completing the course the student shall be able to use an advanced mathematical, Statistics, Simulink and Curve Fitting Toolbox. The student shall be able to adapt an applied problem and use it with Matlab

UNIT I

Basics of MATLAB: The basic features, MATLAB windows , A Few Elementary Calculations, Finding Help in Matlab, File types , Platform dependence , General commands; Matrices and Vectors: Input, Indexing, Matrix manipulation, Creating vectors; Matrix and Array Operations: Arithmetic operations, Relational operations, Logical operations, Elementary math functions, Matrix Functions; Character Strings: Manipulating character strings, eval Function; Command- Line Functions: Inline functions, Anonymous functions; Built-in Functions, Plotting Simple Graphs

UNIT II

Programming in MATLAB: Script Files, Function Files, Language-specific Features: Global variables, Loops, branches, control-flow, Interactive input, Recursion; Advanced Data Objects: Multidimensional matrices, Structures, Cells; Handle graphics and user interface: Pre-defined dialogs, Handle graphics, Menu-driven programs

UNIT III

Applications: Linear Algebra, Curve Fitting and Interpolation, Data Analysis and Statistics, Ordinary Differential Equations, Numerical Integration, Nonlinear Algebraic Equations; Graphics: Basic 2-D Plots, Using subplot for Multiple Graphs, 3-D Plots, Saving and Printing Graphs

UNIT IV

Introduction to Simulink and Curve Fitting , Getting Started using Simulink : Block Libraries, Wiring techniques, Help window, Configuration, Building a Simple Model; Getting Started with the Curve Fitting Toolbox : Curve Fitting Tools ,Interactive Curve Fitting , Programmatic Curve Fitting, Model Types for Curves

UNIT V

Statistics Toolbox : Data organization and management, Descriptive Statistics , Statistical plotting and data visualization, Probability Distributions, Linear and Nonlinear Models, Hypothesis Tests , Design of Experiments

Reference Book(s):

1. Hanselman, Duane. Little_eld, Bruce. Mastering Matlab (international edition). Pearson/Prentice Hall.
2. Rudra Pratap, Getting Started with Matlab (Indian edition) Oxford University Press

Practical(s):

1. An overview of MATLAB software
2. Creating and Working with Arrays of Numbers
3. Creating and Printing Simple Plots
4. Creating, Saving, and Executing a Script File
5. Creating and Executing a Function File
6. Manipulate matrices and use them as matrices or arrays
7. Using Built- in Functions

8. Create and work with anonymous functions
9. Work with symbolic mathematics toolbox
10. Saving, loading, importing, and exporting data
11. Learn about file and directory navigation
12. Generate report from your MATLAB programs using publisher
13. Finding the determinant of a matrix , eigenvalues and eigenvectors
14. Linear Algebra : Solving a linear system, Gaussian elimination, Matrix factorizations
15. Curve Fitting and Interpolation
16. Data Analysis and Statistics
17. Ordinary Differential Equations
18. Nonlinear Algebraic Equations
19. SIMULINK