MATLAB/SIMULINK

Commencing from Saturday,11th Feb 2023 via Hybrid Mode (Online/Offline)
Timing: 2-5 PM (Only on Saturdays) for 10 weeks

Unit-1: Introduction

- What Is MATLAB?
- The MATLAB System
- Development Environment
- Starting and Quitting MATLAB
- MATLAB Desktop

Unit-2: Manipulating Matrices

- Matrices and Magic Squares Expressions
- Working with Matrices
- Creating and Concatenating Matrices
- Matrix Indexing
- More About Matrices and Arrays
- Getting Information About a Matrix
- Resizing and Reshaping Matrices
- Shifting and Sorting Matrices
- Operating on Diagonal Matrices
- Empty Matrices, Scalars, and Vectors
- Full and Sparse Matrices
- Multidimensional Arrays

Unit-3: Data Types

- Overview of MATLAB Data Types
- Numeric Types
- Logical Types
- Characters and Strings
- Dates and Times
- Structures
- Cell Arrays
- Function Handles

Unit-4: Programming with MATLAB

- Basic Program Components
- Variables, Keywords and Operators
- MATLAB Expressions
- Regular Expressions
- Comma-Separated Lists
- Program Control Statements
- MATLAB Functions

Unit-8: Programming Tips

- Command and Function Syntax Help
- Development Environment
- M-File Functions
- Function Arguments
- Program Development
- Debugging, Variables, Strings
- Evaluating Expressions
- MATLAB Path, ProgramControl
- Save and Load, Files and Filenames
- Input/ Output, Starting MATLAB

Unit-9: Mathematical Functions and Applications

- Solutions to Systems of Linear Equations
- Curve Fitting and Interpolation
- Integration and Differentiation
- Strings, Time, Base Conversion and Bit Operations Symbolic Processing

Unit-10: Elements of GUI Design

- What is a MATLAB Graphical User Interface?
- The Three Phases of Interface Design
- UI Control Elements
- UI Menu Elements
- High-Level GUI Development – Guide
- Common Programming Desires with UI Objects

Unit-11: SIMULINK – Getting Started

- Useful Features
- Data-driven Modeling
- Hybrid Systems (continuous and discrete)

- ➢ M-File Programming
- ➢ Program Development
- ➢ Working with M-Files
- ➢ M-File Scripts and Functions
- ➢ Function Arguments
- ➢ Function Handles, Calling Functions

Unit-5: Graphics

- ➢ Basic Plotting, Editing Plots
- ➢ Mesh and Surface Plots
- ➢ Animations

Unit-6: Data Import and Export

- ➢ Overview
- ➢ Using the Import Wizar Supported File Formats
- ➢ Saving and Loading MAT-Files
- ➢ Importing Text Data
- ➢ Exporting Text Data
- ➢ Working with Graphics Files
- ➢ Working with Audio and Video Data
- ➢ Working with Spreadsheets
- ➢ Using Low-Level File, I/O Functions

Unit-7: Improving Performance and Memory Usage

- ➢ Analyzing Your Program's Performance
- ➢ Techniques for Improving Performance
- ➢ Making Efficient Use of Memory
- ➢ Resolving **"Out of Memory"** Errors
- ➢ Using SIMULINK as Design Tool
- ➢ Referencing a Model
- ➢ Working with Blocks
- ➢ Using Composite Signals
- ➢ Working with Data Stores
- ➢ Modeling with SIMULINK
- ➢ SIMULINK Debugger
- ➢ Customizing SIMULINK User Interface

- ➢ Example: Mass-Spring-Damper System

Unit-12: SIMULINK Features

- ➢ Model Based Design
- ➢ SIMULINK Software basics
- ➢ Create a SIMULINK Model
- ➢ Modeling a Dynamic Control System
- ➢ Basic Simulation Workflow

Unit-13: Using SIMULINK as Design Tool

- ➢ SIMULINK Debugger
- ➢ Customizing SIMULINK User Interface
- ➢ Creating Custom Blocks
- ➢ Using the Embedded Function Block
- ➢ Print Frame Editor

Unit-14: Advanced Usage of SIMULINK

- ➢ Building a Model
- ➢ Setting Simulink Preferences
- ➢ Modeling Dynamic Systems
- ➢ Simulating Dynamic Systems
- ➢ Entering SIMULINK Commands
- ➢ SIMULINK Windows
- ➢ Printing a Block Diagram
- ➢ Getting a Model Report
- ➢ Creating a Model
- ➢ Working with Blocks
- ➢ Working with Signals
- ➢ Working with Data
- ➢ Exploring, Searching and Browsing Models
- ➢ Running Simulations
- ➢ Analyzing Simulation Results
- ➢ Creating Masked Subsystems

Course Fee: Rs.15,000/-
25% discount for IETE Members & 50% for Students/Teaching Staffs
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