MATLAB

Zetlan Technologies

e-Learning Course

ZETLAN TECHNOLOGIES

COURSE MODULES

Module 1: Introduction to MATLAB

- Overview of MATLAB environment
- MATLAB interface and workspace
- Basic commands and syntax
- Variables, data types, and operators
- Scripts and functions

Module 2: Vectors and Matrices

- Creating and manipulating vectors
- Matrix operations and indexing
- Element-wise operations
- Special matrices (identity, zeros, ones, etc.)
- Transpose, inverse, and determinant of matrices

Module 3: Control Flow & Loops

- Conditional statements (if, else, switch)
- Loop structures (for, while)
- Logical operations
- Handling exceptions with try-catch

Module 4: Functions and Scripts

- Creating and calling functions
- Function inputs and outputs
- Anonymous and nested functions
- Debugging and breakpoints
- File management and path settings

Module 5: Data Handling and Visualization

- Importing and exporting data (Excel, CSV, Text)
- Working with tables and structures
- Plotting:
  - 2D plots (plot, bar, scatter, pie)
  - 3D plots (mesh, surf, contour)
  - Customizing plots (labels, legends, grid. Subplots and multiple fig

Module 6: Numerical Computing & Linear Algebra

- Solving linear equations (A\b operator)
- Eigenvalues and eigenvectors
- Interpolation and curve fitting
- Numerical differentiation and integration

Module 7: Signal Processing & Filtering

- Introduction to signals in MATLAB
- Fourier Transform (fft)
- Filtering techniques (low-pass, high-pass)
- Convolution and correlation

Module 8: Image Processing (Optional)

- Reading and displaying images
- Image transformations and filtering
- Edge detection and segmentation
- Morphological operations

Module 9: Simulink & GUI Development (Optional)

- Introduction to Simulink
- Building models and simulations
- Creating GUI using App Designer
- Adding interactive elements

Module 10: Machine Learning & AI with MATLAB

- Introduction to MATLAB's Machine Learning Toolbox
- Data preprocessing and feature engineering
- Training and evaluating ML models
- Neural networks and deep learning basics