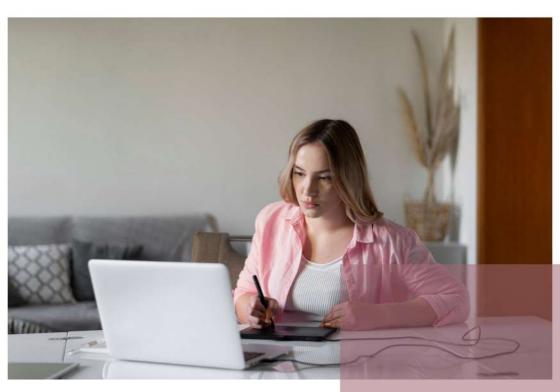
## **MATLAB**





# 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:
  - o 2D plots (plot, bar, scatter, pie)
  - o 3D plots (mesh, surf, contour)
  - o 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