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CEML01: MATLAB Fundamentals and Programming Techniques (2-days)

MATLAB Fundamentals and Programming Techniques is a two-day course that provides a working introduction to the MATLAB by integration of its computation, visualization, and programming concepts. No prior knowledge of MATLAB is required. The course is intended for beginning and intermediate users, while experienced users will benefit by seeing efficient use of MATLAB by our expert trainers.

Day 1 of 2	
Introduction	• A quick overview of MATLAB computing environment • Course content and material discussion
Starting MATLAB	• MATLAB user interface • Working with MATLAB variables • Arithmetic, trigonometric, and complex-valued and logarithmic operations • Display formats • Working with directories in MATLAB • Workspace related commands • Getting HELP
Elementary matrix operations in MATLAB	• Matrix creation • Accessing vector and matrix data (indexing) • multidimensional arrays • Row-column, linear, and logical indexing • Basic matrix operations • Solving systems of linear equations • Obtaining partial fractions • Polynomial operations
Plotting and visualization	• Plotting vector and matrix data • Plot labeling, curve labeling, legend and color bar editing • Plot types • Plot editing • Zoom-in, zoom-out, rotation, and point labeling • Contours and surfaces • Data interpolation • Obtaining data statistics •

Day 2 of 2	
M-files	• The MATLAB Editor • Script M-files • The MATLAB path • Function M-files • Subfunctions and nested functions • Debugging • Best script file writing tactics
Basic statistics and data analysis	• Covariance and correlation • Principal component analysis • Convolution and filtering • Linear and non-linear regression models • Fast Fourier transform and inverse transform