

## Statistical Methods in MATLAB



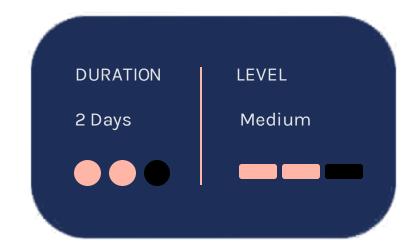
SciEngineer's training courses are designed to kelp organizations and individuals close skills gaps, keep up-to-date with the industry-accepted best practices and achieve the greatest value from MathWorks® and COMSOK® Products.

### Statistical Methods in MATLAB

This two-day course focuses on performing statistical data analysis with MATLAB and Statistics and Machine Learning Toolbox. Examples and exercises demonstrate the use of appropriate MATLAB and Statistics and Machine Learning Toolbox functionality throughout the analysis process; from importing and organizing data, to exploratory analysis, to confirmatory analysis and simulation.

#### **Prerequisites**

MATLAB Fundamentals and knowledge of basic Statistics and Machine Learning Toolbox.



#### **TOPICS**

#### Day 1

- Importing and Organizing Data
- Exploring Data
- Distributions
- Hypothesis Tests

#### Day 2

- Analysis of Variance
- Regression
- Working with Multiple Dimensions
- Random Numbers and Simulation

## Importing and Organizing Data

TRAINING CONTENT - DAY 1

#### **Exploring Data**

#### **Distributions**

OBJECTIVE: Bring data into MATLAB and organize it for analysis. Perform common tasks, such as merging data and dealing with missing data.

Importing data

- Data types
- Tables of data
- Merging data
- Categorical data
- Missing data

OBJECTIVE: Perform basic statistical investigation of a data set, including visualization and calculation of summary statistics.

- Plotting
- Central tendency
- Spread
- Shape
- Correlations
- Grouped data

OBJECTIVE: Investigate different probability distributions and fit distributions to a data set.

- Probability distributions
- Distribution parameters
- Comparing and fitting distributions
- Nonparametric fitting

#### **Hypothesis Tests**

TRAINING CONTENT - DAY 1

OBJECTIVE: Determine how likely an assertion about a data set is. Apply hypothesis tests for common uses, such as comparing two distributions and determining confidence intervals for a sample mean.

- Hypothesis tests
- Tests for normal distributions
- Tests for nonnormal distributions

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#### **Analysis of Variance**

#### Regression

#### **Working with Multiple Dimensions**

**OBJECTIVE:** Compare the sample means of multiple groups and find statistically significant differences between groups.

**OBJECTIVE:** Perform predictive modeling by fitting linear and nonlinear models to a data set. Explore techniques for improving model quality.

**OBJECTIVE:** Simplify high-dimensional data sets by reducing the dimensionality.

• Multiple comparisons

TRAINING CONTENT - DAY 2

- One-way ANOVA
- N-way ANOVA
- MANOVA
- Nonnormal ANOVA
- Categorical correlations

- Linear regression models
- Fitting linear models to data
- Evaluating the fit
- Adjusting the model
- Logistic and generalized linear regression
- Nonlinear regression

- Feature transformation
- Feature selection

## Random Numbers and Simulation

OBJECTIVE: Use random numbers to evaluate the uncertainty or sensitivity of a model, or perform simulations. Generate random numbers from various distributions, and manage the MATLAB random number generation algorithms.

- Bootstrapping and simulation
- Generating numbers from standard distributions
- Generating numbers from arbitrary distributions
- Controlling the random number stream



# Expand your knowledge

