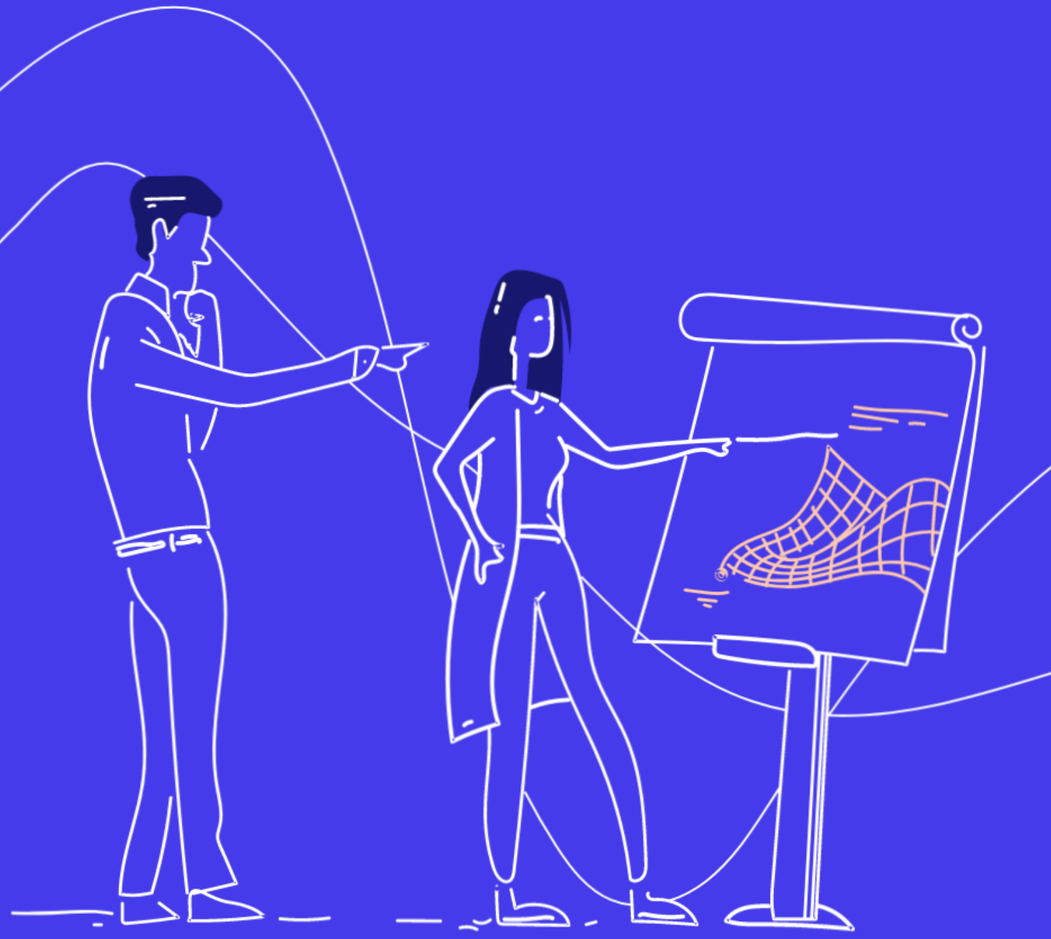
sciengineer

# Signal Preprocessing and Feature Extraction for Data Analytics with MATLAB



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

# Signal Preprocessing and Feature Extraction for Data Analytics with MATLAB

This one-day course shows how to preprocess time-based signals and extract key features in the time and frequency domains. This course focuses on creating, importing, visualizing signals, preprocessing to improve data quality and extracting features in the time and frequency domains. No prior knowledge on signal processing is needed for this course.

## Prerequisites

MATLAB Fundamentals or equivalent experience using MATLAB


TOPICS

## Day 1

- Explore and Analyze Signals (Time Series) in MATLAB
- Preprocess Signals to Improve Data Set Quality
- Extract Features from Signals

# Explore and Analyze Signals (Time Series) in MATLAB

OBJECTIVE: Learn to easily import and visualize multiple signals or time series data sets to gain insights into the features and trends in the data.

- Import, visualize, and browse signals to gain insights
- Make measurements on signals
- Compare multiple signals in the time and frequency domain
- Perform interactive spectral analysis
- Extract regions of interest for focused analysis
- Recreate analysis with auto-generated MATLAB scripts

# Preprocess Signals to Improve Data Set Quality

OBJECTIVE: Learn techniques to clean signal sets with operations such as resampling, removing outliers, and filling gaps.

- Perform resampling to ensure a common time base across signals
- Work with non-uniformly sampled data
- Find gaps in data and remove or fill gaps
- Remove noise and unwanted frequency content
- Perform wavelet denoising
- Use the envelope spectrum to perform fault analysis
- Locate outlier values in data and replace them with acceptable data
- Locate signal changepoints and use boundaries to automatically create signal segments

# Extract Features from Signals

OBJECTIVE: Apply different techniques in time and frequency domains to extract features. Become familiar with the spectral analysis tools in MATLAB and explore ways to bring out features for multiple signals.

- Locate peaks
- Locate desired signals from patterns in the time and spectral domains
- Use spectral analysis to extract features from signals
- Perform classification using supervised learning
- Use the Classification Learner app to interactively train and evaluate classification algorithms

sciengineer

# Expand your knowledge