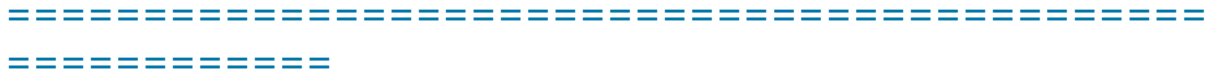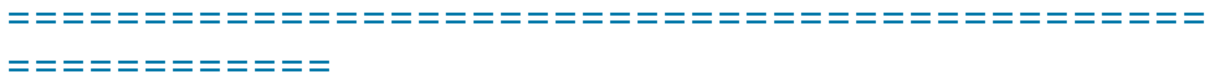# Machine Learning with MATLAB

Course Duration: 03 Days

Course Objectives

Apply different types of machine learning models for clustering, classification, and regression in MATLAB®. Explore how different techniques can optimize your model performance.

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Course modules

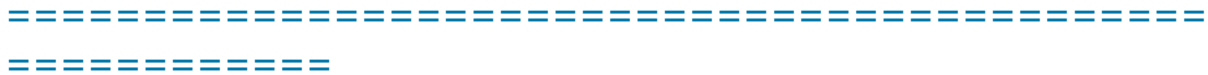==

Module 01: Introduction to Machine Learning

Get an overview of the course. Import and process data, explore data features, and train and evaluate a classification model.

Lessons:
- Course Overview
- Review - Machine Learning Onramp

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Module 02: Finding Natural Patterns in Data

Use unsupervised learning techniques to group observations based on a set of explanatory variables and discover natural patterns in a data set.

Lessons:
- Course Example - Grouping Basketball Players
- Low Dimensional Visualization
- k-Means Clustering
- Gaussian Mixture Models
- Interpreting the Clusters
- Hierarchical Clustering
- Project – Clustering

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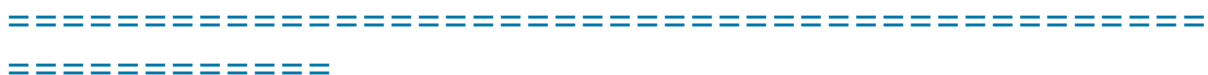
Module 03: Classification Methods

Use available classification methods to train data classification models. Make predictions and evaluate the accuracy of a predictive model.

Lessons:
- Course Example - Classifying Fault Types
- Nearest Neighbour Classification
- Classification Trees
- Naive Bayes Classification
- Discriminant Analysis
- Support Vector Machines
- Classification with Neural Networks
- Project - Classification Methods

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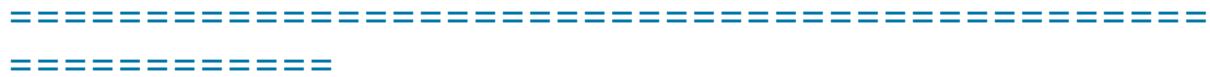
Module 04: Improving Predictive Models

Validate model performance. Optimize model properties. Reduce the dimensionality of a data set and simplify machine learning models.

Lessons:
- Methods for Improving Predictive Models
- Cross Validation
- Reducing Predictors - Feature Transformation
- Reducing Predictors - Feature Selection
- Hyperparameter Optimization
- Ensemble Learning
- Project - Improving Predictive Models

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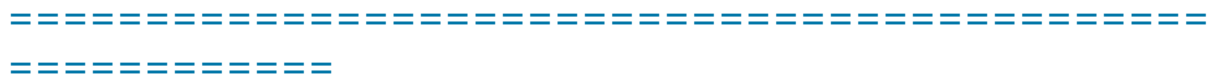
Module 05: Regression Methods

Use supervised learning techniques to perform predictive modeling for continuous response variables.

Lessons:
- Course Example - Fuel Economy
- Linear Models
- Stepwise Fitting
- Regularized Linear Models

- SVMs, Trees and Neural Networks
- Gaussian Process Regression
- Project – Regression

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