

# Course : Introduction to Artificial Intelligence

## Course Outline

### **Module 1: Introduction to Machine Learning**

This module introduces machine learning and discussed how algorithms and languages are used.

#### **Lessons**

- What is machine learning?
- Introduction to machine learning algorithms
- Introduction to machine learning languages

#### **Lab : Introduction to machine Learning**

- Sign up for Azure machine learning studio account
- Run a simple experiment from gallery
- Evaluate an experiment

### **Module 2: Introduction to Azure Machine Learning**

Describe the purpose of Azure Machine Learning, and list the main features of Azure Machine Learning Studio.

#### **Lessons**

- Azure machine learning overview
- Introduction to Azure machine learning studio
- Developing and hosting Azure machine learning applications

#### **Lab : Introduction to Azure machine learning**

- Explore the Azure machine learning studio workspace
- Clone and run a simple experiment
- Clone an experiment, make some simple changes, and run the experiment

### **Module 3: Managing Datasets**

At the end of this module the student will be able to upload and explore various types of data in Azure machine learning.

#### **Lessons**

- Categorizing your data
- Importing data to Azure machine learning
- Exploring and transforming data in Azure machine learning

#### **Lab : Visualizing Data**

- Prepare Azure SQL database
- Import data
- Visualize data
- Summarize data

## **Module 4: Preparing Data for use with Azure Machine Learning**

This module provides techniques to prepare datasets for use with Azure machine learning.

### **Lessons**

- Data pre-processing
- Handling incomplete datasets

### **Lab : Preparing data for use with Azure machine learning**

- Explore some data using Power BI
- Clean the data

## **Module 5: Using Feature Engineering and Selection**

This module describes how to explore and use feature engineering and selection techniques on datasets that are to be used with Azure machine learning.

### **Lessons**

- Using feature engineering
- Using feature selection

### **Lab : Using feature engineering and selection**

- Merge datasets
- Use PCA to reduce dimensions
- Select some variables and edit metadata

## **Module 6: Building Azure Machine Learning Models**

This module describes how to use regression algorithms and neural networks with Azure machine learning.

### **Lessons**

- Azure machine learning workflows
- Scoring and evaluating models
- Using regression algorithms
- Using neural networks

### **Lab : Building Azure machine learning models**

- Using Azure machine learning studio modules for regression
- Evaluate machine learning models
- Add further regression models
- Create and run a neural-network based application

## **Module 7: Using Classification and Clustering with Azure machine learning models**

This module describes how to use classification and clustering algorithms with Azure machine learning.

### **Lessons**

- Using classification algorithms
- Clustering techniques
- Selecting algorithms

### **Lab : Using classification and clustering with Azure machine learning models**

- Using Azure machine learning studio modules for classification.
- Add k-means section to an experiment
- Add PCA for anomaly detection.
- Evaluate the models

## **Module 8: Using R and Python with Azure Machine Learning**

This module describes how to use R and Python with azure machine learning and choose when to use a particular language.

### **Lessons**

- Using R
- Using Python
- Using Jupyter notebooks
- Supporting R and Python

### **Lab : Using R and Python with Azure machine learning**

- Adding R and Python scripts
- Using Python with Visual Studio IDE
- Add a Jupyter notebook
- Run Jupyter notebook
- Import packages for R/Python
- Data visualization using R/Python
- R programming to work on a time series

## **Module 9: Initializing and Optimizing Machine Learning Models**

This module describes how to use hyper-parameters and multiple algorithms and models, and be able to score and evaluate models.

### **Lessons**

- Using hyper-parameters
- Using multiple algorithms and models
- Scoring and evaluating ensembles

### **Lab : Initializing and optimizing machine learning models**

- Using hyper-parameters

- Build an ensemble using stacking
- Evaluate the ensemble

## **Module 10: Using Azure Machine Learning Models**

This module explores how to provide end users with Azure machine learning services, and how to share data generated from Azure machine learning models.

### **Lessons**

- Deploying and publishing models
- Exporting data

### **Lab : Using Azure machine learning models**

- Deploy machine learning models
- Consume a published model
- Export data
- Use exported data in machine learning model

## **Module 11: Using Cognitive Services**

This module introduces the cognitive services APIs for text and image processing to create a recommendation application and describes the use of neural networks with Azure machine learning.

### **Lessons**

- Cognitive services overview
- Processing text
- Processing images
- Creating recommendations

### **Lab : Using Cognitive Services**

- Create and run a text processing application
- Create and run an image processing application
- Create and run a recommendation application

## **Module 12: Using Machine Learning with HDInsight**

This module describes how use HDInsight with Azure machine learning.

### **Lessons**

- Introduction to HDInsight
- HDInsight cluster types
- HDInsight and machine learning models

### **Lab : Machine Learning with HDInsight**

- Deploy an HDInsight cluster
- Use the HDInsight cluster
- Display data in Power BI

## **Module 13: Using R Services with Machine Learning**

This module describes how to use R and R server with Azure machine learning, and explain how to deploy and configure SQL Server and support R services.

### **Lessons**

- R and R server overview
- Using R server with machine learning
- Using R with SQL Server

### **Lab : Using R services with machine learning**

- Deploy DSVM
- Explore the data science VM
- Configure R server
- Run a sample R server application
- Deploy a SQL server 2016 Azure VM
- Configure SQL Server to allow execution of R scripts
- Execute R scripts inside T-SQL statements
- Use R to visualize data