

## **Course Outline: DP-100T01: Designing and Implementing a Data Science Solution on Azure**

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

In this module, you will learn how to provision an Azure Machine Learning workspace and use it to manage machine learning assets such as data, compute, model training code, logged metrics, and trained models. You will learn how to use the web-based Azure Machine Learning studio interface as well as the Azure Machine Learning SDK and developer tools like Visual Studio Code and Jupyter Notebooks to work with the assets in your workspace.

#### Lessons

Getting Started with Azure Machine Learning

Azure Machine Learning Tools

Lab : Creating an Azure Machine Learning Workspace

Lab : Working with Azure Machine Learning Tools

After completing this module, you will be able to

Provision an Azure Machine Learning workspace

Use tools and code to work with Azure Machine Learning

### **Module 2: No-Code Machine Learning with Designer**

This module introduces the Designer tool, a drag and drop interface for creating machine learning models without writing any code. You will learn how to create a training pipeline that encapsulates data preparation and model training, and then convert that training pipeline to an inference pipeline that can be used to predict values from new data, before finally deploying the inference pipeline as a service for client applications to consume.

#### Lessons

Training Models with Designer

Publishing Models with Designer

Lab : Creating a Training Pipeline with the Azure ML Designer

Lab : Deploying a Service with the Azure ML Designer

After completing this module, you will be able to

Use designer to train a machine learning model

Deploy a Designer pipeline as a service

### **Module 3: Running Experiments and Training Models**

In this module, you will get started with experiments that encapsulate data processing and model training code, and use them to train machine learning models.

#### Lessons

Introduction to Experiments

Training and Registering Models

Lab : Running Experiments

Lab : Training and Registering Models

After completing this module, you will be able to

Run code-based experiments in an Azure Machine Learning workspace

Train and register machine learning models

### **Module 4: Working with Data**

Data is a fundamental element in any machine learning workload, so in this module, you will learn how to create and manage datastores and datasets in an Azure Machine Learning workspace, and how to use them in model training experiments.

#### Lessons

Working with Datastores

Working with Datasets

Lab : Working with Datastores

Lab : Working with Datasets

After completing this module, you will be able to

Create and consume datastores

Create and consume datasets

### **Module 5: Compute Contexts**

One of the key benefits of the cloud is the ability to leverage compute resources on demand, and use them to scale machine learning processes to an extent that would be infeasible on your own hardware. In this module, you'll learn how to manage experiment environments that ensure consistent runtime consistency for experiments, and how to create and use compute targets for experiment runs.

## Lessons

Working with Environments

Working with Compute Targets

Lab : Working with Environments

Lab : Working with Compute Targets

After completing this module, you will be able to

Create and use environments

Create and use compute targets

## **Module 6: Orchestrating Operations with Pipelines**

Now that you understand the basics of running workloads as experiments that leverage data assets and compute resources, it's time to learn how to orchestrate these workloads as pipelines of connected steps. Pipelines are key to implementing an effective Machine Learning Operationalization (ML Ops) solution in Azure, so you'll explore how to define and run them in this module.

## Lessons

Introduction to Pipelines

Publishing and Running Pipelines

Lab : Creating a Pipeline

Lab : Publishing a Pipeline

After completing this module, you will be able to

Create pipelines to automate machine learning workflows

Publish and run pipeline services

## **Module 7: Deploying and Consuming Models**

Models are designed to help decision making through predictions, so they're only useful when deployed and available for an application to consume. In this module learn how to deploy models for real-time inferencing, and for batch inferencing.

## Lessons

Real-time Inferencing

Batch Inferencing

Lab : Creating a Real-time Inferencing Service

Lab : Creating a Batch Inferencing Service

After completing this module, you will be able to

Publish a model as a real-time inference service

Publish a model as a batch inference service

## **Module 8: Training Optimal Models**

By this stage of the course, you've learned the end-to-end process for training, deploying, and consuming machine learning models; but how do you ensure your model produces the best predictive outputs for your data? In this module, you'll explore how you can use hyperparameter tuning and automated machine learning to take advantage of cloud-scale compute and find the best model for your data.

### Lessons

Hyperparameter Tuning

Automated Machine Learning

Lab : Tuning Hyperparameters

Lab : Using Automated Machine Learning

After completing this module, you will be able to

Optimize hyperparameters for model training

Use automated machine learning to find the optimal model for your data

## **Module 9: Interpreting Models**

Many of the decisions made by organizations and automated systems today are based on predictions made by machine learning models. It's increasingly important to be able to understand the factors that influence the predictions made by a model, and to be able to determine any unintended biases in the model's behavior. This module describes how you can interpret models to explain how feature importance determines their predictions.

### Lessons

Introduction to Model Interpretation

using Model Explainers

Lab : Reviewing Automated Machine Learning Explanations

Lab : Interpreting Models

After completing this module, you will be able to

Generate model explanations with automated machine learning

Use explainers to interpret machine learning models

## **Module 10: Monitoring Models**

After a model has been deployed, it's important to understand how the model is being used in production, and to detect any degradation in its effectiveness due to data drift. This module describes techniques for monitoring models and their data.

### Lessons

Monitoring Models with Application Insights

Monitoring Data Drift

Lab : Monitoring a Model with Application Insights

Lab : Monitoring Data Drift

After completing this module, you will be able to

Use Application Insights to monitor a published model

Monitor data drift