MS-AI102T00: DESIGNING AND IMPLEMENTING A MICROSOFT AZURE AI SOLUTION

DURATION	LEVEL	TECHNOLOGY	DELIVERY METHOD	TRAINING CREDITS
4 Days	Intermediate	Azure	Instructor-led	NA

INTRODUCTION

The course AI-102 Designing and Implementing an Azure AI Solution is intended for software developers wanting to build AI infused applications that leverage Azure Cognitive Services, Azure Cognitive Search, and Microsoft Bot Framework. The course will use C#, Python, or JavaScript as the programming language.

AUDIENCE PROFILE

Software engineers concerned with building, managing and deploying AI solutions that leverage Azure Cognitive Services, Azure Cognitive Search, and Microsoft Bot Framework. They are familiar with C#, Python, or JavaScript and have knowledge on using REST-based APIs to build computer vision, language analysis, knowledge mining, intelligent search, and conversational AI solutions on Azure.

PREREQUISITES

Before attending this course, delegates must have:
– Knowledge of Microsoft Azure and ability to navigate the Azure portal
– Knowledge of either C#, Python, or JavaScript

COURSE OBJECTIVES

After completing this course, students will be able to:
– Create, configure, deploy, and secure Azure Cognitive Services
– Integrate speech services
– Integrate text analytics
– Create language understanding capabilities with LUIS
– Create and manage Azure Cognitive Search solutions
– Create intelligent agents using the Bot Framework
– Implement Computer Vision solutions

COURSE CONTENT

Module 1: Prepare to develop AI solutions on Azure
As an aspiring Azure AI Engineer, you should understand core concepts and principles of AI development, and the capabilities of Azure services used in AI solutions.
Lessons

– Define artificial intelligence.
– Understand AI-related terms.
– Understand considerations for AI Engineers.
– Understand considerations for responsible AI.
– Understand capabilities of Azure Machine Learning.
– Understand capabilities of Azure AI Services.
– Understand capabilities of the Azure Bot Service.

– Understand capabilities of Azure Cognitive Search.
– Exercise - Utilize prompt engineering in your application.
Learning objectives
By the end of this module, you'll be able to:
– Define artificial intelligence.
– Understand AI-related terms.
– Understand considerations for AI Engineers.
– Understand considerations for responsible AI.
– Understand capabilities of Azure Machine Learning.
– Understand capabilities of Azure AI Services.
– Understand capabilities of the Azure Bot Service.

– Understand capabilities of Azure Cognitive Search.

Module 2: Create and consume Azure AI Services
Azure AI Services enable developers to easily add AI capabilities into their applications. Learn how to create and consume these services.
Lessons

– Provision an Azure AI Services resource
– Identify endpoints and keys
– Use a REST API
– Use an SDK
– Exercise - Use Azure AI Services
Learning objectives
After completing this module, you will be able to:

– Provision Azure AI Services resources in an Azure subscription.
– Identify endpoints, keys, and locations required to consume an Azure AI Services resource.
– Use a REST API to consume an Azure AI service.
– Use an SDK to consume an Azure AI service.

Module 3: Secure Azure AI Services

Securing Azure AI Services can help prevent data loss and privacy violations for user data that may be a part of the solution.
Lessons
– Consider authentication
– Implement network security
– Exercise - Manage Azure AI Services Security
Learning objectives
After completing this module, you will be able to:
– Consider authentication for Azure AI Services
– Manage network security for Azure AI Services

Module 4: Monitor Azure AI Services

Azure AI Services enable you to integrate artificial intelligence into your applications and services. It's important to be able to monitor Azure AI Services in order to track utilization, determine trends, and detect and troubleshoot issues.
Lessons
– Monitor cost
– Create alerts
– View metrics
– Manage diagnostic logging
– Exercise - Monitor Azure AI Services
Learning objectives
After completing this module, you will be able to:
– Monitor Azure AI Services costs
– Create alerts
– View metrics
– Manage diagnostic logging

Module 5: Deploy Azure AI services in containers

Learn about Container support in Azure AI Services allowing the use of APIs available in Azure and enable flexibility in where to deploy and host the services with Docker containers.
Lessons
– Understand containers
– Use Azure AI Services containers
– Exercise - Use a container
Learning objectives
After completing this module, learners will be able to:

– Create Containers for Reuse
– Deploy to a Container
– Secure a Container
– Consume Azure AI Services from a Container

Module 6: Translate text with the Azure AI Translator service

The Azure AI Translator service enables you to create intelligent apps and services that can translate text between languages.
Lessons
– Provision an Azure AI Translator resource
– Understand language detection, translation, and transliteration
– Specify translation options
– Define custom translations
– Exercise - Translate text with the Azure AI Translator service
Learning objectives
After completing this module, you will be able to:
– Provision an Azure AI Translator resource
– Understand language detection, translation, and transliteration
– Specify translation options
– Define custom translations

Module 7: Create speech-enabled apps with the Azure AI Speech service

The Azure AI Speech service enables you to build speech-enabled applications. This module focuses on using the speech-to-text and text to speech APIs, which enable you to create apps that are capable of speech recognition and speech synthesis.
Lessons
– Provision an Azure resource for speech
– Use the Azure AI Speech to text API
– Use the text to speech API
– Configure audio format and voices
– Use Speech Synthesis Markup Language
– Exercise - Create a speech-enabled app
Learning objectives
After completing this module, you will be able to:
– Provision an Azure resource for the Azure AI Speech service
– Use the Azure AI Speech to text API to implement speech recognition
– Use the Text to speech API to implement speech synthesis
– Configure audio format and voices
– Use Speech Synthesis Markup Language (SSML)

Module 8: Translate speech with the Azure AI Speech service.

Translation of speech builds on speech recognition by recognizing and transcribing spoken input in a specified language, and returning translations of the transcription in one or more other languages.
Lessons
– Provision an Azure resource for speech translation
– Translate speech to text
– Synthesize translations
– Exercise - Translate speech
Learning objectives
After completing this module, you will be able to:
– Provision Azure resources for speech translation.
– Generate text translation from speech.
– Synthesize spoken translations.

Module 9: Build an Azure AI Language Understanding model

The Azure AI Language Understanding service enables you to train an Azure AI Language model that apps can use to extract meaning from natural language.
Lessons
– Understand resources for building an Azure AI Language understanding model.
– Define intents, utterances, and entities.
– Use patterns to differentiate similar utterances.
– Use pre-built entity components.
– Train, test, publish, and review an Azure AI Language Understanding model.
– Exercise - Build an Azure AI Language Understanding model.
Learning objectives
After completing this module, you'll be able to:
– Provision Azure resources for Azure AI Language Understanding
– Define intents, utterances, and entities
– Use patterns to differentiate similar utterances
– Use pre-built entity components
– Train, test, publish, and review an Azure AI Language Understanding model

Module 10: Publish and use an Azure AI Language Understanding app

After creating an Azure AI Language Understanding app, you can publish it and consume it from client applications.

Lessons
- Understand capabilities of the Azure AI Language service.
- Process predictions.
- Use a container.
- Exercise - Create an Azure AI Language Understanding app.

Learning objectives
After completing this module, you'll be able to:
- Understand capabilities of an Azure AI Language Understanding app.
- Process predictions from an Azure AI Language Understanding app.
- Deploy an Azure AI Language understanding app in a container.

Module 11: Build a question answering solution
The question answering capability of the Azure AI Language service makes it easy to build applications in which users ask questions using natural language and receive appropriate answers.
Lessons
- Understand question answering.
- Compare question answering to Azure AI Language understanding.
- Create a knowledge base.
- Implement multi-turn conversation.
- Test and publish a knowledge base.
- Use a knowledge base.
- Improve question answering performance.
- Create a question answering bot.
- Exercise - Create a question answering solution.

Learning objectives
After completing this module, you will be able to:
- Understand question answering.
- Compare question answering to language understanding.
- Create a knowledge base.
- Implement multi-turn conversation.
- Test and publish a knowledge base.
- Consume a knowledge base.
- Implement active learning.
- Create a question answering bot.

Module 12: Create a bot with the Bot Framework SDK
Learn how to build a bot by using the Microsoft Bot Framework SDK.
Lessons
- Introduce principles of bot design
- Get started with the Bot Framework SDK

- Implement activity handlers and dialogs
- Deploy a bot
- Exercise - Create a bot with the Bot Framework SDK

Learning objectives
After completing this module, you will be able to:
- Understand principles of bot design
- Use the Bot Framework SDK to build a bot
- Deploy a bot to Azure

Module 13: Create a Bot with the Bot Framework Composer
User the Bot Framework Composer to quickly and easily build sophisticated conversational bots without writing code.
Lessons
- Understand ways to build a bot
- Get started with the Bot Framework Composer
- Understand dialogs
- Understand adaptive flow
- Design the user experience
- Exercise - Create a bot with the Bot Framework Composer

Learning objectives
After completing this module, you will be able to:
- Understand dialogs
- Plan conversational flow
- Design the user experience
- Create a bot with the Bot Framework Composer

Module 14: Analyze images
With the Azure AI Vision service, you can use pre-trained models to analyze images and extract insights and information from them.
Lessons
- Provision an Azure AI Vision resource.
- Analyze an image.
- Generate a smart-cropped thumbnail.
- Exercise - Analyze images with Azure AI Vision.

Learning objectives
After completing this module, you'll be able to:
- Provision an Azure AI Vision resource.
- Analyze an image.
- Generate a smart-cropped thumbnail.

Module 15: Analyze video
Azure Video Indexer is a service to extract insights from video, including face identification, text recognition, object labels, scene segmentations, and more.
Lessons
- Understand Azure Video Indexer capabilities.
- Extract custom insights.

- Use Video Analyzer widgets and APIs.
- Exercise - Analyze video.

Learning objectives
After completing this module, you'll be able to:
- Describe Azure Video Indexer capabilities.
- Extract custom insights.
- Use Azure Video Indexer widgets and APIs.

Module 16: Classify images
Image classification is used to determine the main subject of an image. You can use the Azure AI Custom Vision services to train a model that classifies images based on your own categorizations.
Lessons
- Provision Azure resources for Azure AI Custom Vision
- Understand image classification.
- Train an image classifier.
- Exercise - Classify images with Azure AI Custom Vision.

Learning objectives
After completing this module, you will be able to:
- Provision Azure resources for Azure AI Custom Vision.
- Understand image classification.
- Train an image classifier.

Module 17: Detect objects in images
Object detection is used to locate and identify objects in images. You can use Azure AI Custom Vision to train a model to detect specific classes of object in images.
Lessons
- Understand object detection.
- Train an object detector.
- Consider options for labeling images.
- Exercise - Detect objects in images with Azure AI Custom Vision.

Learning objectives
After completing this module, you will be able to:
- Provision Azure resources for Azure AI Custom Vision.
- Understand object detection.
- Train an object detector.
- Consider options for labeling images.

Module 18: Detect, analyze, and recognize faces
The ability for applications to detect human faces, analyze facial features and emotions, and identify individuals is a key artificial intelligence capability.
Lessons
- Identify options for face detection analysis and identification.

- Understand considerations for face analysis.
- Detect faces with the Azure AI Vision service.
- Understand capabilities of the face service.
- Compare and match detected faces.
- Implement facial recognition.
- Exercise - Detect, analyze, and identify faces.

Learning objectives
After completing this module, you will be able to:
- Identify options for face detection, analysis, and identification.
- Understand considerations for face analysis.
- Detect faces with the Azure AI Vision service.
- Understand capabilities of the Face service.
- Compare and match detected faces.
- Implement facial recognition.

Module 19: Read Text in Images and Documents with the Azure AI Vision Service
Azure's Azure AI Vision service uses algorithms to process images and return information. This module teaches you how to use the Read API for optical character recognition (OCR).
Lessons
- Explore Azure AI Vision options for reading text.
- Use the Read API.
- Exercise - Read text in images.

Learning objectives
After completing this module, you will be able to:
- Read text from images with the Read API.
- Use the Azure AI Vision service with SDKs and the REST API.
- Develop an application that can read printed and handwritten text.

Module 20: Extract data from forms with Azure Document Intelligence
Azure Document Intelligence uses machine learning technology to identify and extract key-value pairs and table data from form documents with accuracy, at scale. This module teaches you how to use the Azure Document Intelligence Azure AI service.
Lessons
- What is Azure Document Intelligence?
- Get started with Azure Document Intelligence.
- Understand prebuilt models.
- Train custom models.
- Use Azure Document Intelligence models.
- Exercise - Extract data from custom forms.
- Use the Azure Document Intelligence Studio.

Learning objectives
After completing this module, you will be able to:
- Identify how Azure Document Intelligence's layout service, prebuilt models, and custom service can automate processes.
- Use Azure Document Intelligence's Optical Character Recognition (OCR) capabilities with SDKs, REST API, and Azure Document Intelligence Studio.
- Develop and test custom models.

Module 21: Create an Azure Cognitive Search solution
Unlock the hidden insights in your data with Azure Cognitive Search.
Lessons
- Azure resources.
- Search components.
- Understand the indexing process.
- Search an index.
- Apply filtering and sorting.

- Enhance the index.
- Exercise - Create a search solution.

Learning objectives
After completing this module, you will be able to:
- Create an Azure Cognitive Search solution.
- Develop a search application.

Module 22: Create a custom skill for Azure Cognitive Search
Use the power of artificial intelligence to enrich your data and find new insights.
Lessons
- Create a custom skill.
- Add a custom skill to a skillset.
- Exercise - Implement a custom skill.

Learning objectives
After completing this module, you will be able to:
- Implement a custom skill for Azure Cognitive Search.
- Integrate a custom skill into an Azure Cognitive Search skillset.

Module 23: Create a knowledge store with Azure Cognitive Search
Persist the output from an Azure Cognitive Search enrichment pipeline for independent analysis or downstream processing.
Lessons
- Define projections.
- Define a knowledge store.
- Exercise - Create a knowledge store.

Learning objectives
After completing this module, you will be able to:
- Create a knowledge store from an Azure Cognitive Search pipeline.
- View data in projections in a knowledge store.

ASSOCIATED CERTIFICATIONS & EXAM

This course will prepare delegates to write the AI-102: Designing and Implementing an Azure AI Solution exam.