

Develop AI cloud solutions on Azure

Courses Code: AI-200T00

Duration: 5 Days

Delivery Mode: Instructor-led Training (ILT) | Virtual Instructor led Training (VILT)

Overview

This course teaches developers how to create, monitor, and troubleshoot AI solutions on Microsoft Azure. Students will learn how to implement Azure compute and containerization patterns to host applications, build serverless APIs with Azure Functions, and integrate services using event-driven and message-based architectures such as Azure Service Bus and Event Grid. The course also covers working with Azure data services that support AI workloads, including designing and querying solutions with Cosmos DB for NoSQL, Azure Database for PostgreSQL with pgvector, and Azure Managed Redis for caching, streaming, and vector search. By the end of the course, developers will be able to connect services, orchestrate AI workflows, and build secure, scalable, and observable AI-driven applications on Azure.

Skills Covered

- Understand the fundamentals of Artificial Intelligence (AI) and how it is implemented on Microsoft Azure
- Design and develop AI-powered applications using Azure services
- Work with Azure AI Services for vision, speech, language, and decision-making solutions
- Build and deploy machine learning models using Azure Machine Learning
- Integrate AI capabilities into cloud-based applications and workflows
- Use Azure Cognitive Services to add intelligence to apps without deep AI expertise
- Implement responsible AI practices, including security, privacy, and ethical considerations
- Deploy, manage, and monitor AI solutions in a cloud environment
- Automate AI workflows using Azure tools and services

Who Should Attend

This course is designed for developers who build backend and AI-driven applications on Azure and need practical skills in containerized compute, data services for AI, event-driven workflows, and application security and monitoring.

Prerequisites

- Programming experience with languages such as Python, JavaScript, or C#.
- Basic understanding of Azure services and cloud computing concepts.
- Familiarity with containerization fundamentals.



Course Modules

Module 1: Store and manage containers in Azure Container Registry

Use Azure Container Registry to store, build, and manage container images for AI applications. Learn the registry hierarchy, build images with ACR Tasks, and implement tagging strategies for reliable deployments.

Module 2 : Deploy containers to Azure App Service

Deploy and manage containerized applications on Azure App Service by configuring container sources, runtime settings, application configuration, and diagnostics.

Module 3: Deploy and manage apps on Azure Container Apps

Create and manage container deployments in Azure Container Apps. Work with environments, runtime configuration, registry authentication, and deployment verification techniques.

Module 4: Manage containers in Azure Container Apps

Manage container apps across the day-two lifecycle. Update images, manage revisions, diagnose failing deployments, tune resources and scaling, and troubleshoot with logs and health probes.

Module 5: Scale containers in Azure Container Apps

Learn how to configure automatic horizontal scaling for containerized applications in Azure Container Apps. Configure HTTP, TCP, CPU, and memory scale rules, implement event-driven scaling with KEDA, optimize compute resources, and apply revision modes for traffic management.

Module 6: Deploy applications to Azure Kubernetes Service

Learn how to deploy applications to Azure Kubernetes Service. This module covers creating deployment manifests, exposing applications with services, and deploying to Azure Kubernetes Service.

Module 7: Configure applications on Azure Kubernetes Service

Learn to externalize configuration, secure sensitive settings, and attach persistent storage using Kubernetes features on Azure Kubernetes Service.

Module 8: Monitor and troubleshoot applications on Azure Kubernetes Service

Learn to monitor application health, inspect logs and metrics, troubleshoot pods and Services, and verify connectivity for AI workloads on Azure Kubernetes Service (AKS).

Module 9: Build queries for Azure Cosmos DB for NoSQL

Learn how to connect to Azure Cosmos DB for NoSQL using the SDK, perform data operations on items, and write efficient SQL queries to retrieve document data for AI applications.



Module 10: Implement vector search on Azure Cosmos DB for NoSQL

Learn how to store vector embeddings, execute similarity queries using the VectorDistance function, combine vector search with metadata filters and hybrid search, and use the change feed to keep embeddings synchronized.

Module 11: Optimize query performance for Azure Cosmos DB for NoSQL

Learn how to optimize query performance by analyzing query patterns, configuring range and composite indexes, selecting vector index types, and choosing consistency levels that balance freshness with cost efficiency.

Module 12: Build and query with Azure Database for PostgreSQL

Learn how to use Azure Database for PostgreSQL to build data foundations for AI applications. Design schemas, write efficient queries, and integrate with Python applications using secure authentication.

Module 13: Implement vector search with Azure Database for PostgreSQL

Learn how to implement vector search using the pgvector extension in Azure Database for PostgreSQL. Store embeddings, create vector indexes, and build semantic retrieval patterns for AI applications.

Module 14: Optimize vector search in Azure Database for PostgreSQL

Learn how to optimize vector search performance in Azure Database for PostgreSQL using pgvector. Tune configuration parameters, select and configure vector indexes, design efficient data layouts, scale for high-volume workloads, and implement connection pooling for AI applications.

Module 15: Implement data operations in Azure Managed Redis

Learn how to implement data operations in Azure Managed Redis. This module covers Azure Managed Redis features, client library best practices, and how to store and retrieve data efficiently.

Module 16: Implement event messaging with Azure Managed Redis

Learn how to implement event messaging with Azure Managed Redis, including pub/sub for broadcasting notifications and Redis Streams for reliable async task processing. This module covers building real-time notification systems and coordinating multi-step processing pipelines.

Module 17: Implement vector storage in Azure Managed Redis

Learn how to implement vector storage and similarity search in Azure Managed Redis. This module covers creating vector indexes, querying embeddings, choosing vector types and indexing strategies, and selecting optimal data structures for AI applications.



Module 18 : Queue and process AI operations with Azure Service Bus

Learn how to use Azure Service Bus to decouple AI application components, queue inference requests, distribute processing workloads across competing consumers, and handle failures through dead-letter queues. This module covers queues, topics with subscriptions, message structuring for AI payloads, and reliable message processing with the Python SDK.

Module 19: Develop event-driven AI workflows with Azure Event Grid

Build reactive AI architectures using Azure Event Grid to route events from sources to handlers with low latency and high reliability. Learn to configure event subscriptions, design CloudEvents, implement delivery policies, and publish custom events from AI applications.

Module 20: Build serverless AI backends with Azure Functions

Learn how to use Azure Functions as lightweight serverless compute for AI workloads. Build inference endpoints, event processors, and service integrations that scale automatically with demand.

Module 21: Manage application secrets with Azure Key Vault

Learn how to use Azure Key Vault to store, retrieve, and manage secrets in AI solutions on Azure. This module covers vault organization, SDK-based secret retrieval with managed identity, secret versioning and rotation strategies, and caching patterns that reduce API calls while maintaining credential freshness.

Module 22: Manage application settings with Azure App Configuration

Learn how to use Azure App Configuration to centralize application settings for AI solutions on Azure. This module covers connecting from Python application code with managed identity, organizing settings with labels and feature flags, referencing Key Vault secrets, and deciding which settings belong in each service.

Module 23: Instrument an app with OpenTelemetry

Learn how to instrument distributed applications with OpenTelemetry on Azure, create custom spans and traces, export telemetry to Azure Monitor Application Insights, and use trace data to debug performance issues in distributed AI solutions.

Module 24: Analyze app telemetry with logs and metrics

Learn to write KQL queries against Application Insights logs, explore error patterns and performance trends, build dashboards and workbooks for ongoing visibility, and configure alerts to detect failures and anomalies in AI solutions on Azure.



Ref: <https://trainocate.com/courses/microsoft/ai-200t00-develop-ai-cloud-solutions-on-azure-training>

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