



# AI-300T00: Operationalize Machine Learning and Generative AI Solutions

Course ID #: 7000-1165-ZZ-Z

Hours: 28

## Course Content

### Course Description:

This course prepares learners to design, implement, and operate Machine Learning Operations (MLOps) and Generative AI Operations (GenAIOps) solutions on Azure. It covers building secure and scalable AI infrastructure, managing the full lifecycle of traditional machine learning models with Azure Machine Learning, and deploying, evaluating, monitoring, and optimizing generative AI applications and agents using Microsoft Foundry. Learners will gain hands-on knowledge of automation, continuous integration and delivery, infrastructure as code, and observability by using tools such as GitHub Actions, Azure CLI, and Bicep. The course emphasizes collaboration with data science and DevOps teams to deliver reliable, production-ready AI systems aligned with modern MLOps and GenAIOps best practices.

### Course Objectives:

- Understand the core concepts of machine learning and generative AI.
- Learn to design and deploy machine learning models in production.
- Gain proficiency in managing data pipelines and machine learning workflows.
- Implement effective model evaluation and monitoring strategies.
- Explore best practices for scaling AI solutions across different environments.
- Familiarize with tools and services for operationalizing AI within cloud platforms.
- Understand compliance and ethical considerations in AI implementations.
- Learn to integrate generative AI with traditional machine learning models.
- Develop skills in troubleshooting and optimizing AI solutions.
- Master techniques for collaborating with cross-functional teams on AI projects.

### Prerequisites:

- A basic understanding of machine learning concepts and principles.
- Familiarity with Python programming, as it is commonly used in machine learning.
- Experience with Azure services and cloud computing concepts.
- Understanding of data processing and data analysis techniques.

### Target Audience:

- Data Scientists
- Machine Learning Engineers
- AI/ML Practitioners
- Software Developers
- Data Analysts
- Business Analysts
- IT Project Managers
- Solution Architects
- Technical Managers
- DevOps Engineers
- AI Research Scientists
- Consultants in AI/ML
- Product Managers
- University Students in Tech Fields
- Researchers in AI Technology



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## Topics:

### Experiment with Azure Machine Learning

- Preprocess data and configure featurization
- Run an automated machine learning experiment
- Evaluate and compare models
- Configure MLflow for model tracking in notebooks
- Train and track models in notebooks
- Evaluate models with the Responsible AI dashboard
- Exercise - Find the best classification model with Azure Machine Learning
- Module assessment

### Perform hyperparameter tuning with Azure Machine Learning

- Define a search space
- Configure a sampling method
- Configure early termination
- Use a sweep job for hyperparameter tuning
- Exercise - Run a sweep job
- Module assessment

### Run pipelines in Azure Machine Learning

- Create components
- Create a pipeline
- Run a pipeline job
- Exercise - Run a pipeline job
- Module assessment

### Trigger Azure Machine Learning jobs with GitHub Actions

- Understand the business problem
- Explore the solution architecture
- Use GitHub Actions for model training
- Exercise
- Module assessment

### Trigger GitHub Actions with feature-based development

- Understand the business problem
- Explore the solution architecture
- Trigger a workflow

- Exercise
- Module assessment

### Work with environments in GitHub Actions

- Understand the business problem
- Explore the solution architecture
- Set up environments
- Exercise
- Module assessment

### Deploy a model with GitHub Actions

- Understand the business problem
- Explore the solution architecture
- Model deployment
- Exercise
- Module assessment

### Plan and prepare a GenAIOps solution

- Explore use cases for GenAIOps
- Select the right generative AI model
- Understand the development lifecycle of a language model application
- Explore available tools and frameworks to implement GenAIOps
- Exercise - Compare language models from the model catalog
- Module assessment

### Manage prompts for agents in Microsoft Foundry with GitHub

- Apply version control to prompts
- Understand Microsoft Foundry agents and prompt versioning
- Organize prompts in GitHub repositories
- Develop safe prompt deployment workflows
- Exercise - Develop prompt and agent versions
- Knowledge check

### Evaluate and optimize AI agents through structured experiments

- Design evaluation experiments
- Apply Git-based workflows to optimization experiments



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- Apply evaluation rubrics for consistent scoring
- Exercise - Evaluate and compare AI agent versions
- Knowledge check

## **Automate AI evaluations with Microsoft Foundry and GitHub Actions**

- Understand why automated evaluations matter
- Align evaluators with human criteria
- Create evaluation datasets
- Implement batch evaluations with Python
- Integrate evaluations into GitHub Actions
- Exercise - Set up automated evaluations
- Knowledge check

## **Monitor your generative AI application**

- Why do you need to monitor?
- Understand key metrics to monitor
- Explore how to monitor with Azure

- Integrate monitoring into your app
- Interpret monitoring results
- Exercise - Enable monitoring for a generative AI application
- Knowledge check

## **Analyze and debug your generative AI app with tracing**

- Why do you need to use tracing?
- Identify what to trace in generative AI applications
- Implement tracing in generative AI applications
- Debug complex workflows with advanced tracing patterns
- Make informed decisions with trace data analysis
- Exercise - Enable tracing for a generative AI application
- Knowledge check

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## NASBA Information

**Level:** Intermediate

**Attendance Requirement:** To be awarded the full credit hours, you must sign in and attend the entire course.

**Fields:** Computer Software & Applications

**CPEs:** 31.20

### **Policies: Course Registration, Cancellation, Refund and Complaint Resolution**

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