

# AutoGen Agentic Framework

**Duration: 32 hours**

## Course Overview

This advanced course offers a comprehensive, hands-on journey into building scalable, secure, and collaborative AI agents using AutoGen and Microsoft Azure. Participants will explore agentic frameworks, set up AutoGen in Python, and integrate with Azure OpenAI services. Through progressive modules, learners will design cloud-ready tools, orchestrate multi-agent workflows, manage state and memory, and implement resilient error-handling strategies. The curriculum emphasizes best practices in deployment, monitoring, and CI/CD using Azure Container Apps, Kubernetes, and GitHub Actions. By the end, participants will be equipped to build and host MCP servers, integrate AutoGen clients, and architect robust agentic AI systems optimized for enterprise-grade cloud environments.

## Prerequisites

- Proficiency in Python
- Understanding of LLM basics and Azure account setup

## Course Contents

### Module 1: Introduction to Agentic Frameworks and AutoGen

- Concepts of agentic workflows and AI agents
- Overview of AutoGen and Microsoft Azure integration

### Module 2: Setting Up AutoGen in Python on Azure

- Installing AutoGen and dependencies
- Configuring Azure OpenAI and cloud resources
- Authenticating and securing API keys with Azure Key Vault

### Module 3: Building Tools and Functions for Azure Agents

- Registering tools/functions in AutoGen (Python)
- Conforming tools for cloud readiness (stateless, logging)

### Module 4: Agent Implementation and Orchestration

- Creating Azure-ready agents using AutoGen APIs
- Orchestrating multi-agent workflows for cloud execution

### **Module 5: State, Memory, and Context Management**

- Leveraging Azure storage for agent memory
- Using in-memory and persistent state
- Debugging and logging in a cloud environment

### **Module 6: Planning and Advanced Agent Patterns**

- Planner agents and multi-step execution
- Designing scalable agent pipelines for Azure Container Apps
- Scheduling/planning with Azure Functions and Logic Apps

### **Module 7: Multi-Agent Collaboration in Azure**

- Agent team patterns optimized for cloud
- Sharing resources and messages on Azure
- Example: Planner-Worker-Validator system using Azure services

### **Module 8: Error Handling, Fallbacks, and Resilience in the Cloud**

- Exception handling for distributed agent workflows
- Designing retry/fallback strategies using Azure services
- Maintaining contextual state and user sessions

### **Module 9: Azure-Based Deployment, Monitoring, and Logging**

- Dockerizing and containerizing your AutoGen agent apps
- Deploying with Azure Container Apps and Azure Kubernetes Service
- Using Azure CLI and GitHub Actions for CI/CD
- Implementing monitoring and tracing with Azure Application Insights and MLflow
- Managing configuration and secrets with Azure Key Vault

### **Module 10: Building, Hosting, and Consuming MCP Servers on Azure**

- Setting up the MCP protocol and Streamable HTTP
- Implementing secure authentication
- Scaling MCP server deployments using Azure tools

### **Module 11: Integrating AutoGen MCP Client with Azure MCP Server**

- Designing Integration architecture for cloud scenarios
- Securing endpoints with Azure-based authentication
- Best practices for robust agentic AI with MCP and Azure

### **Final Q&A, Interactive Quiz, and Feedback**