

Data Analytics with Microsoft Generative and Agentic AI Bootcamp

Structure:

- Course Duration: 12 weeks
- Two live sessions per week, 24 sessions total for each 12-week course (Cohort)
- Each session: 3 hours teaching including availability for lab review and consultation to assist the students with the course content.

Course Objectives

- Learn Python fundamentals and apply them to AI workflows.
- Work with NumPy, Pandas, and Matplotlib to analyze and visualize data.
- Understand Azure AI, Azure OpenAI, Generative AI, and Agentic AI capabilities.
- Build modern AI solutions including RAG, NLP, Vision, Agents and Document Intelligence.
- Apply responsible AI practices and content safety controls.
- Prepare for Microsoft AI-102 certification through hands-on Skillable labs.

Module 1 — Python Foundations for AI

Session 1 — Python Fundamentals

- Learn Python syntax and practice writing basic scripts.
- Use conditional logic, loops, and functions.

Session 2 — Data Structures, OOP & Jupyter

- Work with lists, sets, and dictionaries to manage data.
- Understand classes, objects, and inheritance through simple OOP examples.
- Use Jupyter Notebook for interactive coding.

Session 3 — File Handling & Exceptions

- Read and write data using CSV and JSON files.
- Handle errors gracefully using try-except blocks.

Session 4 — Python Mini Project

- Build a complete data-processing workflow using Python.
- Apply functions, OOP, and file handling together.

Module 2 — Data Analytics with NumPy, Pandas & Matplotlib

Session 5 — NumPy Deep Dive

- Create and manipulate arrays for fast numerical computation.
- Use broadcasting and vectorization to optimize performance.
- Reshape and combine arrays for analytics tasks.

Initials: _____ Company: _____ Provider: _____

Session 6 — Data Preparation with Pandas

- Load data from CSV, Excel, and JSON files into DataFrames.
- Clean and transform data for analysis.

Session 7 — Exploratory Data Analysis

- Explore datasets through grouping, merging, and pivoting.
- Generate summary statistics to understand patterns.

Session 8 — Visualization + Intro to ML

- Build meaningful charts using Matplotlib.
- Train a simple machine learning model using scikit-learn.

Module 3 — Microsoft AI-102 (AI-Engineer Associate Certification)

Session 9 — Choosing & Deploying Language Models

- Learn differences between Azure OpenAI models and their uses.
- Deploy a language model in Azure.
- Demonstration + Lab: Choose and deploy a language model.

Session 10 — Building Generative AI Chat Applications

- Structure conversations using chat completions.
- Add memory for multi-turn chat experiences.
- Demonstration + Lab: Create a generative AI chat app.

Session 11 — RAG with Your Own Data

- Index documents using embeddings and Azure AI Search.
- Build a retrieval-augmented generation pipeline.
- Demonstration + Lab: Create a generative AI app that uses your own data.

Session 12 — Content Safety & Moderation

- Apply Azure safety filters to manage harmful content.
- Use responsible AI policies in generative apps.
- **Demonstration + Lab:** Apply content filters.

Session 13 — Evaluating Generative AI Models

- Measure groundedness, coherence, and relevance of model outputs.
- Use Azure evaluation tools to improve quality.
- **Demonstration + Lab:** Evaluate generative AI model performance.

Session 14 — Introduction to AI Agents

- Learn how agents plan tasks and call external tools.
- Understand the role of context and memory.
- **Demonstration + Lab:** Explore AI Agent development.

Session 15 — Building Your First AI Agent

Initials: _____ Company: _____ Provider: _____

- Design a structured plan for an agent to complete tasks.
- Enable an agent to call APIs and external functions.
- Demonstration + Lab: Develop an AI agent.

Session 16 — Multi-Agent Collaboration

- Coordinate multiple agents working together.
- Assign roles and manage collaborative workflows.
- Demonstration + Lab: Develop a multi-agent solution with Azure AI Foundry.

Session 17 — Advanced Agent Integrations

- Connect agents to remote tools using MCP.
- Extend agent abilities using Semantic Kernel.
- Demonstration with Labs: Connect AI Agents to a remote MCP server
- Develop an Azure AI agent with the Semantic Kernel SDK

Session 18 — NLP with Azure AI Language

- Extract insights using sentiment analysis, NER, and key phrases.
- Demonstration + Lab: Analyze text.

Session 19 — Question Answering & Custom Classification

- Build question-answering systems using Azure AI.
- Train custom text classification models.
- Labs: Create a QA solution + Custom classification.

Session 20 — Speech Recognition & Audio AI

- Convert speech to text and generate voice output.
- Build audio-enabled chat applications.
- Labs: Recognize/Synthesize speech + Build audio chat app.

Session 21 — Image Analysis & OCR

- Detect objects and extract text from images.
- Labs: Analyze images + Read text in images.

Session 22 — Face Analysis, Classification & Vision Chat

- Detect faces and extract facial attributes.
- Build classification models for images.
- Labs: Detect faces + Classify images + Build a vision chat app.

Session 23 — Generative Vision & Multimodal AI

- Generate images using text prompts.
- Extract insights from multimodal inputs like image + text.
- Labs: Generate images + Extract multimodal content.

Session 24 — Enterprise Document AI + Capstone

Initials: _____ Company: _____ Provider: _____

- Use prebuilt and custom Document Intelligence models.
- Build a full knowledge mining pipeline integrating RAG, agents, and DI.
- Demonstration with Labs: Content Understanding app and Prebuilt form analysis

AI-102 Certification Prep Support - AI-102 is the official Microsoft Associate-level certification. Completing this course prepares participants for certification and equips them to create and design AI powered Solutions for business use cases.

- Microsoft AI-102 exam domains, format, study strategies, and sample questions
- Four weeks of post-course mentoring and exam support

Initials: _____ Company: _____ Provider: _____