Foundry Ready – Azure AI, Fundamentals to Engineer

Duration: 5 Days (40 hours)

Course Overview

This 5-day, 40-hour practical program provides a structured foundation in AI on Azure, progressing from core AI concepts and responsible AI principles through language, speech, and vision fundamentals, into building real generative AI applications, designing intelligent agents, grounding solutions in real data, and deploying production-ready systems. The program is organized across fourteen modules, spread across the five days as the concepts build in complexity. The sequence builds from foundational AI thinking to hands-on engineering, so a student who completes the path can confidently design, build, and ship real AI solutions.

Course Syllabus

Day 1

Module 1 – What AI Actually Is

- Lesson 1 – Responsible AI Principles
- Covers fairness, reliability and safety, privacy and security, inclusiveness, transparency, and accountability. Anchors every later technical decision in a framework for building AI responsibly.
- Lesson 2 – Recognizing AI Workloads
- Distinguishes generative and agent-based AI, text analytics, speech, computer vision, and information extraction. Gives students a shared vocabulary before any hands-on work begins.
- Lesson 3 – How AI Models Are Built and Deployed
- Explains how a generative AI model functions and the options for configuring and deploying one. Prepares students to make informed model choices later in the course.

Module 2 – Generative AI and Agents, Simply Explained

- Lesson 1 – Large Language Models
- Introduces how LLMs generate text and the factors that shape output quality. Forms the conceptual base for every generative AI module that follows.
- Lesson 2 – Prompts and Prompt Design
- Covers how prompt wording and structure influence a model's response. Students learn why identical models can produce very different results.
- Lesson 3 – What Makes an AI Agent
- Defines an agent as a model paired with tools, memory, and a goal. Sets up the deeper agent-architecture work covered later in the course.

Module 3 – Teaching Machines to Read

- Lesson 1 – Tokenization
- Shows how text is broken into the units a model actually processes. Removes the mystery behind why a model "sees" language the way it does.
- Lesson 2 – Statistical Text Analysis
- Covers keyword extraction, entity recognition, sentiment analysis, and summarization. These are the techniques behind most production text-analytics features.
- Lesson 3 – Semantic Language Models
- Explains how modern models represent meaning rather than just words. Bridges classic NLP and today's generative systems.

Day 2

Module 4 – Teaching Machines to Listen and Speak

- Lesson 1 – Speech-Enabled Solutions
- Surveys where speech technology fits into real applications, from transcription to voice assistants.
- Lesson 2 – Speech Recognition
- Covers converting spoken audio into text reliably across accents and conditions.
- Lesson 3 – Speech Synthesis
- Covers generating natural-sounding speech from text, including voice selection and tuning.

Module 5 – Teaching Machines to See

- Lesson 1 – Computer Vision Tasks and Techniques
- Surveys classification, detection, and segmentation as the core vision tasks. Sets the map for every vision topic that follows.
- Lesson 2 – Images and Image Processing
- Covers how raw pixels are prepared and transformed before a model sees them.
- Lesson 3 – Convolutional Neural Networks
- Explains how CNNs extract visual features layer by layer.
- Lesson 4 – Vision Transformers and Multimodal Models
- Introduces newer architectures that let a single model reason across text and images together.
- Lesson 5 – Image Generation
- Covers how generative vision models produce new images from a prompt.

Module 6 – Making Sense of Documents

- Lesson 1 – Overview of Information Extraction
- Frames the problem of turning unstructured documents into structured data.
- Lesson 2 – Optical Character Recognition
- Covers extracting text from scanned pages and images.
- Lesson 3 – Field Extraction and Mapping
- Covers pulling specific values, such as invoice totals or dates, into a usable schema.

Day 3

Module 7 – First Steps on the Platform

- Lesson 1 – Understanding Azure for AI
- Orients students to the Azure services an AI solution is built on.
- Lesson 2 – Developing AI Apps on Azure
- Walks through the path from idea to a working AI-powered app.
- Lesson 3 – A Unified Platform for AI
- Introduces the unified platform for building, testing, and deploying AI solutions.
- Lesson 4 – Using Platform Endpoints
- Covers calling a deployed model or agent from an application.

Module 8 – Building Real Generative AI Apps

- Lesson 1 – Working with Foundation Models
- Covers selecting, configuring, and calling a foundation model inside an application.
- Lesson 2 – Prompt Engineering at Scale
- Moves prompt design from single examples to repeatable, testable patterns used in production.

- Lesson 3 – Managing Inputs, Outputs, and Context
- Covers structuring conversation context and handling model responses reliably.
- Lesson 4 – Evaluating and Refining Model Responses
- Introduces techniques for measuring and improving output quality before shipping.

Module 9 – Designing Agents That Actually Work

- Lesson 1 – Agent Architecture and Design Patterns
- Covers the common shapes an agent solution takes, from single-tool to multi-step reasoning.
- Lesson 2 – Task Planning and Execution
- Explains how an agent breaks a goal into steps and carries them out.
- Lesson 3 – Managing Agent State and Memory
- Covers keeping an agent's context consistent across a multi-turn task.
- Lesson 4 – Multi-Agent Orchestration
- Introduces patterns for coordinating several agents toward one outcome.
- Lesson 5 – Debugging and Monitoring Agent Performance
- Covers diagnosing why an agent took the actions it did and tracking its performance over time.

Day 4

Module 10 – Grounding AI in Real Data

- Lesson 1 – Retrieval-Augmented Generation
- Covers the RAG pattern for keeping model answers grounded in real, current data.
- Lesson 2 – Building a Search Index
- Introduces the indexing and query engine most RAG pipelines are built on.
- Lesson 3 – Vector and Hybrid Search
- Covers combining semantic vector search with traditional keyword search for better grounding.

Module 11 – Vision and Documents in Production

- Lesson 1 – Custom Vision Models
- Covers training a vision model on an organization's own images and categories.
- Lesson 2 – Video Analysis
- Extends vision techniques from single images to video streams.
- Lesson 3 – Document Intelligence
- Covers production-grade document processing, building on the OCR and field-extraction concepts from earlier in the course.

Module 12 – Conversations at Scale

- Lesson 1 – Conversational AI Design
- Covers structuring multi-turn conversations that stay coherent and on-task.
- Lesson 2 – Speech Services in Production
- Extends earlier speech concepts into real deployed pipelines with latency and reliability constraints.

Day 5

Module 13 – Keeping AI Safe and Compliant

- Lesson 1 – Content Safety
- Covers filtering and moderating harmful or unwanted content in AI-generated output.
- Lesson 2 – Security for AI Solutions

- Covers securing endpoints, data, and access for an AI application.
- Lesson 3 – Evaluation Metrics
- Covers groundedness, coherence, similarity, and F1 as the metrics for judging solution quality.

Module 14 – From Prototype to Production

- Lesson 1 – End-to-End Solution Design
- Covers pulling every prior module together into one coherent architecture.
- Lesson 2 – Lifecycle Management
- Covers versioning, updating, and retiring AI components over time.
- Lesson 3 – Testing and Validation Strategy
- Covers building a test suite an AI solution can be trusted against before release.
- Lesson 4 – Real-World Capstone Scenarios
- Applies the full course to end-to-end scenarios mirroring real client engagements.

Delivery Structure

- Day 1: Modules 1–3 – AI concepts, responsible AI, generative AI and agents, and natural language fundamentals
- Day 2: Modules 4–6 – speech, computer vision, and document information extraction
- Day 3: Modules 7–9 – first steps on the platform, building real generative AI apps, and designing working agents
- Day 4: Modules 10–12 – grounding AI in real data, production vision and document systems, and conversations at scale
- Day 5: Modules 13–14 – keeping AI safe and compliant, and taking a solution from prototype to production

Expected Outcome

- Participants understand core AI concepts, responsible AI principles, and every major AI workload in use today.
- Participants can build and deploy generative AI apps and agents on a modern AI platform.
- Participants can ground AI solutions in real data, and extend vision, speech, and document processing into production.
- Participants can secure, evaluate, and confidently ship real-world AI solutions.