

Generative AI Course (4 Months) – Syllabus (Revised)

Course Type: Certification

Duration: 4 Months (16 Weeks)

Class Frequency: 2 Classes/Week

Mode: On-Campus

Course Objectives

- Develop practical skills in Generative AI, LLMs, and AI applications
- Build real-world AI solutions (chatbots, RAG systems, AI agents)
- Learn essential Python for AI development, including working with AI-generated code
- Deploy AI models and create a professional portfolio

Note on this revision: The programming block (originally Weeks 2–5) has been compressed from 4 weeks into 2, teaching the essential Python needed to work with AI. The freed time is used to add high-value AI foundations (Week 3) and to strengthen the capstone. All AI content is preserved and now begins earlier.

Week 1: Introduction to AI & Generative AI

Topics:

- AI, ML & Deep Learning Overview
- What is Generative AI?
- Applications & Industry Use Cases

Learning Outcome: Understanding AI landscape and real-world applications

Assignment:

- Write 3 use cases of Generative AI
 - Difference between AI, ML, and Generative AI
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Week 2: Essential Python for AI

Topics:

- Tools Setup & Environment (VS Code, Python Installation, API Keys)
- Variables, Data Types, Operators & Conditional Statements
- Loops & Functions
- Basic File Handling
- Reading, Running & Debugging AI-Generated Code

Learning Outcome: Enough Python fluency to write simple scripts and to read, adapt and debug the code an LLM produces

Assignment:

- Set up the environment and run a first script and a first AI API prompt
 - Write a small program using variables, a loop, a function and an if-statement
 - Take a block of AI-generated Python, run it, find the bug, and fix it
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Week 3: How AI Actually Works (Foundations)

Topics:

- How LLMs Work (predicting the next word; why they sound confident)
- Why AI Hallucinates and How to Reduce It
- Prompt Engineering as Real Engineering (prompt vs code decisions)
- When NOT to Use AI

Learning Outcome: Understand what AI can and cannot reliably do — the judgment that makes graduates employable

Assignment:

- Explain in your own words why an AI chatbot can give a confident but wrong answer
 - Improve a weak prompt using few-shot examples
 - List 3 tasks where AI fits and 2 where it does not, with reasons
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Week 4: Introduction to LLMs

Topics:

- What are LLMs?
- How ChatGPT Works
- Prompt Engineering Basics

Learning Outcome: Understanding LLM behavior

Assignment:

- Write 5 optimized prompts for business use
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Week 5: API Integration & AI Apps

Topics:

- API Handling using Python
- OpenAI API Integration

- Build Simple AI Apps

Learning Outcome: Develop AI-powered applications

Assignment:

- Build a chatbot using API
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Week 6: LangChain & LLM Frameworks

Topics:

- LangChain Basics
- LlamaIndex Overview
- Chains & Workflows

Learning Outcome: Understanding AI frameworks

Assignment:

- Create a simple LangChain pipeline
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Week 7: RAG (Retrieval Augmented Generation) – Part 1

Topics:

- RAG Architecture
- Document Embeddings
- Vector Databases

Learning Outcome: Knowledge-based AI systems

Assignment:

- Design RAG workflow diagram
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Week 8: RAG Implementation – Part 2

Topics:

- PDF Q&A Chatbot
- Knowledge Retrieval Systems

Learning Outcome: Hands-on RAG development

Assignment:

- Build a PDF-based chatbot

Week 9: AI Agents – Fundamentals

Topics:

- What are AI Agents?
- Agent Workflows
- Use Cases

Learning Outcome: Understanding intelligent automation

Assignment:

- Design an AI agent use case
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Week 10: AI Agents – Development

Topics:

- Multi-agent Systems
- Context Handling
- MCP Integration

Learning Outcome: Build AI automation systems

Assignment:

- Create a simple AI agent
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Week 11: Deployment of AI Models

Topics:

- Cloud Basics
- Model Deployment
- Hosting AI Apps

Learning Outcome: Production-level AI deployment

Assignment:

- Deploy a basic AI app
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Week 12: Business Use Cases & Monetization

Topics:

- AI for Business
- Freelancing Opportunities
- SaaS AI Products

Learning Outcome: Commercial application of AI
Assignment:

- Propose an AI business idea
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Week 13: Capstone Project Development

Topics:

- Project Planning
- Implementation
- Debugging

Learning Outcome: End-to-end AI solution development
Assignment:

- Build final AI project
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Week 14: Final Evaluation & Portfolio

Topics:

- Project Presentation
- Mock Interviews
- Portfolio Building

Learning Outcome: Industry readiness
Final Assignment:

- Submit project + demo presentation
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Weeks 15–16: Extended Capstone & Portfolio Polish

Topics:

- Additional project development time
- Portfolio refinement and mock interviews

Learning Outcome: A strong, presentable final project for job/freelance applications
Assignment:

- Complete and present the final portfolio project
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Assessment Structure

- Class Participation: 10%
- Assignments: 30%
- Quizzes: 20%
- Final Project: 40%