Generative AI Course (4 Months) – Syllabus

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 Python programming for AI development
- Deploy AI models and create a professional portfolio

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

Week 2: Tools Setup & AI Environment

Topics:

- IDE Setup (VS Code / Jupyter)
- Python Installation
- API Keys & OpenAI setup

Learning Outcome:
Environment readiness for AI development

Assignment:

- Install Python and run a basic script
- Setup OpenAI API and test a simple prompt

Week 3: Python Fundamentals (Part 1)

Topics:

- Variables, Data Types
- Operators
- Conditional Statements

Learning Outcome:
Basic programming logic

Assignment:

- Write 3 Python programs (if-else based)

Week 4: Python Fundamentals (Part 2)

Topics:

- Loops
- Functions
- File Handling

Learning Outcome:
Build structured programs

Assignment:

- Create a simple file-based chatbot

Week 5: Advanced Python for AI

Topics:

- OOP Concepts
- Libraries (NumPy, Pandas basics)
- Debugging

Learning Outcome:
Efficient coding for AI systems

Assignment:

- Create a small data analysis script

Week 6: 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

Week 7: 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

Week 8: LangChain & LLM Frameworks

Topics:

- LangChain basics
- LlamaIndex overview
- Chains & workflows

Learning Outcome:
Understanding AI frameworks

Assignment:

- Create a simple LangChain pipeline

Week 9: RAG (Retrieval Augmented Generation) – Part 1

Topics:

- RAG architecture

- Document embeddings
- Vector databases

Learning Outcome:
Knowledge-based AI systems

Assignment:

- Design RAG workflow diagram

Week 10: 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 11: AI Agents – Fundamentals

Topics:

- What are AI Agents?
- Agent workflows
- Use cases

Learning Outcome:
Understanding intelligent automation

Assignment:

- Design an AI agent use case

Week 12: AI Agents – Development

Topics:

- Multi-agent systems
- Context handling
- MCP integration

Learning Outcome:
Build AI automation systems

Assignment:

- Create a simple AI agent

Week 13: Deployment of AI Models

Topics:

- Cloud basics
- Model deployment
- Hosting AI apps

Learning Outcome:
Production-level AI deployment

Assignment:

- Deploy a basic AI app

Week 14: 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

Week 15: Capstone Project Development

Topics:

- Project planning
- Implementation
- Debugging

Learning Outcome:
End-to-end AI solution development

Assignment:

- Build final AI project

Week 16: Final Evaluation & Portfolio

Topics:

- Project presentation
- Mock interviews
- Portfolio building

Learning Outcome:
Industry readiness

Final Assignment:

- Submit project + demo presentation

Assessment Structure

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