

# Gen AI for Python Developers

## Course Objectives

- Understand core GenAI concepts and terminology
- Set up development environment for AI projects
- Implement basic GenAI applications using Python
- Explore popular AI libraries and frameworks
- Develop custom GenAI solutions
- Understand prompt engineering
- Implement RAG (Retrieval-Augmented Generation) systems
- Build scalable AI applications

## Course Content

### Module 1. Foundation & Setup

- Introduction to Generative AI landscape
- Machine Learning vs. Deep Learning vs. GenAI
- Python environment setup (Anaconda, virtual environments)
- Introduction to key libraries: NumPy, Pandas, Matplotlib
- Hands-on: Setting up your first AI development environment

### Module 2. Core Concepts & Libraries

- Neural networks fundamentals
- Introduction to TensorFlow and PyTorch
- Working with pre-trained models
- API integrations (OpenAI, Hugging Face)
- Hands-on: Building your first chatbot

### Module 3. Practical Applications

- Text generation basics
- Image generation introduction
- Data preprocessing for AI models
- Basic prompt engineering
- Hands-on: Creating a simple content generator

### Module 4. Advanced Frameworks & Tools

- Deep dive into LangChain and LlamaIndex
- Vector databases (Pinecone, Weaviate, Chroma)
- Advanced API usage and rate limiting
- Hands-on: Building a document Q&A system

## Module 5. Custom Model Development

- Fine-tuning pre-trained models
- Transfer learning techniques
- Model evaluation and validation
- Hands-on: Fine-tuning a model for specific use case

## Module 6. RAG Systems & Knowledge Bases

- Building retrieval-augmented generation systems
- Document processing and chunking strategies
- Embedding models and similarity search
- Hands-on: Creating an enterprise knowledge assistant

## Module 7. Advanced Applications

- Multi-modal AI (text, image, audio)
- Agent-based systems and tool integration (Agentic AI)
- MCP
- Workflow automation with AI
- Agent2Agent (A2A) Communication (briefing)
- Hands-on: Building an AI-powered automation tool

## Module 8. Production Deployment

- Containerization with Docker
- API development with FastAPI
- Monitoring and logging AI applications
- Hands-on: Deploying your AI application