

Generative AI: LangChain, LangGraph & Hugging Face

Learn to build generative AI applications with Hugging Face, LangChain, LangGraph and Microsoft Agent Framework, from prompts to production agents.

10 Days

80 HOURS

9

MODULES

32

TOPICS

17

HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course covers the foundations of machine learning, deep learning and transformer architectures before moving into open-source models with Hugging Face, prompt engineering and preprocessing unstructured data for retrieval-augmented generation. It then addresses fine-tuning large language models and building applications with LangChain, progressing through the shift from LangChain to LangGraph for agentic orchestration. Later modules cover developing agents in Microsoft Foundry and building AI applications with the open-source Microsoft Agent Framework, including Semantic Kernel and Autogen.

WHO THIS COURSE IS FOR

AI Developers

Machine Learning Engineers

Data Scientists

Prompt Engineers

Software Developers

Solution Architects

PREREQUISITES

- Basic Python or Object-Oriented programming knowledge
- Foundational ML knowledge
- Experience with Jupyter Notebooks or Python IDEs

LEARNING OBJECTIVES

By the end of this course, learners will be able to:

- Understand and apply core machine learning, deep learning, and transformer-based architecture
- Build, fine-tune, and deploy generative AI models using open-source and cloud-based tools
- Design effective prompts and preprocess unstructured data for retrieval-augmented generation (RAG) applications
- Develop intelligent AI agents, chatbots, and workflows using LangChain, LangGraph, and Microsoft Agent Framework
- Implement scalable, responsible, and production-ready generative AI solutions using modern LLMOps best practices

9 Modules, 32 Topics

01

Foundations of Machine Learning & Deep Learning

TOPICS

- Overview of Artificial Intelligence
- **Overview of Machine Learning:** Supervised, Unsupervised, Reinforcement Learning
- Deep Learning Concepts for Generative AI Models
- Introduction to GAN
- Overview of Generative AI
- Introduction to Transformers

02

Hands-on

Open-Source Models with Hugging Face

TOPICS

- Explore Hugging Face Hub for open-source models
- Use the transformers library for text, image, and multimodal tasks
- Share apps via Gradio and Hugging Face Spaces

03

Lab

Prompt Engineering

TOPICS

Understand Prompting Engineering · Key Terminologies · Elements of Prompting · Prompt System Design · Tips for Prompting · Generative AI Tools for Prompting

04

Hands-on

Preprocessing Unstructured Data for LLM Applications

TOPICS

- Extract data from PDFs, PowerPoints, Word, HTML, images, and tables
- Add metadata for enhanced RAG
- Apply layout detection, vision, and table transformers

05**Hands-on**

Finetuning Large Language Models

TOPICS

What is Fine Tuning · Pre-trained LLM vs Fine-Tuned LLM · What is Instruction Fine-Tuning · Data preparation for Fine-Tuning · Approach to Fine-Tuning

06**4 Labs**

LangChain: Building Applications

TOPICS

Introduction to LangChain

07**Lab**

The Evolution of Agentic Orchestration

TOPICS

- The Evolution of Agentic Orchestration (moving from LangChain to LangGraph)

LangGraph for Agent Design

4 Labs**09**

Develop Agents in Microsoft Foundry

TOPICS

- Understanding AI agent development on Azure
- Develop an AI agent with Foundry Agent Service
- Integrate custom tools into your agent
- Develop a multi-agent solution with Foundry Agent Service
- Integrate MCP Tools with Foundry Agents

10**4 Labs**

Microsoft Agent Framework (Open Source) for AI Application Development

TOPICS

- Primitive to Microsoft Agent Framework (Semantic Kernel and Autogen)
- Overview of Microsoft Agent Framework

Practise What You Learn

#	MODULE	ACTIVITY
02	Open-Source Models with Hugging Face	Hands-on: Deploy your first Hugging Face AI app
03	Prompt Engineering	Lab: Prompting Techniques
04	Preprocessing Unstructured Data for LLM Applications	Hands-on: Preprocess enterprise data for RAG
05	Finetuning Large Language Models	Hands-on: Fine-tune a Hugging Face model (QWEN)
06	LangChain: Building Applications	LAB ■ Build a semantic search engine with LangChain ■ Build a RAG agent with LangChain ■ Build a SQL agent ■ Build a Deep Research Agent
07	The Evolution of Agentic Orchestration	Lab: Build a Personal Assistant using LangChain and LangGraph (to understand difference between both)
08	LangGraph for Agent Design	LAB ■ Build a multi-source knowledge base with routing ■ Build a custom RAG agent with LangGraph ■ Workflows and Agents in LangGraph ■ Build and run SQL Agent in LangGraph Studio
10	Microsoft Agent Framework (Open Source) for AI Application Development	LAB ■ Semantic Kernel Basics ■ Understanding Autogen Basics ■ Foundations of AI Agents with Microsoft Agent Framework and Ollama ■ Advanced Multi-Agent Retrieval-Augmented Generation with Ollama

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

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Live Online Classes (ILO)

Fly-Me-A-Trainer (FMAT)

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1-on-1 Training

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