

KOENIG SOLUTIONS · COURSE OUTLINE

GenAI Specialty: LangChain RAG & LLM Fine-Tuning (Koenig Original)

Learn to build, prompt, fine-tune and evaluate LLM systems using LangChain, RAG and MLflow with open-source models.

5 Days

40 HOURS

7

MODULES

28

TOPICS

12

HANDS-ON ACTIVITIES

COURSE OVERVIEW

Generative AI Specialty Course Overview Our Generative AI Specialty course is designed to provide a comprehensive understanding of generative AI technologies over a 5-day (40-hour) period. Participants will begin with an introduction to Generative AI, including architectures and applications like GANs. The course covers Large Language Models (LLMs), focusing on their architecture, types, and varied applications such as text translation and image captioning. Prompt Engineering includes effective techniques for text, image, and code prompting. Advanced labs explore LangChain for creating LLM systems like Retrieval-augmented generation and Question-answering systems. The course also focuses on Fine-tuning techniques and Evaluation using MLflow. Practical labs ensure hands-on experience, empowering attendees to apply learned concepts in real-world scenarios. Pre-requisite: Fundamentals of Python (Machine learning knowledge is an added advantage).

WHO THIS COURSE IS FOR

This comprehensive 5-day course is designed for professionals and enthusiasts aiming to master Generative AI, with a focus on open-source platforms and hands-on labs. It is ideal for individuals with a background in Python and machine learning.

Data Scientists

Machine Learning Engineers

AI Researchers

Software Developers

IT Professionals

Data Analysts

AI Enthusiasts

Python Programmers

Deep Learning Specialists

Technical Leads and Managers

UX/UI Designers with an interest in AI

Automation Engineers

Research Scholars

AI Product Developers

PREREQUISITES

- Fundamentals of Python (Machine learning knowledge is an added advantage)

What You Will Learn

- Explain generative AI architectures and applications such as GANs
- Describe LLM architectures, types and task-based applications
- Apply prompt engineering techniques for text, image and code
- Build RAG applications and chatbots using LangChain
- Develop question-answering systems over tabular and SQL data
- Apply quantization and fine-tuning techniques to open-source LLMs
- Evaluate LLM performance and deployment using MLflow

COURSE SYLLABUS

7 Modules, 28 Topics

01

Lab

Introduction to Generative AI

TOPICS

- Overview of Generative AI
- Architecture of Generative AI
- Applications of Generative AI with the Transformer Library
- Introduction to Generative Adversarial Networks (GANs)

02

Lab

Introduction to Large Language Models (LLMs)

TOPICS

- Architecture of Large Language Models
- Types of Large Language Models (LLMs)
- **Task-based Text AI LLMs:** Translation, Summarization, Sentence Similarity, Automatic Speech Recognition, Text-to-Speech, etc.
- **Major Text AI LLMs:** LLaMA, Qwen, Cohere, Falcon LLM
- **Image AI Models & Services:** Object Detection, Image Segmentation, Image Retrieval, Image Captioning, Visual Q&A, Zero-shot Image Classification, etc.

03**Lab**

Learning Prompt Engineering Using Open-Source Models

TOPICS

Introduction to Prompt Engineering · Prompt Engineering Techniques · Text Prompting with LLaMA (Meta) · Image Prompting with LLaMA (Meta) · Code Prompting with LLaMA (Meta)

04**6 Labs**

Basic LLM Systems (RAG) Using Open-Source Models

TOPICS

- Introduction to Retrieval-Augmented Generation (RAG)
- Overview of LangChain
- Concepts of Embeddings, Retrieval, Chains, and Agents with LangChain

05**Lab**

Advanced LLM Systems (Q&A) Using Open-Source Models

TOPICS

- Difference Between RAG and Question-Answering Systems
- Build a Question-Answering System Over Tabular Data with LangChain
- Build a Question-Answering System Over SQL Data with LangChain

06**Lab**

Fine-Tuning Techniques Using Open-Source Models

TOPICS

- Introduction to Quantization
- Optimization of Model Weights (Data Types)
- Modes of Quantization
- Fine-Tuning LLMs (e.g., Meta's LLaMA, Alibaba's Qwen, Google's Gemma)

07**Lab**

Evaluation of Open-Source Models Using MLflow

TOPICS

Introduction to MLflow · Build a Machine Learning Model with MLflow · MLflow Deployment Servers · LLM Evaluation with MLflow

Practise What You Learn

#	MODULE	ACTIVITY
01	Introduction to Generative AI	Labs: Labs
02	Introduction to Large Language Models (LLMs)	Labs: Labs
03	Learning Prompt Engineering Using Open-Source Models	Labs: Labs
04	Basic LLM Systems (RAG) Using Open-Source Models	LABS ■ Build a Simple LLM Application with LangChain ■ Create a Chatbot with LangChain ■ Develop Vector Stores and Retrievers using LangChain ■ Build an Agent with LangChain ■ Create a Retrieval-Augmented Generation (RAG) Application with LangChain ■ Develop a Conversational RAG Application with LangChain
05	Advanced LLM Systems (Q&A) Using Open-Source Models	Labs: Labs
06	Fine-Tuning Techniques Using Open-Source Models	Labs: Labs
07	Evaluation of Open-Source Models Using MLflow	Lab: Evaluate a Hugging Face LLM

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

Learn the Way That Suits You

Classroom Training

Live Online Classes (ILO)

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✉ info@koenig-solutions.com