KOENIG
step forward

KOENIG SOLUTIONS · COURSE OUTLINE

Agentic AI: LangGraph, AutoGen & MCP

Learn to build agentic AI systems using LangChain, LangGraph, AutoGen and MCP, from prompt engineering to multi-agent workflows.

13	62	11
MODULES	TOPICS	HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course covers generative AI and large language model foundations, followed by prompt engineering techniques and multi-modal models such as Whisper and DALL-E Mini. It then addresses retrieval-augmented generation with LangChain and Weaviate, deployment of generative AI systems with Gradio and Streamlit, and the concepts, architectures and ethics of agentic AI. Later modules build chatbots, work with AutoGen for multi-agent interactions, and introduce LangGraph, agentic RAG with vector databases, and n8n workflow automation with the Model Context Protocol.

WHO THIS COURSE IS FOR

- **AI Developers**
- **Machine Learning Engineers**
- **Prompt Engineers**
- **Chatbot Developers**
- **Data Scientists**
- **Automation Engineers**

PREREQUISITES

Pre-requisites:

- Basics of Python language.
- Basics of Machine Learning

LEARNING OBJECTIVES

- Explain the architecture of generative AI and large language models
- Apply prompt engineering techniques such as zero-shot and chain-of-thought
- Build question answering and RAG applications using LangChain
- Configure multi-modal models for speech and image tasks
- Deploy generative AI interfaces using Gradio and Streamlit
- Compare agentic AI architectures such as ReAct and planning agents
- Develop multi-agent workflows using AutoGen
- Implement agentic RAG and context-aware workflows with n8n and MCP

COURSE SYLLABUS

13 Modules, 62 Topics

01

Lab

Introduction of GenAI

TOPICS

- Introduction to Generative AI
- Architecture of Generative AI
- Applications of Generative AI using Transformer Library

02

Lab

Introduction of Large Language Model

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, Image Captioning, Visual QnA, Zero-shot Image Classification, etc.

03

Lab

Learning Prompt Engineering Using Open Source Models

TOPICS

- Introduction to Prompt Engineering
- **Prompt Engineering Techniques:** Zero-shot prompting, few shot prompting, Chain-of Thought, persona based prompting etc
- Best practices in prompt engineering
- Use cases in IT and operations

04

Multi-Modal Models

TOPICS

- Prompting with multi-modal models
- **OpenAI Whisper:** Speech-to-text model (open-source)
- **DALL-E Mini:** Image generation and understanding (open-source alternative)
- Multi-modal task processing

05

6 Labs

LLM Systems (RAG) Using Open Source Models

TOPICS

- Introduction to Retrieval Augmented Generation (RAG)
- Embedding generation and storage
- Concept of Vector search and similarity scoring
- Introduction to LangChain
- Concept of Embedding, Retrieval, Chain and Agents using LangChain
- Difference between RAG & Question Answering system
- Build a Question Answering system over Tabular Data using LangChain
- Introduction to Weaviate and vectorbase
- Multi-modal RAG using weaviate

06

Deployment of Generative AI Systems

TOPICS

- **LangChain:** Building complex agent workflows
- **Gradio:** Creating interactive user interfaces
- **Streamlit:** Lightweight UIs for Agentic AI applications

07

Introduction to Agentic AI

TOPICS

- What is Agentic AI?
- Characteristics of Agentic AI Systems
- Generative AI vs Agentic AI
- Use Cases and Applications
- Architecture of Agentic AI (Reflex, ReAct, Planning Agent, Multi-agent systems etc.)
- Agent Frameworks (LangChain, AutoGen etc)
- Ethical Considerations and Risks

08

Hands-On

Building Chatbots with Agentic AI

TOPICS

- Using Llama 2 and Open-Assistant for Conversational Agents
- LangChain for Multi-Turn Conversations and Workflow Automation
- Integrating Gradio or Streamlit for Chatbot UIs

09

Lab

Working with AutoGen

TOPICS

- Introduction to AutoGen
- AutoGen Architecture, components and ReAct pattern
- Agent-agent interaction, agent groups etc
- RAG and Function calling

10

Ethical and Responsible Use of Agentic AI

TOPICS

- Bias Detection and Mitigation in Open-Source Models
- Transparency in Decision-Making Processes
- Safeguards Against Unintended Outcomes

11

Introduction to Agentic Frameworks

TOPICS

- **Overview of Agentic AI:** concept of autonomous agents

INTRODUCTION TO LANGGRAPH

- Graph-based execution for LLM workflows
- Use cases and architecture

INTRODUCTION TO LANGCHAIN

- Composable, modular LLM pipelines
- Chains, agents, tools, and memory modules

INTRODUCTION TO MULTI-AGENT SYSTEMS

- Collaboration and task delegation between agents
- Real-world business use cases

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Agentic Retrieval-Augmented Generation (RAG)

TOPICS

- Refresh on traditional RAG pipelines

WHAT IS AGENTIC RAG?

- Combining retrieval with agent-based reasoning
- Dynamic decision making in information retrieval
- Implementing advanced Q&A and research assistants
- Integrating vector databases (e.g., Chroma, Pinecone) with agents

13

n8n and Model Context Protocol (MCP)

INTRODUCTION TO N8N

- Visual workflow automation platform
- Connecting LLM agents with business systems

MCP (MODEL CONTEXT PROTOCOL)

- Maintaining conversation context across steps
- State management and memory persistence
- **Example use cases:** multi-turn workflows, context-aware virtual assistants, automated reporting

HANDS-ON ACTIVITIES

Practise What You Learn

#	MODULE	ACTIVITY
01	**Introduction of GenAI**	**Labs:** Labs
02	**Introduction of Large Language Model**	**Labs:** Labs
03	**Learning Prompt Engineering Using Open Source Models**	**Labs:** Labs
05	**LLM Systems (RAG) Using Open Source Models**	**LAB** ■ Build a Simple LLM Application using LangChain ■ Build a Chatbot LangChain ■ Build vector stores and retriever using LangChain ■ Build an Agent LangChain ■ Build a Retrieval Augmented Generation (RAG) Application using LangChain ■ Build a Conversational RAG Application using LangChain
08	**Building Chatbots with Agentic AI**	**Hands-On:** Building a Task-Specific Chatbot
09	**Working with AutoGen**	**Labs:** Labs

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.

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