

KOENIG SOLUTIONS • COURSE OUTLINE

AI Agents: Fundamentals and Advanced Techniques with LangGraph & AutoGen

Learn to build, orchestrate and evaluate AI agents using LangGraph, AutoGen, LangChain and LlamaIndex, from tools to memory.

40 Hours

DURATION

8

MODULES

22

TOPICS

COURSE OVERVIEW

Large language models (LLMs) have opened new possibilities for building agentic systems—software that can reason, use tools, integrate external data, and collaborate with humans (and other agents) to accomplish complex tasks. This course focuses on building highly controllable, robust, and evaluable AI agents using cutting-edge frameworks like LangGraph, AutoGen, LangChain, and LlamaIndex.

WHO THIS COURSE IS FOR

Intermediate Python developers who are comfortable writing scripts, installing packages, and using Python data structures

Anyone who has basic familiarity with large language models (e.g., ChatGPT or GPT-4) or has done simple prompt engineering before

Developers or data scientists looking to integrate AI agents into real-world applications or research projects

PREREQUISITES

- Python programming skills (comfortable with virtual environments, pip/conda installs).
- Basic understanding of LLMs, prompt engineering, and standard API usage (e.g., OpenAI, Anthropic, or local LLM APIs).
- Familiarity with Git or version control recommended, for managing course projects.

LEARNING OBJECTIVES

By the end of this course, learners will have a practical understanding of how to design, build, and evaluate AI agents that can:

- Use search, retrieval, and indexing to enhance their knowledge
- Incorporate long-term memory and human feedback
- Collaborate with other agents and human operators
- Evaluate, debug, and improve their performance systematically

8 Modules, 22 Topics

01

Agentic Fundamentals

Explore the basics of AI agents, their architecture, and how they differ from single-call LLM applications

TOPICS

- Understand what an AI agent is and how it differs from standard single-call LLM applications
- Learn to decompose an agent-based system into tasks, tools, memory, and a decision-making loop

02

Building Agents from Scratch

Learn to manually invoke LLMs, parse reasoning, and separate responsibilities between language models and environment code

TOPICS

- See how to manually call an LLM to parse, reason, and perform actions
- Understand the division of tasks between the LLM (“brain”) and your code (“environment”)

03

Working with LangGraph

Discover LangGraph’s components to build flow-based LLM applications, orchestrate branching logic, and enable advanced agentic search

TOPICS

- Explore LangGraph’s core components for designing AI workflows: nodes, edges, agent controllers
- Learn how to build a flow-based application that orchestrates LLM calls, tools, and branching logic
- Add advanced capabilities like agentic search for returning multiple structured answers

04

Multi-Agent Systems with AutoGen

Create collaborative AI agents with specialized roles, employing reflection, tool-use, planning, and code-validation for complex tasks

TOPICS

- Create agents that can collaborate, each with different roles (e.g., coder, reviewer, editor)
- Employ design patterns such as reflection, tool-use, planning, and multi-agent conversation
- Integrate code-generation and validation steps for tasks like building custom plots or analyzing data

05

Functions, Tools & Routing in LangChain

Utilize OpenAI's function-calling and LCEL for simplified tool usage, building a conversational agent with structured function calls

TOPICS

- Use OpenAI's function-calling and the LangChain Expression Language (LCEL) to simplify tool usage and chain construction
- Build a conversational agent capable of responding with structured tool calls (e.g., function calling) for tasks like extraction, classification, or other tool-based workflows

06

Event-Driven Document Workflows with LlamaIndex

Implement asynchronous agentic workflows with LlamaIndex, parsing documents, retrieving relevant text, and incorporating human-in-the-loop interactions

TOPICS

- Understand how to build event-driven agentic workflows that respond to triggers or tasks asynchronously
- Use LlamaIndex to parse documents, embed them, and retrieve relevant text for a question-answer loop (RAG)
- Implement human-in-the-loop steps for a document processing agent (e.g., form-filling, summarization)

07

Long-Term Memory & Continual Learning

Add semantic, episodic, and procedural memory to agents, enabling dynamic prompt refinement and adaptive behavior over time

TOPICS

- Distinguish between semantic, episodic, and procedural memory in an agent
- Add a long-term memory store (e.g., vector DB or knowledge graph) that grows with user interactions
- Incorporate memory retrieval to refine system prompts and adapt behaviors

08

Evaluating & Monitoring AI Agents

Learn observability techniques, systematic evaluation methods, and experiment tracking to debug, improve, and deploy production-ready AI agents

TOPICS

- **Add observability:** trace each step of the agent's thought process, tool usage, and final outputs
- Configure systematic evaluation of correctness, efficiency, consistency, and user satisfaction
- Compare code-based metrics vs. "LLM-as-a-judge" evaluations vs. human feedback.
- Structure evaluations into experiments for iterative improvement and deploy monitoring to track performance in production

WHAT IS INCLUDED

Everything You Need to Succeed

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

Fly-Me-A-Trainer (FMAT)

Flexi (Self-Paced)

1-on-1 Training

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