Training Course on Agentic AI Systems with LLMs

Professional Development Training Course Outline

Category	Data Science	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The advent of **Agentic AI Systems** powered by **Large Language Models (LLMs)** marks a transformative era in artificial intelligence. These advanced AI agents, capable of **autonomous decision-making**, **complex task execution**, and **adaptive learning**, are rapidly redefining possibilities across industries. Unlike traditional rule-based automation or even basic generative AI, agentic systems can interpret nuanced contexts, leverage external tools, and iteratively refine their strategies to achieve sophisticated goals, significantly enhancing **operational efficiency** and driving **innovation**.

Training Course on Agentic AI Systems with LLMs: Designing and Deploying AI Agents for Complex Tasks delves into the intricate architecture and practical deployment of **AI agents**. Participants will gain a deep understanding of how to design, develop, and manage these intelligent systems, integrating them seamlessly with existing **enterprise workflows**. The course emphasizes hands-on experience with leading **AI agent frameworks** and the crucial role of **Retrieval-Augmented Generation (RAG)** in empowering agents with real-time, context-aware knowledge, ensuring their performance is both robust and ethically sound for future-proof business solutions.

Programme Curriculum

Training Course on Agentic AI Systems with LLMs

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Course Duration

5 days

Course Objectives

1. Master the fundamentals of Agentic AI architecture and its distinction from traditional AI.
2. Understand the symbiotic relationship between Large Language Models (LLMs) and AI agents.
3. Design intelligent agents capable of autonomous reasoning and multi-step problem-solving.
4. Implement tool-use capabilities for AI agents to interact with external systems and APIs.
5. Leverage Retrieval-Augmented Generation (RAG) to enhance agent knowledge and reduce hallucinations.
6. Develop and deploy multi-agent systems for collaborative task execution and distributed intelligence.
7. Apply leading AI agent frameworks like LangChain, AutoGen, and CrewAI effectively.
8. Implement memory mechanisms (short-term and long-term) for context retention in agents.
9. Address ethical AI considerations, including bias mitigation, transparency, and accountability in agent design.
10. Optimize AI agent performance through advanced prompt engineering and iterative refinement.
11. Design robust human-agent collaboration workflows for seamless human-in-the-loop oversight.
12. Explore AI agent deployment strategies and scaling considerations for enterprise environments.
13. Identify emerging trends and the future of AI agents in various industry verticals.

Organizational Benefits

- Automate complex, multi-step business processes that were previously impossible, leading to significant **efficiency gains** and **cost savings**.
- AI agents can analyze vast datasets in real-time, providing quicker, more insightful, and **data-driven decisions**.
- Deploy proactive and personalized AI agents for customer service, leading to higher **customer satisfaction** and engagement.
- Rapidly scale operations and adapt to changing market demands with highly adaptable and scalable AI agent deployments.
- Unlock new possibilities for product development, service delivery, and operational excellence, fostering a strong **competitive edge**.
- Minimize manual errors in repetitive and complex tasks, ensuring higher accuracy and consistency across operations.
- Intelligently allocate resources by leveraging AI agents to manage and prioritize tasks efficiently.

Target Audience

1. AI Developers & Engineers
2. Machine Learning Engineers.
3. Data Scientists.
4. Solutions Architects.
5. Product Managers
6. Automation Specialists
7. Technical Leads & Managers
8. Researchers in AI/ML

Course Outline

Module 1: Foundations of Agentic AI and LLMs

- Understanding the paradigm shift from traditional AI to **Agentic AI**.
- Deep dive into **Large Language Model (LLM)** architectures and capabilities.
- The role of LLMs as the "brain" for **intelligent agents**.
- Key characteristics: **Autonomy, adaptability, goal-oriented behavior, tool use**.
- **Case Study**: How a financial institution uses LLMs for personalized customer query resolution, laying the groundwork for agentic expansion.

Module 2: Designing Intelligent AI Agents

- Principles of **agent design**: Perception, Reasoning, Planning, Action, Learning.
- Defining agent goals, roles, and boundaries for **complex tasks**.
- Structuring agent memory: **Short-term context** vs. **long-term knowledge retrieval**.
- **Prompt engineering** for robust agent behavior and instruction following.
- **Case Study**: Designing an AI agent for a real estate platform that autonomously processes property listings and responds to client inquiries.

Module 3: Integrating LLMs with External Tools and APIs

- Enabling **tool use** for AI agents to interact with external systems.
- Strategies for **API integration** and function calling.
- Handling diverse data formats and external information sources.
- Error handling and fallback mechanisms for tool interactions.
- **Case Study**: An e-commerce agent integrating with inventory management and shipping APIs to provide real-time order updates and issue refunds.

Module 4: Retrieval-Augmented Generation (RAG) for Enhanced Agents

- Understanding the need for **RAG** to combat LLM hallucinations and provide up-to-date information.
- Architecting **RAG pipelines**: Embeddings, vector databases, and retrieval mechanisms.
- Optimizing retrieval relevance and context integration for agent responses.
- Implementing RAG for domain-specific knowledge and proprietary data.
- **Case Study**: A legal research AI agent leveraging RAG to accurately cite legal precedents from a vast, private document repository.

Module 5: Building Multi-Agent Systems

- Concepts of **multi-agent collaboration** and distributed intelligence.
- Designing communication protocols and coordination mechanisms between agents.

- Hierarchical vs. flat multi-agent architectures.
- Orchestrating complex workflows with frameworks like **CrewAI** and **AutoGen**.
- **Case Study**: A marketing campaign team composed of AI agents for content generation, social media scheduling, and performance analytics.

Module 6: Advanced Agent Frameworks and Deployment

- Practical application of leading **AI agent frameworks**: LangChain, AutoGen, CrewAI, and custom solutions.
- Deployment strategies: On-premise, cloud, and hybrid solutions.
- Monitoring and logging agent performance in production environments.
- Version control and continuous integration/continuous deployment (CI/CD) for agents.
- **Case Study**: Deploying a customer support multi-agent system on a cloud platform to handle millions of queries daily.

Module 7: Ethical AI, Bias Mitigation, and Human-Agent Collaboration

- Addressing **ethical considerations**: **Bias, fairness, transparency, accountability**, and privacy.
- Techniques for **bias detection** and mitigation in agent training data and behavior.
- Designing for **human-in-the-loop (HITL)** interaction and oversight.
- Strategies for building trust and ensuring responsible AI agent deployment.
- **Case Study**: Implementing guardrails and human escalation points for an AI agent assisting in loan approvals to ensure fairness and compliance.

Module 8: Optimization, Evaluation, and Future Trends

- **AI agent performance optimization**: Latency, cost, and accuracy.
- Metrics and methodologies for evaluating agent effectiveness.
- Adaptive learning and self-improvement mechanisms for agents.
- Emerging trends: Embodied AI, symbolic AI integration, and the future of **AI agents**.
- **Case Study**: Optimizing a supply chain AI agent to minimize logistics costs and predict disruptions with higher accuracy, showcasing continuous learning capabilities.

Training Methodology

This course employs a highly interactive and practical training methodology, combining theoretical foundations with extensive hands-on exercises and real-world case studies. The approach includes:

- **Instructor-Led Sessions**: Engaging lectures and discussions to convey core concepts.
- **Hands-on Labs**: Practical coding exercises using Python and popular AI agent frameworks (e.g., LangChain, AutoGen, CrewAI) to build and deploy agents.
- **Interactive Demonstrations**: Live walkthroughs of complex agentic systems and their functionalities.
- **Case Study Analysis**: Deep dives into real-world applications and challenges of agentic AI.
- **Group Projects**: Collaborative exercises to design and implement multi-agent solutions.
- **Q&A and Troubleshooting Sessions**: Dedicated time for addressing participant queries and technical issues.
- **Best Practices and Design Patterns**: Sharing industry-proven methods for robust and scalable agent development.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

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