Faysal Aziz

AI-Ready Engineering for Banking Systems

From Concepts to Code: Secure, Scalable, and Production-Ready AI Integration - 3 days

FA-0093 · 3 days

Agentic & Generative AI · Software Development · DevOps, Cloud & Infrastructure · Data & Analytics

Introduction

Modern banking is no longer defined solely by financial products, but by the intelligence embedded in its systems. AI is reshaping fraud detection, customer experience, risk modeling, and operational efficiency—but its real impact depends on how well technical teams can implement, govern, and scale it. This course is designed to move beyond surface-level understanding and equip engineers with the practical knowledge required to integrate AI into banking environments securely and effectively. Delivered by an instructor with over 30 years of industry experience, the program emphasizes real-world, industry-demanded practices rather than purely academic theory, ensuring participants leave with applicable and production-ready skills.

Learning outcomes

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

- Clearly explain AI concepts, classifications, and real-world applications in banking systems
- Differentiate between Machine Learning, Deep Learning, and Neural Network architectures
- Design and implement AI-assisted development workflows
- Apply prompt engineering and context engineering for code generation and system design
- Evaluate and integrate tools from OpenAI, Google, Anthropic, Meta, Microsoft Power Platform, GitHub Copilot, and Hugging Face
- Architect AI solutions across cloud, on-premises, and hybrid environments
- Implement secure and compliant AI systems aligned with banking regulations

- Automate engineering and business workflows using AI
- Analyze risks, limitations, and ethical considerations in AI deployment
- Build agentic AI systems and understand Model Context Protocol (MCP) concepts

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Prerequisites

- Strong understanding of software development principles
- Familiarity with APIs, microservices, and distributed systems
- Working knowledge of at least one programming language (Python preferred)
- Basic understanding of cloud platforms and DevOps practices
- Exposure to data structures and databases
- Prior exposure to automation or scripting tools is beneficial

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Training outline

1. Foundations of Artificial Intelligence in Banking

1. Definition and evolution of AI
2. AI vs automation vs analytics
3. Key AI use cases in banking systems
4. Regulatory landscape and compliance considerations
5. Demystification of AI hype vs reality

2. Types and Classification of AI

1. Narrow AI vs General AI vs Superintelligence
2. Reactive machines, limited memory, theory of mind
3. Symbolic AI vs statistical AI
4. Generative AI vs discriminative models
5. AI capability vs deployment classifications

3. Machine Learning Fundamentals

1. Supervised, unsupervised, and reinforcement learning
2. Model training lifecycle
3. Feature engineering and data preprocessing

4. Evaluation metrics and model validation
5. Model drift and monitoring

4. Deep Learning and Neural Networks

1. Structure of neural networks
2. Activation functions and optimization techniques
3. CNNs, RNNs, Transformers
4. Large Language Models (LLMs) architecture
5. Fine-tuning vs prompt-based adaptation

5. AI Development Methodologies

1. CRISP-DM and modern AI pipelines
2. MLOps lifecycle
3. Data versioning and experiment tracking
4. CI/CD for AI systems
5. Model governance and auditability

6. AI-Assisted Software Engineering

1. AI-driven code generation workflows
2. Refactoring and optimization using AI
3. Documentation automation
4. Test case generation and validation
5. Debugging with AI assistance

7. Prompt Engineering for Coding

1. Prompt structure and design patterns
2. Zero-shot, few-shot, and chain-of-thought prompting
3. Code-specific prompting techniques
4. Prompt evaluation and iteration
5. Avoiding hallucinations in code generation

8. Context Engineering

1. Context window management

2. Retrieval-Augmented Generation (RAG)
3. Embeddings and vector databases
4. Context injection strategies
5. Maintaining state across interactions

9. Agentic AI Systems

1. Definition and architecture of AI agents
2. Task planning and orchestration
3. Tool usage and chaining
4. Autonomous vs semi-autonomous systems
5. Multi-agent collaboration patterns

10. Model Context Protocol (MCP)

1. Concept and purpose of MCP
2. Context standardization across tools
3. Integration patterns
4. Interoperability challenges
5. Enterprise use cases

11. AI Tools Ecosystem Exploration

1. Overview of platforms from OpenAI, Google, Anthropic, Meta
2. Low-code/no-code tools using Microsoft Power Platform
3. Developer copilots and IDE integrations
4. Open-source model usage via Hugging Face
5. Model selection criteria and benchmarking

12. API Integration and Usage

1. RESTful API fundamentals for AI services
2. Authentication and rate limiting
3. Cost optimization strategies
4. Error handling and fallback mechanisms
5. API orchestration in production systems

13. Deployment Architectures

1. Cloud-based AI deployment models
2. On-premises AI infrastructure
3. Hybrid AI architectures
4. Latency, scalability, and cost considerations
5. Data residency and compliance constraints

14. Security and Risk Management

1. AI-specific security threats
2. Prompt injection and data leakage risks
3. Model poisoning and adversarial attacks
4. Secure API usage practices
5. Governance frameworks and audit trails

15. Limitations and Ethical Considerations

1. Bias and fairness in AI systems
2. Explainability and transparency
3. Regulatory compliance in financial systems
4. Responsible AI principles
5. Operational risks and mitigation strategies

16. Process Optimization Using AI

1. Workflow automation strategies
2. Intelligent process automation (IPA)
3. Integration with existing banking systems
4. Performance monitoring and optimization
5. ROI measurement and KPIs

17. Task Automation Use Cases

1. Automated presentation generation
2. Data cleaning and preprocessing pipelines
3. Data analysis and visualization

4. Report generation and summarization
5. Email automation and communication workflows

18. Performance and Cost Optimization

1. Model efficiency techniques
2. Token optimization strategies
3. Caching and reuse of responses
4. Load balancing and scaling AI systems
5. Monitoring and logging frameworks

19. Future Trends and Strategic Adoption

1. Evolution of generative AI
2. AI-native software development
3. Banking-specific AI innovations
4. Vendor ecosystem evolution
5. Strategic roadmap for AI adoption

Disclaimer

This course outline is intended to serve as a structured guideline for the training program. The instructor reserves the right to modify, adjust, or refine the content, sequence, or emphasis of topics as deemed appropriate based on participant needs, emerging industry developments, or practical constraints, without prior notice.

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