

AI for Developers: Software Development and API Integration

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Course Overview:

AI for Developers: Software Development and API Integration is an application-oriented corporate training course designed to help software professionals integrate generative AI throughout the development lifecycle. Participants explore how AI tools for developers support requirements analysis, code generation, explanation, refactoring, debugging, testing, documentation, and API integration while maintaining human oversight.

The course examines modern generative AI coding tools, including conversational assistants, IDE extensions, code-completion systems, and agent-based AI-powered developer tools. Through structured prompt engineering for developers, participants learn to provide technical context, define constraints, request verifiable outputs, and improve the reliability of AI-generated code. The program also covers AI code review, AI-assisted debugging, AI code refactoring, AI for unit testing, and AI for integration testing.

Building on the AI-enabled integration lifecycle described in the supporting references, participants examine REST API development, API design and development, data mapping, API testing and automation, and API documentation with AI. Security topics address authentication, authorization, credential protection, input validation, and vulnerabilities in AI-generated code. The NIST Generative AI Profile informs discussions of governance, pre-deployment testing, monitoring, incident management, and responsible use.

This AI Developer Course enables participants to use artificial intelligence for software development productively while applying engineering judgment, secure coding controls, and measurable quality standards.

Target Audience:

- Software Developers and Software Engineers
- Application and Integration Developers
- API Developers and API Engineers
- Full-Stack and Backend Developers
- Systems Integration Specialists
- Software and Solution Architects
- DevOps and DevSecOps Engineers
- Quality Assurance and Test Automation Engineers
- Technical Team Leaders and Development Managers
- IT Application Managers
- Digital Services and Electronic Integration Managers

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Targeted Organizational Departments:

- Software Development and AI Software Engineering
- Application Development and Maintenance
- Systems Integration and Enterprise Architecture
- API Management and Digital Services
- Information Technology and Digital Transformation
- DevOps, DevSecOps, and Platform Engineering
- Quality Assurance and Software Testing

Targeted Industries:

- Government and public-sector digital services
- Banking, financial services, and insurance
- Telecommunications and technology services
- Healthcare and health technology
- Energy, utilities, and infrastructure
- Transportation, aviation, and logistics
- Manufacturing and industrial automation
- Retail, e-commerce, and digital marketplaces

Course Offerings:

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

- Select appropriate AI tools for software development tasks.
- Apply prompt engineering for developers using structured technical context.
- Generate, explain, improve, and refactor code with AI assistance.
- Perform AI-assisted debugging and root-cause analysis.
- Review AI-generated code for correctness, quality, and maintainability.
- Generate unit, integration, and API tests using generative AI.
- Apply AI to REST API design, development, integration, and documentation.
- Automate API testing, error analysis, and data transformation tasks.
- Identify security risks in AI-generated code and API integrations.

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Training Methodology:

The course uses an interactive, workplace-focused methodology that connects generative AI concepts with realistic software development and API integration scenarios. Facilitator-led sessions introduce the capabilities, limitations, and design patterns of AI coding assistants, from code completion and conversational support to agent-based AI development tools.

Guided demonstrations illustrate how prompt engineering for developers can support requirements analysis, code generation, AI-assisted debugging, code refactoring, test creation, and API documentation. Participants analyze examples of effective and ineffective AI-generated outputs, identify hallucinated dependencies or insecure code patterns, and determine the verification steps required before implementation.

Case studies examine AI software development across the lifecycle, including integration requirements, API design, coding, testing, deployment, monitoring, and incident response. Group discussions allow participants to compare AI pair programming approaches, select appropriate tools for different development contexts, and design governance controls for development teams.

API-focused activities address REST API development, data transformation, authentication, error handling, API testing and automation, and integration monitoring. Feedback sessions reinforce secure coding, human accountability, and evidence-based code acceptance. Daily reflection and review sessions consolidate learning and connect it to participants' organizational environments.

The methodology is technology-neutral: named commercial tools are discussed through insights, demonstrations, and examples, but software licenses, subscriptions, accounts, and paid tools are not provided with the course.

Course Toolbox:

- Prompt engineering templates for programming tasks
- AI coding assistant comparison matrix
- Code-generation and acceptance checklist
- AI code review and verification checklist
- AI-assisted debugging workflow
- Code refactoring evaluation template
- Unit and integration test prompt library

Tool availability note: The Course Toolbox provides frameworks, templates, insights, and examples of relevant tools. API credits, software subscriptions, and paid development tools are not provided.

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Course Agenda:

Day 1: Generative AI and Modern Software Development

- **Topic 1:** Generative AI for Developers and Software Engineering
- **Topic 2:** AI Coding Assistants and Development Tool Categories
- **Topic 3:** AI Capabilities Across the Software Development Lifecycle
- **Topic 4:** Selecting AI Tools for Developers and Development Teams
- **Topic 5:** Human-AI Collaboration and AI Pair Programming
- **Topic 6:** Limitations, Hallucinations, Context, and Human Oversight
- **Reflection & Review:** Selecting suitable AI use cases for the development environment

Day 2: Prompt Engineering and AI-Assisted Coding

- **Topic 1:** Prompt Engineering for Developers
- **Topic 2:** Context, Constraints, Examples, and Acceptance Criteria
- **Topic 3:** AI Code Generation and Code Explanation
- **Topic 4:** AI-Assisted Debugging and Root-Cause Analysis
- **Topic 5:** AI Code Refactoring and Maintainability
- **Topic 6:** GitHub Copilot and Generative AI Coding Workflows
- **Reflection & Review:** Evaluating prompt quality and generated-code reliability

Day 3: AI-Powered Testing, Review, and Documentation

- **Topic 1:** AI Code Review and Quality Controls
- **Topic 2:** AI for Unit Testing and Test-Case Generation
- **Topic 3:** AI for Integration Testing
- **Topic 4:** AI-Powered Software Testing and Test Automation
- **Topic 5:** Edge Cases, Failure Modes, and Regression Coverage
- **Topic 6:** AI for Code Documentation and Technical Specifications
- **Reflection & Review:** Building a verification workflow for AI-generated outputs

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Day 4: AI-Powered API Development and Integration

- **Topic 1:** REST API Design and Development Fundamentals
- **Topic 2:** AI-Powered API Development and Endpoint Design
- **Topic 3:** AI API Integration and Enterprise System Connectivity
- **Topic 4:** Data Mapping, Transformation, and Schema Alignment
- **Topic 5:** API Documentation with AI and OpenAPI Specifications
- **Topic 6:** API Testing, Automation, and Error Analysis
- **Reflection & Review:** Reviewing an AI-supported API integration lifecycle

Day 5: Security, Monitoring, and AI Governance

- **Topic 1:** Security Risks in AI-Generated Code
- **Topic 2:** Secure API Authentication and Authorization
- **Topic 3:** Secrets, Credentials, Data Privacy, and Input Validation
- **Topic 4:** API Monitoring and Integration Incident Analysis
- **Topic 5:** Generative AI Governance for Development Teams
- **Topic 6:** Adoption Roadmap and AI Development Performance Measures
- **Reflection & Review:** Defining a secure and responsible AI development workflow

FAQ:

What specific qualifications or prerequisites are needed for participants before enrolling in the course?

Participants should have a basic understanding of software development, programming logic, APIs, or systems integration. Experience with at least one programming language is recommended. Familiarity with REST APIs, testing, or development environments is helpful but not mandatory. No previous expertise in machine learning or generative AI is required.

How long is each day's session, and is there a total number of hours required for the entire course?

Each day's session is generally structured to last around 4-5 hours, with breaks and interactive activities included. The total course duration spans one week, approximately 20-25 hours of instruction.

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Can AI-generated code be used directly in production systems?

AI-generated code should not be accepted solely because it appears technically convincing. It must undergo human review, functional testing, security analysis, dependency validation, and compliance checks. The course teaches participants to treat generated code as a proposed implementation that requires evidence-based verification before deployment.

How This Course Is Different from Other AI for Developers Courses:

AI for Developers: Software Development and API Integration extends beyond basic code generation or introductory demonstrations of an AI coding assistant. It presents AI software development as an end-to-end engineering discipline covering requirements, programming, review, refactoring, debugging, testing, documentation, integration, security, monitoring, and governance.

Unlike an AI Programming Course focused on writing isolated code snippets, this program connects generative AI coding tools with REST API development and enterprise system integration. Participants examine how AI can support endpoint design, schema mapping, data transformation, integration testing, error analysis, and API documentation while protecting credentials, validating inputs, and enforcing authorization controls.

The course also avoids treating AI-generated output as automatically trustworthy. Drawing on research into modern coding assistants and the NIST Generative AI Profile, it emphasizes human oversight, pre-deployment testing, risk management, incident analysis, and measurable acceptance criteria. Participants learn when AI-powered developer tools add value, where they introduce risk, and how professional judgment remains essential.

Its technology-neutral structure enables organizations to apply the learning across different programming languages, IDEs, cloud platforms, and AI assistants. Commercial tools are referenced through relevant examples and demonstrations, but licenses and subscriptions are not included. This makes the course suitable for both developers and technical leaders responsible for safe, scalable AI adoption.

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- Data Analytics Training and Data Science Courses
- Digital Government & Public Service Training Courses
- Education and Learning Development Training Courses
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- Facilities and Real Estate Training Courses
- Finance and Accounting Training Courses
- Governance, Risk and Compliance Training Courses
- Healthcare Management Training Courses
- Heritage Conservation and Museum Management Training Courses
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- IT Security Training & IT Training Courses
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