Software Development

Level: Introductory

AI-Assisted Software Development: Mastering AI Code Assistants

3 days

Welcome to "AI-Assisted Software Development". This comprehensive course is designed to equip developers with the knowledge and skills needed to effectively leverage AI coding assistants in modern software development.

AI code assistants have revolutionized the way we write, debug, and understand code. By providing intelligent suggestions, automating repetitive tasks, and enhancing overall productivity, these tools are becoming an essential part of the modern developer's toolkit. Whether you're a solo developer or part of a large team, this course will help you harness the full potential of AI-assisted development.

Throughout this course, you'll learn everything from fundamental concepts of AI code assistants to advanced topics like prompt engineering, custom instructions, and workflow optimization. We'll cover best practices for working with various AI tools, ensuring that you can use them effectively while maintaining code quality and security.

By the end of this course, you'll be able to confidently use AI coding assistants, craft effective prompts, manage development workflows, and integrate AI tools into your development process. You'll also gain hands-on experience with popular tools like GitHub Copilot, Cursor, and other AI assistants.

Learning Outcomes

Upon completion of this course, participants will be able to:

- Understand the core concepts of AI-assisted development
- Use various AI coding assistants effectively
- Master prompt engineering for code generation
- Implement AI tools in development workflows
- Write better code with AI assistance
- Debug and refactor code using AI tools
- Maintain security and best practices while using AI
- Optimize development productivity with AI assistants

Course Outline

Module 1: Introduction to AI Code Assistants

- Understanding AI code assistants and their capabilities
- How AI code assistants work with LLMs
- Benefits and limitations of AI assistance
- Role in modern software development
- Setting realistic expectations

Module 2: Using Cursor

- Introduction to Cursor features
- Chat interface and codebase interaction
- Code generation capabilities
- Multi-line edits and smart rewrites
- Intelligent code completion
- Querying your codebase
- Using Ctrl+K for quick edits

Module 3: Prompt Engineering for AI Assistants

- Fundamentals of prompt engineering
- Writing effective prompts for code generation
- Context management and optimization
- Common prompt patterns and anti-patterns
- Iterative refinement techniques
- Mental models for working with AI

Module 4: Language Models for Coding

- Understanding how code assistants work with LLMs
- Context windows and their importance
- Model capabilities and limitations
- Handling model cut-off dates
- Managing hallucinations
- Evaluating and choosing models

Module 5: Custom Instructions

- Setting up global instructions
- Project-specific instructions
- Customizing AI behavior

- Maintaining consistency across teams
- Enhanced context awareness
- Productivity optimization

Module 6: Using v0

- Introduction to v0 capabilities
- UI/UX design with v0
- Component generation
- Code execution
- Integration guide
- Production considerations
- Best practices and tips

Module 7: Working with aider

- Introduction to aider
- Getting started and installation
- Core concepts and workflow
- Advanced features
- Working with large codebases
- Git integration
- Architect mode for complex tasks

Module 8: Development Workflow

- Product planning with AI tools
- Design and architecture assistance
- Development workflow integration
- Refinement and quality control
- Best practices and tips
- Real-world workflow examples

Module 9: Using Windsurf

- Introduction to Windsurf IDE
- Core design philosophies
- Context awareness features
- Autocomplete and supercomplete

- Chat integration
- Command palette usage
- Codeium flows
- Cascade for code exploration

Conclusion and Next Steps

- Recap of key concepts and tools
- Continuing education resources
- Community engagement
- Staying current with AI tools
- Career development opportunities

This course combines theoretical knowledge with practical, hands-on experience to ensure you can effectively leverage AI tools in your development work while maintaining code quality and security standards.

Intended Audience

This course is designed for software developers who want to leverage AI tools to enhance their development workflow. It's suitable for those with basic programming experience who want to learn how to effectively use AI coding assistants in their daily work.

Prerequisites

Those attending this course should meet the following:

- Basic programming experience
- Familiarity with version control (Git)
- Understanding of software development principles