Generative AI for Developers (TTAI2305)

Duration: 3 Days

Course Objective

By the end of this program, participants will be able to apply Generative AI and prompt engineering across the software development life cycle, evaluate AI models and interaction modes, and use AI-assisted development practices in an IDE. They will develop requirements and architecture, apply design and test-driven design, support coding and testing, address security, integrate LLMs into applications, and apply ethics and responsible AI.

Prerequisites

- Familiarity with the software development life cycle
- Experience using an IDE and developing application code
- Basic understanding of application requirements, architecture, testing, and security
- Own access to a coding agent, such as Claude Code, Codex, or Anti gravity

License / Access Requirements

- Student must have their own access to a coding agent (Claude Code, Codex, or Anti gravity)
- An IDE set up for AI-assisted development (configured in Module 4)
- Access to ChatGPT, Claude Sonnet, and Grok, in free and premium tiers where available, for the model comparison in Module 3

Module-wise Course Content

Day 1 — Generative AI, Prompt Engineering, Models, and the SDLC

Module 1 — Introduction to Generative AI

Key Topics

- Generative AI concepts for developers
- Generative AI capabilities in software development
- Generative AI limitations and the role of developer review
- Generative AI use across the software development life cycle

Module 2 — Introduction to Prompt Engineering

Key Topics

- Prompt structure for development tasks
- Instructions, context, constraints, and expected output
- Prompt iteration and refinement
- Prompt evaluation for clear and usable results

Module 3 — Deep Dive into AI Models

Key Topics

- Ask, Edit, or Agent mode
- ChatGPT
- Claude Sonnet
- Grok
- Evaluation of free and premium models
- AI-assisted development in an IDE
- Model performance and limitations

Module 4 — The SDLC and Environment Setup

Key Topics

- Generative AI across the software development life cycle
- AI-assisted development workflow within the SDLC
- Development environment setup
- Environment readiness for AI-assisted development

Day 2 — Requirements, Architecture, Design, and Coding

Module 5 — Developing Application Requirements

Key Topics

- Application requirement development with AI assistance
- Functional and non-functional requirements
- Requirements clarity, consistency, and completeness
- Requirements review and refinement

Module 6 — Architecture and Mermaid Diagrams

Key Topics

- Application architecture development with AI assistance
- Architecture components and relationships
- Mermaid diagrams for architecture representation
- Architecture and diagram review

Module 7 — AI-Assisted Design and Test-Driven Design

Key Topics

- AI-assisted application design
- Translating requirements into design decisions
- Test-driven design practices
- Using test considerations to guide design

Module 8 — AI-Assisted Coding

Key Topics

- AI assistance for code generation and completion
- AI assistance for code explanation and refinement
- Providing development context and constraints
- Developer review of AI-generated code

Day 3 — Testing, Security, LLM Integration, and Responsible AI

Module 9 — AI-Assisted Testing

Key Topics

- AI assistance for test design
- Test scenarios and test cases
- Failure analysis and debugging support
- Review and validation of AI-generated tests

Module 10 — Security

Key Topics

- Security considerations for AI-assisted development
- Secure review of AI-generated code
- Sensitive data and credential handling
- Security risks and controls in development workflows

Module 11 — Integrating LLMs into Applications

Key Topics

- LLM integration within applications
- Application inputs, prompts, outputs, and interactions
- Integration performance and limitations
- Reviewing LLM integration behavior

Module 12 — Ethics and Responsible AI

Key Topics

- Ethics in Generative AI development
- Responsible AI considerations for application development
- Bias, fairness, transparency, privacy, and accountability
- Human oversight of AI-assisted and AI-enabled applications