



To discuss this course and customizations:
Call: 434-509-5680 or Email: sales@cloudcontraptions.com

AI-Driven Test Generation and Maintenance

Class Duration

7 hours of live training delivered over 1-2 days to accommodate your scheduling needs.

Student Prerequisites

- Professional software development experience
- Familiarity with unit testing in at least one language

Target Audience

Software engineers who want to use AI agents to accelerate test creation, close coverage gaps, and keep test suites healthy as the codebase evolves. Relevant for teams with under-tested legacy code, teams adopting TDD with AI assistance, and DevOps engineers who want AI-generated tests as part of their CI/CD pipeline.

Description

This course covers AI-assisted testing from coverage gap analysis through test generation, validation, and ongoing maintenance. We work through unit tests (AI-generated from function signatures and docstrings), integration tests (scenario extraction from specs and existing behavior), and end-to-end tests (AI-driven browser automation generation). We also cover the discipline of validating AI-generated tests — ensuring they actually test the right things, not just pass — and patterns for keeping AI-generated test suites maintainable as code changes.

Learning Outcomes

- Analyze a codebase for coverage gaps and prioritize test generation targets.
- Generate unit tests from function signatures, docstrings, and existing usage patterns using AI agents.
- Produce integration test scenarios from API specs, user stories, and existing behavior.
- Generate end-to-end tests using AI-driven browser automation (Playwright, Cypress).



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- Validate AI-generated tests: distinguish tests that exercise real behavior from tests that trivially pass.
- Integrate AI test generation into CI pipelines as a coverage-improvement step.
- Apply test maintenance strategies when AI-generated tests break due to code evolution.

Training Materials

Comprehensive courseware is distributed online at the start of class. All students receive a downloadable MP4 recording of the training.

Software Requirements

IDE with AI coding assistant, language runtime (Python or TypeScript for labs), and Git.

Training Topics

Coverage Gap Analysis

- Measuring current test coverage
- Identifying high-value uncovered code paths
- Risk-based prioritization for test generation
- Setting realistic coverage targets

Unit Test Generation

- Prompting AI for unit tests from function signatures
- Edge case and boundary condition generation
- Mocking and fixture generation with AI assistance
- Validating that generated tests test the right behavior

Integration Test Generation

- Scenario extraction from OpenAPI/Swagger specs
- Generating integration tests from existing behavior
- Test data and fixture management
- Database and external service mocking patterns

End-to-End Test Generation

- AI-driven Playwright and Cypress test generation
- Page object model generation from UI



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- Scenario coverage from user story descriptions
- Flakiness mitigation in AI-generated E2E tests

Validating AI-Generated Tests

- Mutation testing to verify test effectiveness
- Review checklist for AI-generated tests
- Detecting trivially-passing tests
- Assertion quality and coverage depth analysis

CI Pipeline Integration

- Running AI test generation as a CI step
- Coverage gate configuration
- Test generation for new code on PRs
- Reporting coverage improvement over time

Test Suite Maintenance

- Keeping AI-generated tests current through code changes
- Refactoring test files with AI assistance
- Deprecating tests for deleted code
- Team ownership of AI-generated test files

Workshop

- Unit test generation lab
- Mutation testing validation exercise
- Q&A session