

DEVOPS

INTERMEDIATE

3 DAYS

AI Driven CI/CD Pipeline using GitHub Actions

Build a strong foundation in enterprise CI/CD using GitHub Actions, from workflow design to secure automation and DevSecOps quality gates. Learn how to scale delivery using reusable workflows, caching, approvals, traceability, and AI-assisted troubleshooting to build reliable, auditable pipelines.

Why AI-Driven GitHub Actions?

Faster pipeline delivery

AI accelerates workflow design and YAML authoring without starting from scratch.

Improved security posture

Security checks become default gates in pipelines with clear enforcement policies.

Reduced build failures

AI-assisted troubleshooting helps identify misconfigurations quickly and shorten resolution time.

Better developer experience

Faster feedback loops and stable automation reduce friction and boost productivity.

Standardized DevOps practices

Reusable workflows and templates improve consistency across teams.

What you'll be able to do

- ✓ Understand modern CI/CD pipeline fundamentals and enterprise requirements.
- ✓ Build CI pipelines in GitHub Actions including build, unit tests, lint checks, and artifact packaging.
- ✓ Build secure CD workflows using environments, approvals, protected branches, and controlled deployments.
- ✓ Use AI to accelerate pipeline creation: generate YAML templates, create reusable workflows, and suggest improvements.
- ✓ Use AI for troubleshooting: interpret build failures and recommend fixes for YAML and configuration issues.
- ✓ Integrate DevSecOps controls: dependency scanning, secret scanning concepts, container scanning, and optional IaC scanning.
- ✓ Optimize pipelines using caching, artifact reuse, and matrix testing.
- ✓ Apply enterprise automation practices: reusable workflows, organization standards, auditability, and traceability.
- ✓ Deliver a complete AI-assisted CI/CD workflow as a capstone.

Who this is for

- DevOps Engineers
- Platform Engineers
- SRE teams
- Backend / full-stack developers

- Security teams supporting pipeline governance
- Engineering leaders adopting GitHub Enterprise

Curriculum

01 CI/CD Fundamentals (Enterprise Requirements)

- What CI/CD solves in modern engineering organizations
- Enterprise CI/CD requirements (speed, reliability, compliance, traceability)
- Pipeline concepts (stages, jobs, steps, runners, artifacts)
- Branching strategies (feature branching, trunk-based concepts)
- **Hands-on:** Activity: Map an enterprise CI/CD workflow from commit to production release

02 Building CI Pipelines in GitHub Actions (Build + Test + Lint + Artifacts)

- GitHub Actions workflow structure (triggers, jobs, steps)
- Build and unit test automation patterns
- Lint checks and code quality gates
- Artifact packaging and uploading for downstream jobs
- **Hands-on:** Lab: Create a CI workflow that builds, runs tests, runs lint, and publishes artifacts

03 Secure CD Workflows (Environments, Approvals, Protected Branches)

- CD workflow design principles (safe, controlled, auditable)
- GitHub Environments and environment protection rules
- Approvals and manual gates for production deployments
- Protected branches and required status checks
- **Hands-on:** Lab: Implement a controlled CD workflow with environment approvals and protected main branch

04 AI-Assisted Pipeline Creation (YAML Templates and Reusable Workflows)

- Using AI to scaffold GitHub Actions YAML quickly
- Generating reusable workflows and templates
- Refactoring pipelines for readability and maintainability
- AI-driven suggestions for best practices and improvements
- **Hands-on:** Lab: Generate a pipeline template using AI and convert it into a reusable workflow

05 AI-Assisted Troubleshooting (Failures and Fix Recommendations)

- Reading GitHub Actions logs and common failure patterns
- Fixing YAML syntax and workflow configuration issues
- Dependency and environment troubleshooting in CI
- Using AI to identify root cause and propose fixes
- **Hands-on:** Lab: Break a pipeline intentionally and use AI to troubleshoot and fix it

06 DevSecOps Controls in GitHub Actions (Scan and Enforce)

- Dependency scanning concepts (SCA) and severity thresholds
- Secret scanning concepts and prevention patterns
- Container scanning workflow (image scan in CI)
- Optional IaC scanning concepts (Terraform checks)
- **Hands-on:** Lab: Add DevSecOps checks to CI and fail builds on critical vulnerabilities

07 Pipeline Optimization (Caching, Artifact Reuse, Matrix Testing)

- Caching dependencies to speed up pipelines
- Artifact reuse across jobs and stages
- Matrix testing strategies for multi-version builds
- Balancing speed vs confidence in enterprise pipelines
- **Hands-on:** Lab: Optimize CI using caching + matrix builds and compare run times

08 Enterprise Automation Practices (Standards, Auditability, Traceability)

- Reusable workflows and organization-wide standards
- Versioning pipelines and governance for workflow changes
- Audit trails and traceable deployments (who deployed what, when)
- Secrets handling and least privilege permissions for runners
- **Hands-on:** Workshop: Design a standard CI/CD blueprint for an organization with audit requirements

09 Capstone Project (AI-Assisted CI/CD Workflow)

- Capstone goal: Deliver an enterprise-style CI/CD pipeline with AI assistance
- CI: build, unit test, lint, artifact packaging
- CD: environments, approvals, protected branches, controlled deployment
- DevSecOps checks integrated (SCA, secrets scanning, container scan, optional IaC scan)
- **Hands-on:** Capstone Lab: Build and present a complete AI-assisted GitHub Actions CI/CD workflow with evidence