

**Continuous Integration with Jenkins for Developers and DevOps Initiatives**

**Course Number:** JEN-106  
**Duration:** 2 days

**Overview**

This Continuous Integration with Jenkins training course teaches attendees the principles of continuous integration and how to implement automated test execution using Jenkins. Participants learn the fundamentals of Continuous Integration & Continuous Delivery (CI/CD) and Jenkins CI. By the end of this Jenkins course, students develop an understanding of the various job types in Jenkins and learn how to use the Jenkins Pipeline.

**Prerequisites**

Attendees should have familiarity with Java development practices.

**Materials**

All students receive comprehensive courseware.

**Software Needed on Each Student PC**

Attendees will not need to install any software on their computers for this class. The class will be conducted in a remote environment that Accelebrate will provide; students will only need a local computer with a web browser and a stable Internet connection. Any recent version of Microsoft Edge, Mozilla Firefox, or Google Chrome will work well.

**Objectives**

* Configure Tools in Jenkins
* Create basic and advanced Jenkins Jobs
* Use a Node.js-based Jenkins Job
* Create a Pipeline
* Apply an advanced Pipeline with Groovy DSL
* Configure Jenkins Security
* Incorporate Docker

**Outline**

* Introduction to Continuous Integration, Continuous Delivery, and Jenkins-CI
  + Foundation of Agile AppDev
  + XP Flow
  + Extreme Programming
  + Agile Development
  + What is Continuous Integration
  + Typical Setup for Continuous Integration
  + Setup Notes for Continuous Integration
  + CI with Artifact Management
  + What is Continuous Delivery?
  + Why Continuous Delivery?
  + DevOps and Continuous Delivery
  + Continuous Delivery Challenges
  + Continuous Delivery vs. Continuous Deployment
  + Jenkins Continuous Integration
  + Jenkins Features
  + Running Jenkins
* Installing and Running Jenkins
  + Downloading and Installing Jenkins
  + Running Jenkins as a Stand-Alone Application
  + Running Jenkins as a Stand-Alone Application (cont'd)
  + Running Jenkins on an Application Server
  + The Jenkins Home Folder
  + Installing Jenkins as a Windows Service
  + Initial Configuration
  + Configuration Wizard
  + Configuring Tools
  + Configuring Tools - Best Practices
  + Logging in Jenkins
  + Custom Log Recorders
* Job Types in Jenkins
  + Introduction
  + Different types of Jenkins Items
  + Configuring Source Code Management (SCM)
  + Working with Subversion
  + Working with Git
  + Storing Credentials
  + Service Accounts
  + Storing Credentials
  + Build Triggers
  + Schedule Build Jobs
  + Polling the SCM
  + Polling vs Triggers
  + Maven Build Steps
* Advanced Jobs
  + Parameterized Jobs
  + Built-in Environment Variables
  + Parameter Types
  + Defining Parameters
  + Using Parameters / Environment Variables
  + Parameters in the config.xml File
  + Launching a Build with Parameters
  + Configuration Matrix
  + Configuration Matrix – Example
  + Defining Configuration Matrix
  + Monitoring External Jobs
  + Summary
* Non-Java Jenkins Jobs
  + Jenkins Jobs
  + Non-Java Jobs
  + Building .NET Projects with Jenkins
  + Installing MSTest Plugin in Jenkins
  + Configuring the MSBuild Plugin
  + Creating a Jenkins Job and Specify a Build Step
  + Specifying a Step for Running Unit Tests
  + Adding a Step for Deploying the .NET Project
  + Building a Node.js Application with Jenkins
  + Node.js Plugin
  + Provides direct Pipeline support
  + Building a C++ Project with Jenkins
  + Executing PowerShell Scripts with Jenkins
* Continuous Delivery and the Jenkins Pipeline
  + Continuous Delivery
  + DevOps and Continuous Delivery
  + Continuous Delivery Challenges
  + Continuous Delivery with Jenkins
  + The Pipeline Plugin
  + Defining a Pipeline
  + A Pipeline Example
  + Parallel Execution
  + Creating a Pipeline
  + Invoking the Pipeline
  + Interacting with the Pipeline
  + Pipeline vs. Traditional Jobs
* Groovy DSL
  + What is Groovy
  + Groovy in Jenkins
  + Comments in Groovy
  + Data Types
  + Identifiers
  + Variables
  + def
  + String Interpolation
  + Operators
  + Ranges
  + Conditional Statements
  + Loops
  + Lists
  + Maps
  + Exception Handling
  + Methods
  + Closures
  + this Keyword
  + Classes
  + Static Methods
  + Inheritance
  + Abstract Classes
  + Interfaces
  + Generics
  + Jenkins Script Console
  + Extending with Shared Libraries
  + Directory Structure
  + Sample Groovy Code
  + Defining Shared Libraries
  + Using Shared Libraries
  + Same Shared Library Usage Code
  + Defining Global Variables
* Securing Jenkins
  + Jenkins Security - Overview
  + Jenkins Security
  + Authentication
  + Authorization
  + Confidentiality
  + Activating Security
  + Configure Authentication
  + Using Jenkins's Internal User Database
  + Creating Users
  + Authorization
  + Authorization
  + Matrix-Based Security
  + Note – Create the Administrative User
  + Project-based Matrix Authorization
  + Project-Based Authentication
  + Role-Based Access Control
* Jenkins Plugins
  + Jenkins Plugins - SCM
  + Jenkins Plugins – Build and Test
  + Jenkins Plugins – Analyzers
  + Jenkins for Teams
  + Installing Jenkins Plugins
* Distributed Builds with Jenkins
  + Distributed Builds - Overview
  + Distributed Builds – How?
  + Agent Machines
  + Configure Jenkins Master
  + Configure Projects
* Containerized Builds
  + Introduction to Docker
  + Docker – Benefits
  + Containers vs. Virtual Machines
  + Running Jenkins in a Docker Container
  + Delete Jenkins Container and Image
  + Configuring Command Prompt to Connect to Docker
  + Creating Docker Container from Jenkins Job
  + Test Custom Image Created by a Jenkins Job
  + The Jenkins Docker Build Step Plugin
  + Ephemeral Build Agents
* The Jenkins API
  + Remote Access API
  + What you can do with the Jenkins Remote API
  + Remote API and CSRF Protection – API Token
  + Remote API and CSRF Protection – Crumb
  + Configure Jobs to Support the Jenkins Remote API
  + Making Remote API Calls
  + Example - Advanced REST Client
  + Example – cURL
  + Jenkins CLI
  + Configure Jenkins to use CLI
  + Download and Use Jenkins CLI
* Scripting
  + Introduction to Scripting
  + Benefits of Scripting
  + The Jenkins Script Console
  + Calling Scripts using cURL
  + Sample Scripts
  + Calling Groovy Scripts from a Jenkins Job
  + Jenkins API
* User Interface Options
  + User Interface Options
  + Customizing the UI with CSS
  + The User Content Folder
  + Using the User Content Folder and Simple Theme Plugin
  + Writing a Jenkins Plugin
  + Modify settings.xml
  + Generate Boilerplate Code for Custom Jenkins Plugin
  + Modify pom.xml
  + Package and Deploy the Plugin
  + The Blue Ocean Plugin
  + Blue Ocean Plugin Features
  + New modern user experience
  + Advanced Pipeline visualizations with built-in failure diagnosis
  + Branch and Pull Request awareness
  + Personalized View
* Best Practices for Jenkins
  + Secure Jenkins
  + Users
  + Backups
  + Reproducible Builds
  + Testing and Reports
  + Large Systems
  + Distributed Jenkins
* Conclusion