Jenkins (CI/CD)

Module 1: Introduction to Jenkins

- What is Jenkins?

- History and Evolution of Jenkins

- Jenkins Architecture

- Continuous Integration and Continuous Delivery (CI/CD) Overview

- Installing Jenkins: On-premises and Cloud-based

Module 2: Getting Started with Jenkins

- Jenkins Dashboard Overview

- Jenkins Terminology: Jobs, Builds, Nodes, Executors, Pipelines, etc.

- Setting Up Your First Jenkins Job

- Configuring Jenkins: Global Tool Configuration, Security, Plugins

- Managing Users and Roles in Jenkins

Module 3: Jenkins Pipelines

- Introduction to Jenkins Pipelines

- Creating and Configuring a Simple Pipeline

- Declarative vs. Scripted Pipelines

- Pipeline as Code: Jenkinsfile

- Pipeline Stages, Steps, and Post Actions

- Using Groovy in Jenkins Pipelines

Module 4: Jenkins Plugins

- Understanding Jenkins Plugins

- Installing and Managing Plugins

- Popular Plugins: Git, Maven, Docker, Slack, etc.

- Plugin Compatibility and Troubleshooting

Module 5: Source Code Management Integration

- Integrating Jenkins with GitHub, GitLab, Bitbucket

- Triggering Builds Automatically with Webhooks

- Branch Management and Multibranch Pipelines

Module 6: Build Tools Integration

- Integrating Jenkins with Maven, Gradle, and Ant

- Managing Dependencies and Artifacts

- Build Notifications and Reporting

Module 7: Automated Testing with Jenkins

- Unit Testing, Integration Testing, and End-to-End Testing

- Test Automation Frameworks Integration: JUnit, Selenium, TestNG

- Test Reporting and Analysis

Module 8: Jenkins and Docker

- Introduction to Docker

- Building and Deploying Docker Images with Jenkins

- Using Docker Containers as Jenkins Agents

- Orchestrating Multi-Container Environments with Jenkins

Module 9: Continuous Deployment with Jenkins

- Deployment Strategies: Blue-Green, Rolling, Canary

- Integrating Jenkins with Deployment Tools (e.g., Ansible, Terraform)

- Deploying to Cloud Providers: AWS, Azure, Google Cloud

- Automated Rollbacks and Recovery

Module 10: Jenkins Security Best Practices

- Securing Jenkins: Authentication and Authorization

- Configuring SSL for Jenkins

- Role-Based Access Control (RBAC)

- Auditing and Logging in Jenkins

Module 11: Scaling Jenkins

- Master-Slave Architecture

- Configuring Jenkins Nodes and Distributed Builds

- Jenkins in a Containerized Environment

- High Availability and Load Balancing for Jenkins

Module 12: Jenkins Administration

- Backing Up and Restoring Jenkins

- Upgrading Jenkins Safely

- Monitoring Jenkins Performance

- Troubleshooting Common Issues

Module 13: Real-World Jenkins Use Cases

- Setting Up a Full CI/CD Pipeline with Jenkins

- Real-World Scenarios: Microservices, Mobile Apps, Legacy Systems

- Integrating Jenkins with Other DevOps Tools (e.g., Kubernetes, Helm)

Module 14: Best Practices and Advanced Tips

- Jenkins Pipeline Best Practices

- Optimizing Jenkins for Performance

- Advanced Pipeline Features: Parallelism, Conditional Execution

- Writing Custom Jenkins Plugins

Module 15: Hands-On Projects and Labs

- Building a Jenkins Pipeline from Scratch

- Implementing Continuous Deployment for a Sample Application

- Integrating Jenkins with Your Existing DevOps Toolchain

- Real-World Challenges and Solutions