DevOps Course Syllabus 2024

Module 1: Fundamentals of DevOps

- What is DevOps?
- DevOps principles
- DevOps lifecycle
- DevOps delivery pipeline
- DevOps ecosystem and tools

Module 2: Version Control with Git

- Introduction to version control
- Basics of Git
- Installing and configuring Git
- Common Git commands
- Branching and merging strategies
- Working with remote repositories

Module 3: Continuous Integration with Jenkins

- Introduction to Continuous Integration (CI)
- Jenkins architecture and setup
- Managing Jenkins plugins and nodes
- Building and deploying applications using Jenkins
- Creating and managing Jenkins pipelines
- Pipeline as code with Jenkins

Module 4: Containerization with Docker

- Introduction to Docker
- Docker installation and setup
- Working with Docker images and containers
- Dockerfile and image creation
- Docker networking and storage
- Docker Compose for multi-container applications
- Docker Swarm for container orchestration

Module 5: Orchestration with Kubernetes

- Introduction to Kubernetes
- Kubernetes architecture and components

- Setting up a Kubernetes cluster
- Managing pods, deployments, and services
- Kubernetes networking and storage
- Helm package manager for Kubernetes
- Monitoring and logging in Kubernetes

Module 6: Configuration Management with Ansible

- Introduction to Ansible
- Ansible architecture and installation
- Inventory management
- Ad-hoc commands and playbooks
- Roles and modules in Ansible
- Writing and managing Ansible playbooks
- Integrating Ansible with other tools

Module 7: Cloud Computing and DevOps

- Introduction to cloud computing
- Overview of cloud service models (IaaS, PaaS, SaaS)
- DevOps on AWS, Azure, and Google Cloud
- Setting up CI/CD pipelines in the cloud
- Managing infrastructure as code with Terraform
- Cloud-native DevOps practices

Module 8: Continuous Monitoring and Logging

- Importance of monitoring and logging
- Introduction to Nagios and Prometheus
- Setting up monitoring with Nagios
- Monitoring applications with Prometheus
- Centralized logging with ELK stack (Elasticsearch, Logstash, Kibana)
- Grafana for data visualization

Module 9: Security in DevOps

- Introduction to DevSecOps
- Securing the CI/CD pipeline
- Container security best practices
- Security tools and practices in DevOps
- Implementing security scanning and compliance

Module 10: Advanced DevOps Practices

- Site Reliability Engineering (SRE)
- Chaos engineering for resilience testing
- Automated testing in DevOps
- Blue-green and canary deployments
- Scaling and performance optimization

Introduction to Devops

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- What Is Devops
- History of Devops
- Devops definition
- DevOps Main Objectives
- DevOps and Software Development Life Cycle
  - Waterfall Model
  - Agile Model
- Continuous Integration & Deployment
  - Jenkins
- Containers and Virtual Development
  - Docker
  - Vagrant
- Configuration Management Tools
  - Ansible
  - Puppet
  - Chef

Cloud Computing

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LINUX Basic and Admin

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- Linux OS Introduction
- Importance of Linux in DevOps

- Linux Basic Command Utilities
- Linux Administration
- Environment Variables
- Networking
- Linux Server Installation
- RPM and YUM Installation

Shell Scripting

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Continuous Integration – Jenkins

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- Introduction to Jenkins
- Continuous Integration with Jenkins
- Configure Jenkins
- Jenkins Management
- Scheduling build Jobs
    - POLL SCM
    - Build Periodically
- Maven Build Scripts
- Support for the GIT version control System
- Different types of Jenkins Jobs
- Jenkins Build Pipe Line
    - Parent and Child Builds
    - Sequential Builds
- Jenkins Master & Slave Node Configuration
- Jenkins Workspace Management
- Securing Jenkins
    - Authentication
    - Authorization
    - Confidentiality
    - Creating Users

- Jenkins Plugins
    - Installing Jenkins Plugins
    - SCM plugin
    - Build and test

Version Control-GIT

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- GIT Features
- 3-Tree Architecture
- GIT – Clone /Commit / Push
- GIT Hub Projects
- GIT Hub Management
- GIT Rebase & Merge
- GIT Stash, Reset, Checkout
- GIT Clone, Fetch, Pull

Build tool- Maven

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- Maven Installation
- Maven Build requirements
- Maven POM Builds (pom.xml)
- Maven Build Life Cycle
- Maven Local Repository (.m2)
- Maven Global Repository
- Group ID, Artifact ID, Snapshot
- Maven Dependencies
- Maven Plugins

ANSIBLE

- Introduction to Ansible
- Ansible Server Configuration
- Infrastructure Management
- SSH Connection in Ansible Master
- YAML Scripts
- Host Inventory
    - Hosts and Groups
    - Host Variables
    - Group Variables
    - Host and Group Specific Data
- Ad-hoc Commands
- Playbooks
    - Variables
    - Conditionals
    - Loops
    - Blocks
    - Handlers
    - Templates
- Modules
    - Core Modules
    - Extra Modules
- Ansible Roles

Docker

- How to get Docker Image?
- What is Docker Image
- Docker Installation

- Working with Docker Containers
    - What is Container
    - Docker Engine
    - Crating Containers with an Image
    - Working with Images
- Docker Command Line Interphase
- Docker Compose
- Docker Hub
- Docker Trusted Registry
- Docker swarm
- Docker attach
- Docker File & Commands