DevOps
Syllabus

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Introduction to DevOps :

- What is DevOps?
- Why DevOps?
- Principles of DevOps
- History of DevOps
- SDLC models
- Understand Agile Methodology
- Prerequisites for DevOps
- DevOps with Agile using Scrum
- Overview of DevOps Tools
- How to achieve DevOps?
- What is CICD?

Introduction to Virtualization :

- What is Virtualization?
- What is Hypervisor?
- Types of Server Virtualization
- Benefits of Virtualization

- Important Virtualization products
- Create VM's using Hypervisors

Cloud Fundamentals :

- Introduction to Azure and AWS.
- Cloud App Deployment Basics.
- Cloud Networking and Storage Basics.
- VM's in AWS and Azure.

Application Server Implementation :

- Need for application and web server
- Deploy Tomcat server in different environments
- Setup, configure of Tomcat, Apache.

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IDE (VSCode):

- Introduction to VS Code, Installation.
- Interface and workspace overview.
- Extension and customization.
- Shortcut and settings.
- VS Code for Web Developers.
- VS Code Terminal.
- Python and VS Code.
- Git and GitHub on VS Code.

GIT :

- What is Version Control System?
- (Initialize, Status, Add, Commit, Clone, Pull, Push, Difference, Reset, Log, Show, Tag, Stash, Remove)
- Advanced Git operations (Branching, Merging, Rebasing, Merge vs Rebase, Conflict resolving, Deleting remote repositories, Fork Operation).
- What Is Git?
- Git Installation with Different environments
- Commands and Operations in Git with GitHub

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Build Tool :

- Introduction to maven
- Maven compare with ant and other tools
- Maven setup in multiple environments
- Maven lifecycle
- Maven repository structure
- Real-time maven settings for the project
- Maven structure coding and implementation with Eclipse

Ansible :

- Introduction to Ansible, Deploying Ansible.
- Ansible Inventory, Ansible Ad-Hoc Commands.
- Ansible Architecture.
- Intro to YAML.

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- Ansible Playbooks, Modules, Variables, Conditions & Loops.
- Ansible Roles
- Ansible with AWS, VPC, EC2.

Docker :

- Introduction to Docker, Installing Docker.
- Docker Architecture, Container vs VM's.
- Running your first WebApp container in Docker.
- Docker Networking, DNS config, SSH, etc.
- Images, Docker hub, Image Layers, Image Tagging, Pushing, Docker File, Customising Images.
- Docker Volumes: Data Persistence, Bind Mounting.
- Docker Compose, compose.yml, Image building.
- Docker Swarm, Implement multi node Swarm Cluster.
- Scale-out with Overlay Networking and Routing Mesh, Multi-Node WebApp.
- Secret storage for Swarm
- Swarm App Lifecycle.
- Container Registries.

Kubernetes :

- Introduction to Kubernetes, Deploying Kubernetes, Minikube, Basics of Kubectl.
- Kubernetes Architecture, Scaling, Labels & Selectors, Health Checking, Web Interface.
- DNS, Volumes, Secrets, Usage and Resource Monitor, Auto Scaling.
- HA, Masters, Configuration.

Jenkins :

- Introduction to Jenkins, Installing Jenkins, Overview of Jenkins UI.
- Jenkins Architecture.
- Jenkins plugins for Git, GitHub and Maven.
- Continuous Inspection with Jenkins.
- Continuous Delivery with Jenkins.
- Jenkins File: Pipeline as code.
- Integration with Docker.
- Distributed Builds

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Terraform :

- Introduction to Terraform, Intro to Infra as a Code (IaaC).
- Installing Terraform, HCL Basics.
- Terraform Providers, Configuration Directories, Input Variables, Resource Attributes, Dependencies, Output Variables.
- Introduction to Terraform State.
- Commands, Mutable and Immutable Infra, Life Cycle Rules, Data Sources, Meta-Arguments, Count, Version Constraints.
- Terraform with AWS, IAM, S3, DynamoDB, VPC, EC2.
- Remote State.
- Terraform Modules
- Terraform Functions, Conditional Expressions, Workspace.

Monitoring Tools :

- Introduction to Nagios XI and Zabbix
- Installation and setup of Nagios
- Adding nodes to Nagios master

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- Monitor Windows Servers
- Monitor Linux Servers
- Monitor EC2 Instances
- Monitoring different metrics in Nagios

DevOps Projects :

- Project 1: Simple DevOps project for CI/CD through Jenkins
- Project 2: CI/CD pipeline using GIT, Jenkins, and Ansible
- Project 3: Automatic deployment using Docker