Introduction to DevOps
- What is DevOps?
- DevOps culture, principles, and lifecycle
- DevOps vs Traditional IT
- Agile & DevOps relationship
- DevOps roles and responsibilities

Local Lab Environment Setup - Setting
Up VMware Workstation - Setting Up
Linux Operating System - Setting Up
additional required Software

Linux Fundamentals
- Linux Distribution
- File system Hierarchy
- Networking
- SSH and SCP
- Package installation and handling
- CronJobs
- Web Server Implementation
- DNS Implementation
- Database Server Implementation
- Shell scripting basics

Version Control Systems
- Version Control concepts
- Git architecture
- Git installation and configuration
- Repository creation
- Git workflow
- Branching strategies
- Merging vs Rebasing
- Resolving merge conflicts
- Pull Requests
- Code reviews and approvals
- GitHub & GitLab overview

Application Development and Hosting
- Application architecture basics -
Monolithic vs Microservices
- Application build process
- Environment variables
- Configuration management

- Hosting applications on Linux
- Reverse proxy using Nginx

CI/CD Pipeline Introduction
- CI/CD concepts
- Pipeline architecture
- GitHub Actions
- Workflow files
- Jobs and steps
- Runners
- GitLab CI/CD
- Stages and jobs
- Integrating tools in pipelines
- Automated testing
- Docker build & push in pipeline

Docker and Container
- Container vs Virtual Machine
- Docker architecture
- Docker installation
- Docker images and containers
- Dockerfile
- Multi-stage builds
- Container registry
- Docker Hub
- Private registry hosting
- Container security basics

AWS Fundamentals
- Cloud computing concepts
- AWS global infrastructure
- IAM basics (users, roles, policies)
- EC2
- Instance types
- Key pairs and security groups
- EBS and S3
- VPC basics
- Subnets
- Load Balancer basics
- AWS CLI introduction

- Pricing and free tier overview

Configuration management

concepts

- Ansible architecture
- Inventory files
- Ansible modules
- Playbooks and roles
- Variables and templates
- Ansible for application deployment
- Ansible with AWS EC2

Infrastructure as Code (Terraform) -
Infrastructure as Code (IaC) concepts -
Terraform architecture
- Providers and resources
- Variables and outputs
- State files
- Terraform lifecycle
- Provision AWS resources using Terraform

Kubernetes
- Kubernetes overview
- Kubernetes architecture
- Cluster setup
- Kubernetes objects
  - Pod
  - Deployment
  - Service
  - Secret
- Application hosting on Kubernetes
- LoadBalancer & Ingress
- Scaling applications
- Rolling updates & rollbacks

Monitoring
- Monitoring fundamentals
- Metrics vs Logs
- Prometheus architecture
- Prometheus exporters

- Grafana dashboards
- Alerts and notifications
- Monitoring Kubernetes clusters