Complete Practical, Real-time Job Oriented Training

AWS DEVOPS

Module 1: LINUX Concepts

Ch 1: Introduction to Server & Linux

- **Client-Server Architecture**
  - Concepts and examples
  - Roles of client and server in a network
- **GUI vs CLI**
  - Differences and use cases
  - Advantages of CLI for server management
- **Navigating through CLI**
  - Basic commands: `pwd`, `cd`, `ls`
  - Understanding the file system hierarchy
- **Getting Help**
  - Using `man` pages
  - Help commands like `--help` and `info`

Ch 2: File Hierarchy System (FHS)

- **Using Relative Path and Absolute Path**
  - Understanding and using paths
- **Common File Types**
  - Regular files, directories, links, and special files

Ch 3: Basic File Management

- **Create Files and Directories**
  - `touch` and `mkdir`
- **File and Directory Operations**
  - Copy (`cp`), paste, remove (`rm`), move (`mv`), rename
- **File Editing**

- Introduction to text editors (vim)

Ch 4: Basic User Management

- **User Login Activity and Information**
  - Viewing login records (`last`, `who`, `w`)
- **Local User Authentication Files**
  - Understanding `/etc/passwd`, `/etc/shadow`
- **User Account Management**
  - `useradd`, `usermod`, `userdel`
  - Custom configurations and user profiles

Ch 5: Advanced User Management

- **Setting Passwords**
  - Using `passwd` command
- **Linux Groups and Their Management**
  - Group management commands: `groupadd`, `groupmod`, `groupdel`
- **Substituting Users and Super User (SUDO)**
  - Configuring and using `sudo`
  - Security best practices for sudoers
- **Changing Ownership**
  - Using `chown` and `chgrp`

Ch 6: Advanced File Management

- **File and Directory Access Permissions**
  - Understanding and setting permissions with `chmod`
  - Symbolic and numeric modes
- **File Searching with `find` Command**
  - Using `find` for file searches
  - Practical examples with `find`

Ch 7: Variables and Meta Characters

- **Variables**
  - Environment variables and shell variables
  - Variable substitution
- **Command Substitution**
  - Using backticks and `$(command)`
- **Metacharacters**
  - Understanding and using metacharacters (e.g., `*`, `?`, `{}` `|`)
  - Grep command

Ch 8: Linux Processes and Task Scheduling

- **Processes and Priorities**
  - Understanding process states
  - Monitoring processes with `ps` and `top`
- **Controlling Processes with Signals**
  - Sending signals with `kill`
- **Job Scheduling**
  - One-time jobs with `at`
  - Recurring jobs with `cron`
  - Managing `cron` jobs (`crontab`)

Ch 9: Package Management and Systemctl

- **Installing Packages**
  - Using package managers (e.g., `apt`, `yum`)
- **Uninstalling Packages**
  - Removing packages with package managers
- **Managing Services with `systemctl`**
  - Starting, stopping, enabling, and disabling services
  - Checking service status

Module 2: AWS

Ch 1: Introduction to Cloud Computing

- **What is Cloud Computing**
  - Definition and key concepts
  - On-demand availability and scalability
- **Cloud Implementation Models**
  - Public, Private, and Hybrid Clouds
- **Advantages of Cloud Computing**
  - Cost efficiency, flexibility, disaster recovery, and more

Ch 2: Getting Started with AWS

- **Creating an AWS Free Tier Account**
  - Account setup and initial configuration
- **AWS Global Infrastructure**
  - Overview of Regions, Availability Zones & Edge locations
- **Tour of the AWS Console & Services in AWS**

    - Navigation and key services overview

Ch 3: Elastic Compute Cloud (EC2)

- **Creating EC2 Instances**
    - Instance types, AMIs, and instance launch
- **Security Groups & Classic Ports**
    - Configuring security groups and common port settings
- **SSH Overview**
    - Key pair creation and SSH connection setup
- **Private vs Public vs Elastic IP**
    - IP addressing and usage
- **EC2 hibernate**
    - Setting up and using hibernation

Ch 4: Identity and Access Management (IAM)

- **IAM Introduction**
    - Core IAM concepts and architecture
- **Managing Users and Groups**
    - Creating and managing IAM users and groups
- **IAM Group Policies and Inline Policies**
    - Difference and use cases
- **IAM Multi-Factor Authentication (MFA)**
    - Setting up MFA for enhanced security
- **IAM Roles for AWS Services**
    - Creating and assigning roles
- **AWS CloudShell**
    - Introduction and use cases
- **IAM Best Practices**
    - Security best practices and guidelines
- **AWS Policy Simulator**
    - Testing and validating policies

Ch 5: EC2 Instance Storage

- **EBS Overview**
    - Types and uses of Elastic Block Store
- **Managing EBS Volumes**
    - Creating, attaching, and resizing volumes
- **EBS Snapshots**
    - Creating and managing snapshots
- **Cross-AZ and Regional Replication for EBS Volumes: Best Practices**

    - Configuring replication for high availability
- **EBS Encryption**
    - Setting up encryption for data security

- **Amazon Machine Images (AMI)**
    - Creating and managing AMIs
- **Amazon EFS**
    - Setting up and using Elastic File System
- **EFS Lifecycle Management**
    - Managing the lifecycle of files in EFS
- **EBS vs EFS**
    - Comparison and use cases

Ch 6: Simple Storage Service (S3)

- **Introduction to S3**
    - Overview and use cases
- **S3 Buckets and Objects**
    - Creating and managing buckets and objects
- **S3 Versioning**
    - Enabling and managing versioning
- **S3 Security and Bucket Policies**
    - Setting up bucket policies and access control
- **Static Website Hosting**
    - Hosting a static website on S3
- **Cross-Region and Same-Region Replication**
    - Configuring replication for data redundancy
- **S3 Storage Classes**
    - Overview of storage classes and cost optimization
- **Configuring S3 Lifecycle Rules**
    - Automating transitions and expiration

Ch 7: High Availability and Scalability

- **High Availability and Scalability**
    - Core concepts and benefits
- **Introduction to Load Balancing**
    - Basic principles and use cases
- **Different Types of Load Balancers in AWS**
    - Classic Load Balancers , Application Load Balancers
- **Elastic Load Balancer**

    - Configuration and management
    - Sticky Sessions (Cookies)
    - Cross-Zone Load Balancing
    - Connection Draining
- **Auto Scaling Groups**
    - Setting up and configuring ASGs
- **Scaling Policies**
    - Dynamic and scheduled scaling policies
- **Scaling Triggers with CloudWatch Alarms**
    - Configuring alarms for auto-scaling

Ch 8: DNS and Route 53

- **What is DNS**
    - Basic DNS concepts
- **Route 53 Overview**
    - Features and benefits
- **Registering a Domain**
    - Domain registration and management
- **Creating Records**
    - A, AAAA, CNAME, and other record types
- **Routing Policies**
    - Simple, Weighted, Latency, Failover, Geo Proximity
- **Integrating 3rd Party Domains with Route 53**
    - Setting up external domains

Ch 9: Cloud Networking and VPC

- **Introduction to Networking**
    - Basic networking concepts in the cloud
- **CIDR**
    - Understanding and using CIDR notation
- **Creating Public and Private Subnets**
    - Subnet creation and management
- **Creating Public and Private VPCs**
    - VPC setup and configuration
- **Creating a Custom VPC**
    - Advanced VPC configurations
- **Creating and Managing Internet Gateways**
    - Setting up internet connectivity
- **VPC Peering**

    - Configuring peering connections between VPCs

Ch 10: CloudFront and Global Accelerator

- **Introduction to CloudFront**
    - Content delivery and caching
- **Setting Up CloudFront Distributions**
    - Configuring and managing distributions
- **Global Accelerator Overview**
    - Improving performance and availability
- **Setting Up Global Accelerator**
    - Configuration and management

Ch 11: Budgets and Cost Management

- **AWS Budgets Overview**
    - Setting up and managing budgets
- **Cost Management Tools**
    - Using AWS Cost Explorer and reports
- **Cost Optimization Best Practices**
    - Strategies for reducing AWS costs

Module 3: DevOps & GIT, GITHUB

Ch 1: DevOps Concepts

- What is Dev-Ops and SDLC ?
- Understanding the DevOps terminology
- Continuous Integration and Continuous Deployment

Ch 2: Introduction to Version Control

- Introduction to Version Control Systems (VCS)
- Benefits of using VCS (e.g., collaboration, version tracking, backup)

Ch 3: Installing and Configuring Git

- Downloading and installing Git on various operating systems
- Initial configuration (`git config` for username, email, etc.)

        - `git config --global user.name "Your Name"`
        - `git config --global user.email "your.email@example.com"`

Ch 4: Creating a GitHub Account

- Setting up a GitHub account
- Overview of GitHub features and interface

Ch 5: Familiarizing with Git Bash

- Basic command-line interface commands
- Navigating directories, and basic file operations in Git Bash
    - Commands: `pwd`, `ls`, `cd`, `touch`, `mkdir`, `rm`

Ch 6: Demystifying the Git Workflow

- **Working Area**
    - Understanding the working directory
    - Tracking changes with `git status`
    - Viewing differences with `git`
- **Staging Area**
    - Adding changes to the staging area with `git add`
    - Viewing staged changes with `git`
- **Local Repository**
    - Committing changes with `git commit`
    - Viewing commit history with `git log`
        - Commands: `git commit -m "commit message"`, `git log`

Ch 7: Remote Repositories

- **Managing Remote Repositories**
    - Connecting to remote repositories with `git remote`
    - Viewing and managing remote connections
        - Commands: `git remote add origin <URL>`, `git remote -v`
- **Pushing Code to Remote Repositories**
    - Pushing changes with `git push`
    - Understanding the push workflow and upstream branches
        - Command: `git push origin main`
- **Cloning Repositories**
    - Cloning repositories with `git clone`
    - Working with cloned repositories
        - Command: `git clone <URL>`

Ch 8: Branching & Merging Repositories

- **Creating & Managing Branches**
    - Creating branches with `git branch` and `git checkout`
    - Switching branches with `git switch`
    - Viewing branches with `git branch --list`
        - Commands: `git branch <branch-name>`, `git checkout <branch-name>`,
- **Merging Branches**
    - Merging branches with `git merge`
    - Understanding fast-forward and recursive merges
        - Command: `git merge <branch-name>`

- **Resolving Merge Conflicts**
    - Identifying merge conflicts
    - Manually resolving conflicts and committing the resolution

Jenkins Course Outline

Module 1: Introduction to Jenkins & Installation

- **Introduction to Jenkins**
    - What is Jenkins and its benefits in CI/CD
    - Overview of Jenkins architecture
- **Installation**
    - Installing Jenkins on various operating systems
    - Initial setup and configuration
    - Securing Jenkins with basic security settings

Module 2: Building Your First Job on Jenkins

- **Introduction to Jenkins Dashboard**
    - Overview of the Jenkins interface

    - Key components of the dashboard
- **Creating Your First Job**
    - Job types and their uses
    - Step-by-step guide to creating a freestyle project
    - Configuring job settings
- **Redirecting Your Job Output to a File**
    - Configuring build steps to redirect output
    - Managing build logs and artifacts

Module 3: Creating Users in Jenkins & Role-Based Access

- **Creating Various Users**
    - Adding and managing users in Jenkins
- **Installing Required Plugins**
    - Identifying and installing essential plugins for user management
- **Assigning Roles**
    - Setting up role-based access control (RBAC)
    - Assigning roles and permissions to users
    - Configuring email notifications for multiple recipients

Module 4: Jenkins with Email

- **Configuring Jenkins to Send Mail**
    - Setting up email notifications
    - Configuring SMTP server settings
- **Sending Mail to Multiple Accounts**
    - Creating email notifications for job results

Module 5: Upstream & Downstream Jobs, Periodic Jobs

- **Configuring Upstream & Downstream Jobs in Jenkins**
    - Setting up job dependencies
    - Managing job execution order
- **Configuring Scheduled Jobs in Jenkins**
    - Setting up cron jobs for periodic builds
    - Managing build schedules

Module 6: Jenkins & Git

- **Introduction to Git Plugin**
    - Installing and configuring the Git plugin
- **Git with Poll SCM**

    - Setting up SCM polling to trigger builds
    - Configuring Git repository integration
- **Remote Triggers with Git**
    - Setting up remote build triggers using Git

Module 7: Jenkins Pipeline as Code & Jenkinsfile

- **Introduction to Jenkinsfile**
    - Understanding Pipeline as Code concepts
    - Jenkinsfile syntax and structure
- **Writing Your First Pipeline as Code**
    - Creating a simple pipeline script
    - Using declarative and scripted pipelines

Module 8: Jenkins & Terraform Pipeline (Project)

- **Creating an EC2 Instance with Jenkins Using Terraform**
    - Introduction to Infrastructure as Code (IaC) with Terraform
    - Setting up Terraform on Jenkins
    - Writing a Jenkins pipeline to provision an EC2 instance using Terraform

Terraform Course Outline

Module 1: Introduction to Infrastructure as Code (IaC)

- **Introduction to IaC**
    - Definition and benefits of IaC
    - Comparison of IaC tools
- **Understanding IaC Concepts**
    - Declarative vs. imperative configurations
    - Overview of Terraform architecture
- **Installing Terraform on Servers**
    - Step-by-step installation on various operating systems
    - Verifying installation
- **Setting up Visual Studio Code**
    - Installing and configuring Visual Studio Code
    - Installing Terraform extensions for VS Code

Module 2: Deploying Infrastructure with Terraform

- **Authentication and Authorization**
    - Setting up credentials for cloud providers
    - Managing access with IAM roles and policies
- **Launching First VM through Terraform**
    - Writing the first Terraform configuration file

    - Initializing and applying configurations to launch a VM
- **Provider Tiers**
    - Understanding different providers and their configurations
    - Configuring provider-specific settings
- **Creating a GitHub Repository with Terraform**
    - Automating repository creation with Terraform
    - Managing repository settings and permissions
- **Terraform Destroy**
    - Safely destroying infrastructure
    - Managing resource lifecycle with `terraform destroy`
- **Understanding Terraform State Files**
    - The role of state files in Terraform
    - Managing and securing state files
- **Desired and Current States**
    - Understanding the concept of desired and current states
    - How Terraform reconciles these states

Module 3: Read, Generate, Modify Configurations

- **Cross Resource Attributes**
    - Referencing attributes between resources
    - Using resource outputs as inputs to other resources
- **Output Values**
    - Defining and using output values
    - Exporting data from your configurations
- **Terraform Variables**
    - Defining and using variables
    - Variable types and validation

Module 4: Modules and Remote State Management

- **Understanding DRY Principle**
    - Importance of DRY (Don't Repeat Yourself) in Terraform
    - Structuring configurations to avoid redundancy
- **Implementing EC2 Module with Terraform**
    - Creating reusable EC2 module
    - Using modules in your configurations
- **Variables and Terraform Modules**
    - Passing variables to modules
    - Module outputs
- **Implementing Remote Backend with Terraform S3**
    - Setting up remote state storage in S3
    - Configuring Terraform to use remote backends

Ansible Course Outline

Module 1: Introduction

- **How Ansible Works**
  - Introduction to Ansible and its architecture
  - Understanding the control node and managed nodes
  - Push-based configuration management
- **Setting Up Ansible**
  - Installing Ansible on various operating systems
  - Configuring Ansible control node
  - Verifying the installation

Module 2: YAML and INI Files

- **YAML 101**
  - Basics of YAML syntax
  - Writing and reading YAML files
  - Common pitfalls in YAML
- **YAML Challenge**
  - Practical exercises to reinforce YAML skills
- **Inventory Files 101**
  - Introduction to Ansible inventory
  - Structure and format of inventory files
  - Using inventory files to manage nodes
- **INI Challenge**
  - Writing inventory files in INI format
  - Practical exercises on creating and managing INI files
- **Writing AWS Inventory Files**
  - Inventory with AWS
  - Configuring Ansible to use AWS inventory
  - Practical example of AWS inventory setup

Module 3: Playbooks

- **Understanding the Documentation**
  - Navigating the Ansible documentation
  - Finding module-specific documentation
  - Understanding Ansible's documentation structure
- **Creating Your First Playbook**
  - Structure of a playbook
  - Writing a simple playbook
  - Playbook syntax and best practices
- **Running Playbooks**
  - Executing playbooks with `ansible-playbook`

    - Common options and flags
    - Debugging playbook runs

Module 4: Services, Handlers & Shell

- **Using the Service Module**
    - Managing services with Ansible
    - Starting, stopping, and restarting services
    - Example: Managing a web server service
- **Understanding Handlers**
    - Concept of handlers in Ansible
    - When to use handlers
    - Creating and triggering handlers
- **Creating Handlers**
    - Writing handlers in playbooks
    - Using handlers to manage service state
- **Using Shell Modules**
    - Running shell commands with Ansible
    - Using the `shell` and `command` modules

Docker Course

Module 1: Introduction to Containers

- **Server vs Virtual Machines vs Containers**
    - Comparison of different virtualization technologies
    - Advantages of containers over VMs
- **Problems Docker Solves**
    - Challenges in software deployment and scalability
    - How Docker addresses these challenges
- **Installing and Configuring Docker**
    - Step-by-step installation on various operating systems
    - Basic configuration settings

Module 2: Docker Basics

- **Docker CLI**
    - Overview of Docker command-line interface
    - Commonly used Docker commands
- **Images vs Docker Containers**
    - Understanding the difference between images and containers
    - Managing images and containers with Docker CLI
- **Attached and Detached Mode**
    - Running containers in attached and detached mode
    - Use cases for each mode

Module 3: Image Creation

- **Working with Docker Images**
    - Pulling images from Docker Hub
    - Listing and inspecting images with Docker CLI
- **Overview of Dockerfile**
    - Introduction to Dockerfile syntax and directives
    - Building custom images using Dockerfile
- **Writing Custom Dockerfiles**
    - Writing Dockerfiles for custom applications
    - Best practices for Dockerfile design
- **Building Custom Images from Dockerfiles**
    - Using `docker build` command to build images
    - Building images with build-time arguments and environment variables
- **Managing Images with CLI**
    - Managing image tags and versions
    - Removing unused images

Module 4: Docker Hub

- **Creating Docker Hub Account**
    - Setting up a Docker Hub account
    - Overview of Docker Hub features
- **Tagging Docker Images**
    - Tagging images with version numbers and labels
    - Best practices for image tagging
- **Docker Commit**
    - Committing changes to containers as new images
    - Creating images from running containers
- **Pushing Images to Central Repository**
    - Pushing images to Docker Hub
    - Configuring authentication for Docker Hub
- **AWS Elastic Container Registry (ECR)**
    - Overview of AWS ECR
    - Pushing images to AWS ECR

Module 5: Docker Networking

- **Overview of Docker Networking**
  - Understanding Docker networking concepts
  - Different network modes in Docker
- **Port Binding**
  - Exposing container ports to the host machine
  - Mapping container ports to specific host ports
- **Bridge and Host Networks**
  - Understanding bridge and host network modes
  - Use cases for each network mode

Kubernetes Course Outline

Module 1: Understanding Container Orchestration

- **Introduction to Kubernetes Architecture**
  - Overview of Kubernetes components (Master Node, Worker Nodes)
  - Understanding Kubernetes control plane (API Server, Scheduler, Controller Manager, etc.)
  - Kubernetes cluster architecture and its benefits
- **Installing and Configuring Kubectl**
  - Installing `kubectl` on various operating systems
  - Configuring `kubectl` to interact with a Kubernetes cluster
  - Basic `kubectl` commands and their usage

Module 2: Understanding Managed Kubernetes Architecture (Elastic Kubernetes Service)

- **Elastic Kubernetes Service (EKS) Overview**
  - Introduction to Amazon EKS and its components
  - Differences between self-managed and managed Kubernetes services
- **Eksctl and Kubeconfig File**
  - Installing and configuring `eksctl`
  - Using `eksctl` to create and manage EKS clusters
  - Configuring `kubeconfig` to access the EKS cluster
- **Creating Clusters Using AWS CLI**
  - Step-by-step guide to creating a Kubernetes cluster using AWS CLI
  - Managing cluster nodes and configurations
- **Understanding Eksctl Tool**
  - Detailed overview of `eksctl` commands and functionalities
  - Best practices for managing EKS clusters with `eksctl`

Module 3: Understanding Pods

- **Managing Pods Using CLI and YAML Formats**
    - Introduction to Pods and their lifecycle
    - Creating, managing, and deleting Pods using `kubectl` commands
    - Writing YAML files to define Pod specifications
    - Practical examples of Pod configurations

Module 4: Replicasets and Deployments

- **Replicasets**
    - Introduction to Replicasets and their purpose
    - Creating and managing Replicasets using `kubectl` and YAML
    - Scaling applications with Replicasets
- **Deployments**
    - Understanding Deployments and their role in application management
    - Creating and managing Deployments using `kubectl` and YAML
    - Using Deployments to ensure high availability and scalability
- **Rolling Updates and Rollbacks in Deployments**
    - Implementing rolling updates to deploy new versions of applications
    - Monitoring and managing rolling updates
    - Performing rollbacks to previous versions in case of issues

Empowering DevOps with AI: Advanced Troubleshooting in AWS and DevOps with AI

- Understanding prompting to get desired results
- IAM Policies Troubleshooting
- S3 Bucket Access Challenges
- Ansible Configuration Validation
- Kubernetes Yaml files Validation
- Linux System Troubleshooting

- AWS Service Outages and Performance Issues
- Git and GitHub Repository Management
- Inspecting Terraform Infrastructure Failures
- Jenkins Build Pipeline Failures
- Ansible Playbook Execution Issues
- Docker Containerization Challenges