Cloud Computing Course Syllabus

Total Duration: 180hrs

Module 1: Cloud Foundations and Core Services

Chapter 1: Introduction to Cloud Computing

• Evolution and History of Cloud Computing

• Characteristics and Service Models (IaaS, PaaS, SaaS)

• Deployment Models: Public, Private, Hybrid

• Benefits and Challenges of Cloud Adoption

Chapter 2: Virtualization & Containerization

• Types of Virtualization: OS-level, Hardware-level

• Role of Hypervisors (Type 1 and Type 2)

• Introduction to Docker and Container Concepts

• Comparison: VMs vs Containers

Chapter 3: Cloud Service Providers Overview

• AWS: Key Services and Regions

• Azure: Core Services and Portal

• GCP: Project Structure and Services

• Comparing Pricing and Features

Chapter 4: Cloud Interfaces: Console & CLI

• Navigating Cloud Dashboards

• CLI Setup for AWS, Azure, and GCP

• Performing Resource Operations via CLI

• Scripting Basics with CLI

Chapter 5: Compute & Object Storage Services

• Launching and Configuring VMs

• Introduction to S3, Blob Storage, GCS

• Bucket Policies and Permissions

• Uploading, Retrieving, and Managing Files

Chapter 6: Networking in Cloud

• VPC Fundamentals and CIDR

• Subnetting and IP Allocation

• Internet Gateways, NAT, VPN

• Security Groups and Firewall Rules

Chapter 7: Hosting Applications in Cloud

• Web Server Configuration (Apache/Nginx)

• LAMP and MEAN Stack Deployment

• Application Ports and Firewall Settings

• Managing Instances and Public IPs

Chapter 8: Load Balancing and Auto Scaling

• Load Balancer Types and Configuration

• Auto Scaling Groups (ASG) Setup

• Health Checks and Instance Scaling

• High Availability Strategies

Chapter 9: Domain and SSL Integration

• Domain Registration and DNS Routing

• Mapping Domain to Cloud Service

• SSL Certificate Provisioning (Let's Encrypt, ACM)

• HTTPS Setup and Redirection

Chapter 10: Introduction to Cloud Databases

• Differences: SQL vs NoSQL

• Overview of RDS, DynamoDB, Firebase, Cosmos DB

• Use Cases for Different DB Types

• Provisioning and Configuration Basics

Chapter 11: Cloud Storage Management

• Storage Classes (Standard, IA, Glacier)

• Lifecycle Rules and Transitions

• Versioning and Access Control

• Performance Optimization Techniques

Chapter 12: Backup and Disaster Recovery

• Snapshot Creation and Restoration

• Automated Backups and Retention Policies

- Disaster Recovery Strategies

- Cross-Region Replication

Module 2: Advanced Cloud Concepts and DevOps Practices

Chapter 13: DevOps and CI/CD Concepts

- Understanding DevOps Culture

- Basics of Continuous Integration / Deployment

- Version Control and Repository Management

- DevOps Lifecycle Stages

Chapter 14: Docker and Cloud Deployments

- Dockerfile Creation and Image Building

- Running Containers on Cloud VMs

- Pushing Images to Container Registry

- Container Orchestration Introduction

Chapter 15: Infrastructure as Code (IaC)

- Overview of Terraform and Its Syntax

- Launching EC2, S3, etc. via Terraform

- Using Variables and Outputs

- Managing Cloud State and Versioning

Chapter 16: Introduction to Kubernetes

- Kubernetes Architecture and Components

- Creating Clusters with GKE/EKS/AKS

- Deploying and Scaling Pods

- Service Exposure and Config Maps

Chapter 17: Serverless Computing

- What is Serverless Architecture

- AWS Lambda, Azure Functions, Google Cloud Functions

- Triggering Functions via Events

- Use Cases and Limits

Chapter 18: Identity & Access Management

• IAM Roles, Users, and Policies

• MFA and Secure Access Practices

• Fine-Grained Permissions

• Auditing and Compliance

Chapter 19: Monitoring & Logging in Cloud

• Setting up CloudWatch, Log Analytics

• Metric-Based and Log-Based Alerts

• Dashboards and Visualization

• Troubleshooting with Logs

Chapter 20: Capstone Project & Multi-Cloud Strategy

• Designing Secure, Scalable Cloud Architecture

• Distributing Workloads Across Clouds

• Implementing CI/CD with GitHub Actions

• Cost Management and Billing Alerts