Cloud Architecture & Deployment Handbook

1. Lecture Flow

Introduction to Cloud Computing
- What is Cloud Computing?
- Cloud Service Models (IaaS, PaaS, SaaS)
- Benefits & Challenges of Cloud Computing

Cloud Architecture Components
- Compute, Storage, and Networking
- Virtualization & Containers
- Serverless Computing & Edge Computing

Cloud Deployment Models
- Public, Private, Hybrid, and Multi-cloud
- Cloud Migration Strategies
- Cost Optimization & Scalability

Cloud Security & Compliance
- Identity & Access Management (IAM)
- Data Encryption & Backup Strategies
- Regulatory Compliance (GDPR, HIPAA)

Cloud Automation & DevOps
- Infrastructure as Code (IaC)
- CI/CD Pipelines & Kubernetes
- Monitoring & Logging Best Practices

2. Essential Handbook

Key Concepts
- Virtual Machines vs Containers
- Microservices & API Gateways
- Load Balancers & Auto Scaling
- Cloud Storage Types (Object, Block, File)

- Disaster Recovery & High Availability

Popular Cloud Providers & Tools
- AWS: EC2, S3, Lambda, VPC
- Azure: Virtual Machines, Blob Storage, Functions
- Google Cloud: Compute Engine, Cloud Storage, Cloud Run
- Terraform & Ansible - Infrastructure as Code
- Docker & Kubernetes - Container Orchestration

3. Interview Questions

Conceptual Questions
1. What is the difference between IaaS, PaaS, and SaaS?
2. Explain the benefits of a multi-cloud strategy.
3. How does a load balancer improve cloud performance?
4. What is Infrastructure as Code (IaC) and why is it important?
5. What are best practices for securing cloud applications?

Practical Questions
1. How would you design a highly available web application on AWS?
2. Demonstrate how to deploy a Docker container on Kubernetes.
3. How do you monitor cloud performance using logging tools?

4. Assignments

Hands-on Practice
1. Deploy a Web Application: Launch a simple web app on AWS/Azure/GCP.
2. Set Up Auto Scaling: Configure auto scaling for a cloud instance.
3. Create a CI/CD Pipeline: Automate deployments using GitHub Actions.
4. Containerize an Application: Deploy an application using Docker & Kubernetes.
5. Implement Cloud Security Measures: Configure IAM roles and encryption policies.

End of Handbook