Cloud Computing & Management

COURSE OBJECTIVE:	• Core Cloud Concepts: Articulate the principles of scalability, elasticity, agility, fault tolerance, disaster recovery, and the financial models of CapEx and OpEx in cloud computing. • Cloud Service Models and Deployment Types: Distinguish between Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), and evaluate the differences and use cases for public, private, and hybrid cloud environments. • Navigate and Utilize Oracle Cloud Infrastructure (OCI): Significance of OCI regions, availability domains (ADs), fault domains, and demonstrate proficiency in accessing and managing OCI resources using the Console, API, CLI, and SDKs. • Implement and Manage Key OCI Services: Utilize core OCI services including Identity and Access Management (IAM), compute, network, storage, databases, and cloud-native services such as Oracle Kubernetes Engine (OKE) and Oracle Cloud Infrastructure Registry (OCIR). • Apply OCI Security and Compliance Measures: Implement OCI security services and compliance requirements, ensuring cloud operations adhere to security best practices and regulatory standards
COURSE OUTCOME:	• Hands on Experience scalability, elasticity, agility, fault tolerance, disaster recovery, CapEx, OpEx. • Distinguish between IaaS, PaaS, SaaS, and public, private, hybrid cloud environments. • Identify OCI regions, ADs, fault domains, and access methods like Console, API, CLI, SDKs. • Comprehend IAM, compute, network, storage, database, and cloud-native services like OKE, OCIR.

	• Apply OCI security services and compliance requirements for cloud operations.

Course Duration: 45 Hours

Course Content:

Unit 1: Grasp Cloud Fundamentals

Scalability and Elasticity: Definitions and importance - Horizontal vs. vertical scaling - Auto-scaling examples - Elasticity in cloud computing - Case studies and applications

Agility: Agile methodologies in cloud environments - Benefits of cloud agility - Examples of agile cloud solutions - Role of DevOps - Real-world agility improvements

Fault Tolerance and Disaster Recovery: Designing fault-tolerant systems - Backup strategies - Disaster recovery plans -High availability vs. fault tolerance -Case studies on disaster recovery

CapEx and OpEx: Definitions and differences - Financial implications in cloud computing - Examples of CapEx and OpEx in cloud adoption - Cost management strategies - Total cost of ownership (TCO) considerations

Cloud Migration Strategies: Assessing on-premise to cloud migration - Lift and shift vs. re-architecting - Migration tools and services - Phases of migration - Success stories and lessons learned

Unit 2: Differentiate Cloud Models

Infrastructure as a Service (IaaS): Definition and characteristics - Key providers (AWS, Azure, Oracle) - Use cases and benefits - Examples of IaaS solutions - Comparison with traditional infrastructure

Platform as a Service (PaaS): Definition and characteristics - Key providers (Google App Engine, Oracle Cloud) - Use cases and benefits - PaaS vs. IaaS - Real-world applications

Software as a Service (SaaS): Definition and characteristics - Key providers (Salesforce, Oracle ERP Cloud) - Use cases and benefits - SaaS vs. PaaS - Case studies

Public Cloud Models: Definition and characteristics - Key providers (AWS,

Azure, Google Cloud) - Benefits and drawbacks - Security considerations - Case studies

Private and Hybrid Cloud Models: Definitions and characteristics- Private cloud solutions - Hybrid cloud strategies - Benefits and challenges - Case studies and real-world implementations

Unit 3: Explore OCI Key Features

OCI Regions and Availability Domains (ADs): Overview of OCI global infrastructure - Multi-AD vs. One-AD regions - Availability domains and fault domains - Selecting the right region

Case studies on region selection Fault Domains: Definition and importance - Fault domain configuration - Benefits for high availability - Examples and use cases - Best practices

OCI Console: Navigating the OCI Console - Key features and functionalities - Managing resources via the Console - Real-world examples - Best practices

OCI API: Introduction to OCI API - Key functionalities - Example API calls - Integrating OCI API with other systems - Use cases and benefits

OCI CLI and SDKs: Overview of OCI CLI - Key commands and use cases - Introduction to OCI SDKs - SDK integration examples - Best practices for using CLI and SDKs

Unit 4: Master OCI Core Services

Identity and Access Management (IAM): Overview of OCI IAM - Key features and components - Managing users, groups, and policies - Best practices for IAM

Real-world examples Compute Services: Overview of OCI Compute - Types of compute instances - Configuring and managing instances - Use cases and benefits - Best practices

Networking Services: Overview of OCI Networking - Virtual cloud networks (VCNs) - Subnets, gateways, and routing - Network security best practices - Real-world networking examples

Storage Services: Overview of OCI Storage - Types of storage (block, object, file) - Managing storage resources - Use cases and benefits - Best

practices for storage

Database Services: Overview of OCI Database - Types of databases (Autonomous, DB Systems) - Configuring and managing databases - Use cases and benefits - Best practices

Unit 5: Ensure Security and Compliance

OCI Security Services: Overview of VCN, SL, NSG - Web Application Firewall (WAF) - Identity and Multi-Factor Authentication (MFA) - Key Management Service (KMS) - DataSafe and Audit

Compliance Requirements: Overview of compliance in cloud - Key regulatory frameworks (GDPR, HIPAA) - OCI compliance certifications - Best practices for compliance - Real-world compliance examples

Security Best Practices: Designing secure cloud architectures - Implementing defense in depth - Monitoring and logging - Incident response - Case studies on security breaches and responses

Budget, Quota, and Limits: Understanding OCI budgeting tools - Managing quotas and limits - Best practices for cost management - Monitoring and alerting - Real-world examples

OCI Support and Operations: Overview of OCI support models - Using the support portal - Common operational tasks - Incident management - Best practices for operations and support

Test Projects:

Use Cases

S.No	Use Case	Stages
1	Scalability Implementation	1. Assess current infrastructure 2. Plan scalability strategy 3. Implement auto-scaling 4. Monitor and optimize
2	Disaster Recovery Setup	1. Identify critical systems 2. Develop recovery plan

		3. Implement backup solutions
		4. Test and refine
3	IaaS Deployment	1. Evaluate requirements 2. Select IaaS provider 3. Configure infrastructure 4. Migrate applications
4	PaaS Integration	1. Analyze application needs 2. Choose PaaS solution 3. Develop and deploy 4. Monitor performance
5	SaaS Adoption	1. Identify business needs 2. Evaluate SaaS options 3. Implement solution 4. Train users
6	Public Cloud Migration	1. Assess current setup 2. Plan migration 3. Execute migration 4. Validate and optimize
7	Private Cloud Setup	1. Define requirements 2. Design architecture 3. Deploy infrastructure 4. Manage and maintain
8	Hybrid Cloud Strategy	1. Analyze workloads 2. Design hybrid architecture 3. Implement integration 4. Monitor and manage
9	OCI Console Management	1. Explore console features 2. Configure resources 3. Monitor usage 4. Implement best practices

10	API Utilization in OCI	1. Learn OCI API basics 2. Develop API integration 3. Test API functionality 4. Optimize API usage
11	Secure OCI Environment	1. Identify security requirements 2. Configure security service 3. Implement monitoring 4. Conduct audits
12	IAM Configuration	1. Define user roles 2. Create IAM policies 3. Assign permissions 4. Review and audit
13	Network Configuration in OCI	1. Design network layout 2. Configure VCN and subnets 3. Implement security rules 4. Monitor traffic
14	Storage Optimization	1. Assess storage needs 2. Choose storage solutions 3. Implement storage policies 4. Monitor and adjust
15	Database Management in OCI	1. Select database type 2. Configure database 3. Implement backup strategies 4. Monitor and tune