NAAN MUDHALVAN – POLYTECHNIC – ODD SEMESTER 2025-26

COURSE CURRICULUM

CLOUD COMPUTING

ABOUT THE COURSE

This course provides students with a comprehensive, hands-on introduction to Oracle Cloud Infrastructure (OCI). It covers key cloud concepts including compute, storage, networking, containerization, databases, security, and cost management. The students will gain industry-relevant skills in deploying and managing cloud infrastructure and services using OCI.

COURSE NAME:	Cloud Computing
TOTAL DURATION:	60 HRS
MODE OF DELIVERY	PHYSICAL CLASSROOM TRAINING AT RESPECTIVE COLLEGES
TRAINER TO STUDENT RATIO:	1:60
TOTAL MARKS:	70 (External) + 30 (Internal)

TABLE 1	
OVERALL COURSE OBJECTIVES	• Apply the concepts of OCI architecture, regions, availability domains, and resource hierarchy. • Analyse networking fundamentals in OCI, including VCNs, subnets, gateways, and security features. • Evaluate compute and container services, including container orchestration with Oracle Kubernetes Engine (OKE). • Apply OCI storage options and manage databases, backups, and lifecycle management practices. • Implement OCI security principles, monitoring, logging, and implement cost management strategies effectively.
LEARNING OUTCOME	• Evaluate the core components of Oracle Cloud Infrastructure (OCI) including architecture and resource models. • Develop proficiency in configuring OCI networking features such as VCNs, subnets, gateways, and security rules. • Apply hands-on skills in deploying and managing compute resources and containers using Oracle Kubernetes Engine. • Manage OCI storage, databases, and apply backup and lifecycle management practices efficiently. • Apply security, monitoring, and cost optimization tools within OCI to maintain secure and cost-effective systems.

TABLE 2: MODULE WISE COURSE CONTENT AND OUTCOME				
SL. NO	**MODULE NAME**	**MODULE CONTENT**	**MODULE LEARNING OUTCOME**	**DURATION (HRS)**
1	Introduction to Oracle Cloud Infrastructure	OCI architecture, compartments, regions, availability domains, fault domains, resource hierarchy	Analyse OCI core architecture and describe how resources are organized across compartments and regions	12
2	Networking in OCI	Virtual Cloud Networks (VCNs), subnets, internet/NAT/local gateways, route tables, security lists, Network Security Groups (NSGs)	Configure and manage VCNs, subnets, and associated network security features in Oracle Cloud	12
3	Compute and Container Services	Compute instances, instance configuration, Oracle Kubernetes Engine (OKE), container orchestration, scaling and load balancing	Deploy and manage virtual compute resources and use OKE for containerized application orchestration	12
4	Storage and Database Services	Block, object, and file storage; OCI database options; backup strategies; lifecycle management	Evaluate various storage types and implement database services and backup strategies in OCI	12
5	Security, Monitoring & Cost Management	Identity and Access Management (IAM), budgets, alarms, OCI Monitoring, Logging, Audit, and usage cost management	Apply OCI's monitoring, IAM, and cost tools to secure cloud environments and optimize usage and expenses	12

TABLE 3: OVERALL COURSE LEARNING OUTCOME ASSESSMENT CRITERIA AND USECASES		
LEARNING OUTCOME	**ASSESSMENT CRITERIA**	**USE CASES**
Evaluate the core components of Oracle Cloud Infrastructure (OCI) including architecture and resource models.	Identify and explain the core components of Oracle Cloud Infrastructure	Design a cloud resource map for deploying a multi-region application using OCI regions and compartments
Develop proficiency in configuring OCI networking features such as VCNs, subnets, gateways, and security rules.	Demonstrate configuration and application of VCN, subnets, and security groups	Build a secure and scalable VCN for a web-based e-commerce platform hosted on OCI
Apply hands-on skills in deploying and managing compute resources and containers using Oracle Kubernetes Engine.	Deploy and manage virtual machines and containers using OCI Compute and Oracle Kubernetes Engine	Launch a scalable containerized application using OKE with autoscaling and load balancing features
Manage OCI storage, databases, and apply backup and lifecycle management practices efficiently.	Evaluate and utilize the appropriate storage type and database features for different data needs	Implement object and block storage with automated backup for an enterprise document management system
Apply security, monitoring, and cost optimization tools within OCI to maintain secure and cost-effective systems.	Apply identity, access control, budget alerts, and auditing features to maintain a secure and cost-effective cloud	Set up user roles and IAM policies, configure cost alerts, and monitor logs for a cloud-based HRMS hosted on OCI

TABLE 4: LIST OF FINAL PROJECTS (20 PROJECTS THAT COMPREHENSIVELY COVER ALL THE LEARNING OUTCOMES)		
S. No.	**PROJECTS**	**DESCRIPTION**
1	Set Up a New OCI Account	Demonstrate how to create and configure an OCI tenancy, user accounts, and permissions.
2	Organize Resources Using Compartments	Design and implement a resource hierarchy using OCI compartments to separate environments.
3	Deploy Resources Across Availability Domains	Showcase high availability by deploying resources across multiple Ads and fault domains.
4	Implement Multi-Factor Authentication	Configure user access using OCI IAM with MFA and policy definitions for secure login.

5	Create a Virtual Cloud Network (VCN)	Build a custom VCN with public and private subnets, and configure routing and gateways.
6	Configure Network Security Groups	Apply fine-grained security rules using NSGs to control traffic between OCI instances.
7	Deploy a Load-Balanced Web Application	Launch web servers behind an OCI load balancer with health checks and SSL termination.
8	Establish Hybrid Connectivity with FastConnect	Simulate secure, dedicated connectivity from on-premise data center to OCI using FastConnect.
9	Launch and Configure a Compute Instance	Provision a virtual machine in OCI, configure boot volume, and install web server software.
10	Set Up Auto-Scaling for Compute Instances	Enable auto-scaling policies based on CPU utilization to handle variable workloads.
11	Deploy a Containerized App with OKE	Set up an Oracle Kubernetes Engine (OKE) cluster and deploy a Dockerized microservice.
12	Create and Trigger Oracle Functions	Build a serverless function using OCI Functions to handle events like file uploads.
13	Manage Object and Block Storage	Provision object, block, and file storage and demonstrate their use cases with compute instances.
14	Implement Backup Policies for Storage	Automate backups and manage lifecycle policies for data stored in OCI block volumes.
15	Provision Autonomous Database	Deploy and configure an Autonomous Transaction Processing or Data Warehouse database.
16	Secure Data with Vault and Key Management	Use OCI Vault to store secrets and manage keys for encrypting sensitive information.
17	Monitor Infrastructure with OCI Metrics	Set up alarms and dashboards to monitor compute, network, and database metrics in real-time.
18	Audit and Log User Activity	Use Logging and Audit services to track access, changes, and suspicious actions.
19	Optimize OCI Resource Costs	Implement tagging, budgets, and cost tracking to monitor and manage OCI spending.
20	End-to-End Cloud Application Deployment	Integrate networking, compute, storage, database, and monitoring to deploy a complete enterprise app in OCI.

TABLE 5: COURSE ASSESSMENT RUBRICS (TOTAL MARKS: 70)		
ASSESSMENT CRITERIA	**CRITERIA DESCRIPTION**	**TOTAL MARKS**
Interpretation of OCI Core Architecture	Fair – Identifies some basic OCI components with limited understanding. Good – Describes OCI architecture with proper classification of regions and availability domains. Excellent – Clearly articulates OCI's full architecture with practical deployment implications.	15
Networking and Security Configuration in OCI	Fair – Demonstrates basic knowledge of VCNs and subnets. Good – Configures secure VCNs and gateways with limited supervision. Excellent – Independently sets up full-scale, secure networking with well-defined security rules and access control.	15
Compute & Container Service Deployment	Fair – Deploys basic compute instances. Good – Uses OKE and compute efficiently with proper scaling. Excellent – Designs and automates container orchestration with complete cluster and node pool management.	15
Storage and Database Management	Fair – Uses object or block storage in simple use cases. Good – Implements backups and basic lifecycle rules. Excellent – Strategically uses storage tiers and database backups for performance and cost efficiency.	15
Security, Monitoring & Cost Management	Fair – Understands only identity features. Good – Implements IAM, logging, and basic cost tools. Excellent – Designs a secure, compliant environment with alerting, auditing, and budget planning.	10
TOTAL		**70**

Technical Specification

S. No.	Details	Specifications
1	Software/Tools used	Oracle Cloud Infrastructure (OCI) – Version: 2024.1
2	Certification	Oracle Global Certification