

Teaching Guidelines for
Cloud Computing & Deployment Strategies
ACC-HPC June 2025

Duration: 48 hours (24 theory hours + 24 lab hours)

Objective: To introduce the student to Cloud Computing & Operations

Prerequisites: Knowledge of operating systems and computer Networks.

Evaluation: 100 marks

Weightage: CCEE – 40%, Lab exam – 40%, Internals – 20%

Textbook:

Cloud Computing Black Book by Kailash Jayaswal, Dreamtech

Reference Books:

1. Mastering Cloud Computing by Rajkumar/McGraw-Hill Education
2. Cloud Computing: A Practical Approach by Anthony T. Velte/McGraw-Hill Education
3. Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SAAS, PaaS, and IAAS)

Session 1:

- Introduction to cloud
- What computing paradigms are there?
- Characteristics and benefits
- Understanding Cloud Vendors (AWS/Azure/GCP)
- Definition
- Characteristics
- Components

No Lab

Session 2:

- Introduction to Virtualization
- Types of Hypervisors
- Cluster Architecture
- Cluster Requirements
- Virtual machine provisioning
- Virtualization applications in enterprises

- Pitfalls of virtualization
- Need of Virtualization Provisioning
- Work flow of Virtualization Provisioning
- Operating System Virtualization
- Challenges in Virtualization

Lab:

- VM Creation and Management
- Flavor, Images repository, instances
- Create Ubuntu22.04 based VM
- Access the VM through console
- Check the IP, Storage and Linux user account details

Session 3:

- Introduction to SAAS
- Pros and Cons of SAAS Model
- Traditional packaged software Vs SAAS
- SAAS examples
- Introduction to IAAS
- Introduction to virtualization
- Types and Uses of Virtualization
- Virtual Machine Provisioning
- Virtual Machine Migration Services
- Private Cloud Computing Deployment
- Introduction to PaaS
- Storage as Service (RAID)
- Challenges of cloud environment
- Hypervisor
- Comparisons of web services
- Organizational Scenarios of Clouds

Session 4:

- Administering & Monitoring cloud services
- Benefits and limitations
- Deploy application over cloud.
- Comparison among SAAS, PAAS, IAAS
- Cloud Computing Basics
- Cloud Products and Solutions
- Cloud Pricing
- Compute Products and Services

Lab:

- Explore Openstack Horizon Dashboard Interface
- Flavor, Images repository, instances
- VM Creation and Management
- Create Ubuntu22.04 based VM
- Access the VM through console
- Check the IP, Storage and Linux user account details
- Create and manage security groups
- SaaS, StaaS & PaaS service enablement on Cloud
- Create your own file hosting service just like Dropbox, using opensource platform ownCloud – SaaS

Session 5:

- Concept of a container
- Introduction to Docker
- Installing Docker
- Using Docker to pull an image from Docker Hub
- Creating Docker file for Python, Java, and Web applications
- Docker commands – Image and Container-related
- Docker compose
- Interacting with a container

Session 6:

- Container orchestration
- Introduction to Kubernetes
- Cluster, Node, Pod, Service, Replica set, Deployment
- Kubernetes installation
- Creating a pod
- Using yaml file for Kubernetes deployment
- Understanding replica sets and deployment using an example
- Deploying a container on the cloud
- Running the container orchestration on the cloud

Lab:

- Docker Installation and Configuration
- Docker Image Management
- Docker Port mapping
- Docker Container Management
- Install webserver server-specific container and access the web page
- Nginx/Apache