*Suggested Teaching Guidelines for*

# *Cloud Services & Security – PG-DHPCSA August 2019*

**Duration: 34 class room hours + 36 Lab hours**

**Objective:** To reinforce knowledge of Cloud Computing and Operations

**Prerequisites:** Knowledge of Operating systems and computer Networks.

**Evaluation method:** CCEE Theory exam – 40% weightage
Lab exam (Case Study based) – 40% weightage
Assignments – 20% weightage

**List of Books / Other training material**

**Text Book:**

1. Cloud Computing Black Book by Kailash Jayaswal, Dreamtech

**Reference:**

2. Mastering Cloud Computing by Rajkumar/ McGraw Hill Education
3. Cloud Computing a practical Approach by AnthonyT Velte/ McGraw Hill Education
4. Cloud Securty and Privacy by Tim Mather O`Reilly

**Note: Each session having 2 Hours**

**Session 1:**

- Introduction to Cloud
- Advantages of Cloud
- Cloud types and models
- Cloud service providers

Assignment:

- Write definition of cloud by different vendor.
- Write short note on cloud type
- Create a note on cloud service providers in brief in terms of services

**Session 2:**

- Deep dive in to SAAS, PAAS, IAAS
- Application Architecture for Cloud
- Deploying an application in Cloud

Assignment:

- SAAS, PAAS, IAAS in brief with example, advantages, disadvantages
- Stack view of cloud service model
- What are the different types of deployment model? also Write sort notes on cloud deployment model

**Session 3:**

- Creating Amazon EC2 instance
- Working with Microsoft Azure
- Creating an application using Google App Engine

Assignment:

- Create account in micro soft azure
- Create account in IBM bluemix and deploy chat application

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**Session 4:**

- Cloud analytics with tools
- Cloud with HPC benefits and challenges
- Challenges in Cloud

Assignment:

- Read and create a document on SAS Cloud Analytics

**Session 5:**

- Introduction to Virtualization
- Types of Hypervisors
- Understanding OpenStack and its components

Assignment:

- What is virtualization?
- Why we need virtualization?
- Benefits of virtualization?
- What are the different types of hardware virtualization list it and write notes on it?
- Install, configure and setup cloud using OpenStack

**Session 6:**

- Types of Multi tenancy in Cloud computing
- Multi-tenant models for cloud services
- Multi-tenant Data Architecture

Assignment:

- What is the Relationship of Clouds and Multi tenancy?
- What are the degrees of multi tenancy?
- How to choose your multi tenants' degree?

**Session 7:**

- Need of Virtualization Provisioning
- Work flow of Virtualization Provisioning

Assignment:

- What is virtualization provisioning
- What are the file types that makes virtual machine?
- What are the devices that can be added on running virtual machine?
- Advantages of thick provisioning of storage over thin provisioning with virtual machine

**Session 8:**

- Challenges in Virtualization
- VM-Specific Security techniques

Assignment:

- How storage and VM sprawl and security impact the virtual data centre.

**Session 9:**

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- Architectural Considerations- General Issues,
- Trusted Cloud computing

Assignment:

- What are the design issues in creation of cloud computing?
- What are the attributes covers to create trusted cloud computing?

**Session 10:**

- SLA

Assignment:

- What is the use of SLA?
- Why SLA is required?
- What are the turns and conditions are covers under SLA?

**Session 11:**

- Data access control for enterprise applications.

**Session 12:**

- Cloud Security Basics and Common Cloud Security Mechanisms
- Cloud Security Threats and Threat Categorization Methodology

Assignment:

- What are cloud threats?
- Which are the way to inject threats in cloud?
- What are the possible solution to preventing from the threats?

**Session 13:**

- Cloud Network Security Patterns and Supporting Mechanisms
- Collaborative Monitoring and Logging, Independent Cloud Auditing

Assignment:

- What is iptable rule?
- What is IDS/IPS?
- Implementation of Negios for monitoring

**Session 14:**

- Cloud computing security architecture
- Cloud computing vulnerability assessment
- Privacy and Security in Cloud

Assignment:

- Jerico's cube model for cloud implementation
- Apply the Access control list on every user.

**Session 15:**

- Identity Management
- Access control-Identity management
- Access control and Autonomic Security

Assignment:

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- What are the different methods for user authentication in cloud?
- How authorization has been done for each user
- How access level is defined for users

**Session 16:**

- Virtualization security management
- Secure Execution Environments and Communications in cloud
- VM Security Recommendations
- Cloud computing security challenges

**Assignment:**

- Types of virtualization and how secure they are in different ways?
- What are the challenges to deploy cloud?
- How to find the location for deploy a data centre for cloud

**Session 17:**

- Overview of process automation (DevOps)
- Version control with Git
- Branching and Merging in Git, workflows
- Introduction to Jenkins and Maven
- Introducing Docker
- Understanding images and containers
- Running Hello World in Docker
- Introduction to Container
- Container Life Cycle

**Assignment:**

- Create and Implement docker images and containers
- GIT Installation, Version Control, Working with remote repository
- Branching and merging, Stashing, rebasing, reverting and resetting
- Build and automation of Test using Jenkins and Maven