

Program	Post Graduate Diploma in Data Science
Semester	2
Subject Code and Name	1628002 Cloud Computing
Credit	5

Objectives

- To provide understanding of principles and paradigm of Cloud Computing.
- To make the students aware about Service Model with reference to Cloud Computing.
- To appreciate the role of Virtualization Technologies.
- To provide understanding of cloud security issues and solutions.

Unit No.	Topic(s)	No. of Hours
1.	Introduction to Cloud Computing Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Benefits and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks	6
2.	Cloud Architecture, Services and Applications Exploring the Cloud Computing Stack, Connecting to the Cloud, Infrastructure as a Service, Platform as a Service, SaaS Vs. Paas, Using PaaS Application Frameworks, Software as a Service Cloud Deployment Models, Public vs Private Cloud	8
3.	Abstraction and Virtualization Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action	8
4.	Cloud Infrastructure and Cloud Resource Management Architectural Design of Compute and Storage Clouds, Layered Cloud Architecture Development, Design Challenges, Inter Cloud Resource Management, Resource Provisioning and Platform, Cloud Management Products, Emerging Cloud Management Standards	6
5.	Cloud Security Security Overview, Cloud Security Challenges and Risks, Software-as-a Service Security, Cloud computing security architecture: Architectural Considerations, General Issues Securing the Cloud, Securing Data, Data Security, Application Security, Virtual Machine Security, Identity and Presence, Identity Management and Access Control, Identity Management and Access control Identity management, Access control, Autonomic Security Storage Area Networks,	8
6.	Cloud Based Case-Studies Overview of Cloud services, Designing Solutions for the Cloud, Implement & Integrate Solutions, Emerging Markets and the Cloud, Tools for Building Private Cloud: IaaS using Eucalyptus, PaaS on IaaS - AppScale	4

Reference Books

1. Cloud Computing: Principles and Paradigms
by Rajkumar Buyya, James Broberg and Andrzej Goscinski.
Wiley India Edition
2. Cloud Computing Bible
by Barrie Sosinsky
Wiley Publishing Inc., ISBN-13: 978-0470903568, ISBN-10: 0470903562
3. Mastering Cloud Computing
by Rajkumar Buyya, C. Vecchiola & S. Thamarai Selvi
McGRAW Hill Publication
4. Cloud Computing: Web Based Applications that Change the Way You Work and Collaborate Online
by Miller Michael
Pearson Education India
5. Cloud Computing – A practical Approach
by Velte T., Velte A., Elsenpeter R.
Tata McGraw Hill

Outcomes

After completion of subject, students would be able to:

- compare the strengths and limitations of cloud computing.
- identify the architecture, infrastructure and delivery models of cloud computing.
- apply suitable virtualization concept.
- choose the appropriate cloud player , Programming Models and approach.
- address the core issues of cloud computing such as security, privacy and interoperability.
- design Cloud Services and Set a private cloud.

Suggested list of Practical (at least 10 practical are to be performed by students. These practical should cover majority of all topics of syllabus.)

This is the suggested list of practical but it may not be limited only to this list.

1. Sketch out and analyse architecture of Aneka / Eucalyptus / KVM identify different entities to understand the structure of it.
2. Create a scenario in Aneka / Eucalyptus to create a datacentre and host. Also create virtual machines with static configuration to run cloudlets on them.
3. Make and perform scenario to pause and resume the simulation in Aneka / Eucalyptus entity, and create simulation entities dynamically.
4. Organize a case in Aneka / Eucalyptus for simulation entities in run-time using a its toolkit support and manage virtual cloud.
5. Sketch out and analyse architecture of Microsoft Azure.
6. Sketch out and analyse architecture of Amazon Web Service (AWS).
7. Categorize Microsoft Azure Services and discuss on each.
8. Categorize Amazon Web Service (AWS) and implement its various cloud entities using its Cloud Toolbox support.
9. Implement and use sample cloud services with the help of Microsoft Azure.

10. Create a sample mobile application using Microsoft Azure account as a cloud service. Also provide database connectivity with implemented mobile application.
11. Create a sample mobile application using Amazon Web Service (AWS) account as a cloud service. Also provide database connectivity with implemented mobile application.
