

Devi Ahilya University, Indore, India Institute of Engineering & Technology				IV Year BE Information Technology (Full Time)			
Subject Code & Name	Instructions Hours per Week			Credits			
ITR7C1 Cloud Computing	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	2	3	1	1	5

### Learning Objectives:

- To provide knowledge of cloud architecture, deployment models.
- To introduce broad perceptives of cloud services.
- To introduce about storage and database management in cloud computing.
- To make them understand about resource management in cloud computing
- To make them familiar with the various cloud security issues and research trends in cloud

### Pre requisites:

Fundamentals of Computer Network, Storage and Internet Technology

## COURSE CONTENT

### UNIT-I

**Introduction to Cloud Computing and Cloud Computing Architecture:** Computing era, Cloud evolution, Principles of Parallel and Distributed computing, Web services, Cloud Computing Introduction, Characteristics as per NIST, Need of Cloud Computing, Cloud Computing Reference Model, Cloud Architecture, Cloud Service Models, Cloud Deployment Models, Cloud Adaptation Policy.

### UNIT-II

**Virtualization and Migration:** Concept, Benefits of Virtualization, Challenges in Virtualization, Characteristics of Virtualized environments, Virtualization Techniques, Hypervisor, Components of Virtualization, Hot and Cold conversion, Resource Virtualization, Virtualization Platforms.

**Cloud Migration:** Migrating Strategies, Risk Associated, Precautions

### UNIT-III

**Inter Cloud Computing/Federated Environment:**

**Legal and Compliance Issues-** - Global Exchange of Cloud Resources, Inter Cloud Resource Management, Service level Agreement management. Cross Border Data Storage Issue, Cloud Governance Model, Compliance monitoring, Ownership of Data, storage and backup policy.

**Federated Cloud-** Characteristics, Cloud Federation Stack, Motivation for Cloud Interoperability, Cloud Interoperability Scenario, Challenges, Intercloud enabling techniques, Inter-Cloud Standards, Inter-Cloud Project examples.

#### **UNIT-IV**

##### **Threats, Security and Disaster Management in Cloud Computing:**

**Cloud threats-** Threat actors in cloud, Current Threats in cloud, Mitigation techniques for Cloud threats, Cloud Contracting models, Methods for Data loss prevention, Viability of third party services vendors.

**Data Security issues in Cloud storage-** Cloud Security Challenges, Security Governance, Risk Management, Security Monitoring, Security Architecture Design, Data in Rest, Data in Motion, Identity and Access Management, Authentication Services in cloud.

**Disaster Management-** Disaster recovery as a service model (**DRaaS**), Recovery Point Objectives, Recovery Time Objectives, Monitoring, Load Balancing, Database Recovery, Business Continuity.

#### **UNIT-V**

**Resource Management in Cloud Computing, Case Studies, Advance Topics:** Performance and Scalability of Cloud Services, Data Centre, Components, Architecture with Reference Model, Resource Provisioning and allocation approaches, Challenges in Resource Management.

**Cloud Platforms: Case studies on Cloud Platforms -** Amazon web services, Google App Engines, Microsoft Azure, Salesforce Cloud.

Cloud Application Development, Green Computing, Fog Computing, Big Data application on Cloud, Cloud Mining, Mobile Cloud.

**Cloud Deployment-** Setting up a Small Cloud, Cloud Simulator.

#### **Learning Outcomes:**

Upon completing the course, students will be able to:

- Understand about cloud architecture and deployment models
- Learned about broad perceptives of cloud services
- Learned about database management in cloud computing
- To make them understand about resource management in cloud computing
- To make them familiar with the various cloud security issues and research trends in cloud

#### **BOOKS RECOMMENDED:**

- [1] Rajkumar Buyya; Cloud Computing Principles and Paradigms; John Wiley & Sons 2011.
- [2] Rajkumar Buyya; Mastering Cloud Computing; Elsevier Inc 2013.
- [3] Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010.
- [4] Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach" McGraw-Hill Osborne Media; 1 edition [ISBN: 0071626948], 2009.
- [5] Dimitris N. Chorafas, "Cloud Computing Strategies" CRC Press; 1 edition [ISBN: 1439834539], 2010.

#### **List of Practical Assignment:**

During the learning of course, students need to do assignments:

1. Configuration of Baremetal or Para Hypervisor.
2. Study of various cloud data centers and green cloud models.

3. Installation and configuration of Eucalyptus/Aneka cloud.
4. Study of cloud CRM applications i.e Salesforce, Zoho.
5. Hadoop Configuration with Hortonworks.
6. Deployment of CloudSIM tool.

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