

Course Title	Cloud Computing	
Course Code	CE608	
Course Credit	Lecture	: 03
	Practical	: 01
	Tutorial	: 00
	Total	: 04
Course Objective		
<p>On the completion of the course, students will be able:</p> <ul style="list-style-type: none"> • To identify the technical foundations of Cloud systems architecture. • To analyze the problems and solutions to cloud application problems. • To understand the common terms and definitions of Virtualization, Hypervisor and other cloud computing concepts with some examples. • To describe various service delivery models of cloud computing architecture, and the ways in which clouds can be deployed as public, private, hybrid, and community clouds • To evaluate various vendor offerings in this space. • To comprehend the technical capabilities and business benefits of virtualization and cloud computing. • To describe the landscape of different types of virtualization and understand the different types of clouds. 		
Detailed Syllabus		
Sr. No.	Name of chapter & details	Hours Allotted
Section – I		
1	Introduction to Cloud Computing: Cloud Computing in a Nutshell, Roots of Cloud Computing, Layers and Types of Cloud, Features of a cloud, Software-as-a-Service, Platform-as-a-Service, Google App Engine, Microsoft Azure; Infrastructure-as-a-Service, Amazon EC2; Challenges and Risks.	08

2	<p>Migrating into a Cloud: Broad Approaches to Migrating into Cloud: Need for Migration, Deciding on cloud migration –Capex, Opex, SLA, ROI. The seven step model of Migration into Cloud: Migration Risks and Mitigation Service Level Agreement: SLA and Monitoring</p>	08
3	<p>Web Services, AJAX and Mashups Web services: SOAP/WSDL web services, REST web services, SOAP v/s REST AJAX:Asynchronous 'rich' interfaces Mashups: user interface services</p>	08
Section – II		
4	<p>Cloud Technologies Hypervisor: Introduction, Types of Hypervisor. Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Network Attached Storage (NAS), Storage Area Network (SAN), Network Virtualization, Server Virtualization, Pitfalls of virtualization.</p>	08
5	<p>Cloud security fundamentals Vulnerability assessment tool for cloud, Privacy and Security in cloud,Cloud computing security architecture: Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control Identity management, Access control, Autonomic Security Cloud computing security challenges: Virtualization security management virtual threats, VM Security Recommendations, VM-Specific Security techniques.</p>	08
6	<p>Enterprise Cloud Computing Ecosystem: Introduction, Public Cloud Providers, Cloud Management Platforms and Tools, Tools for Building Private Cloud: IaaS using Eucalyptus Roadmap for Enterprise Cloud Computing: Introduction, Quick wins using Public Clouds</p>	08
Instructional Method and Pedagogy		

- Lecture will be conducted with the aid of multi-media projector, blackboard, OHP etc.
- Students are provided with Lecture notes and power point presentations for pre reading.
- Edmodo is used as learning management systems for engaging students in off time.
- Students are engaged through various Active Learning Methodologies like problem based learning, quiz, group discussion etc.
- Assignments based on Course contents will be given to the students at the end of each unit/topic and will be evaluated at regular interval.

Text book

- RajkumarBuyya, Cloud Computing: Principles and Paradigms, John Wiley & Sons, First Edition
- Gautam Shroff, Enterprise Cloud Computing: Technology, Architecture, Applications, Cambridge University Press, First Edition
- Judith Hurwitz, R Bloor, M.Kanfman, F.Halper, Cloud Computing for Dummies, Wiley India Edition, First Edition

Reference Books

- Anthony T Velte, Cloud Computing : A Practical Approach, McGraw-Hill Osborne, First Edition
- Barrie Sosinsky, Cloud Computing Bible, Wiley India, First Edition
- Ronald Krutz and Russell Dean Vines, Cloud Security, Wiley-India, First Edition
- Tim Malhar, S.Kumaraswamy, S.Latif, Cloud Security & Privacy, O'Really Publications, First Edition
- Scott Granneman, Google Apps, Pearson, First Edition

List of Tutorials

Tutorial-1

1. **Sketch out** and **analyze** architecture of Cloudsim and **identify** different entities to understand the structure of cloudsim.

Tutorial-2

1. **Create** a scenario in cloudsim to create a datacenter along with one host. Also **create** one virtual machine with static configuration to run one cloudlet on it.
2. **Illustrate** a scenario in cloudsim to create one datacenter and one host. Also **implement** required virtual machines to run two cloudlets on it. Assume that cloudlets run in VMs with the same MIPS requirements. The cloudlets will take the same time to complete the execution.

Tutorial-3

1. **Implement** a datacenter with two hosts and run two cloudlets on it in cloudsim. Consider the cloudlets run in VMs with different MIPS requirements. The cloudlets will take different time to complete the execution depending on the requested VM performance.
2. **Design** a program in cloudsim to create two datacenters with one host and run two cloudlets on it.

Tutorial-4

1. **Construct** a case in cloudsim to create two datacenters with one host each and run cloudlets of two users on them.
2. **Compose** a scenario using a java program in cloudsim to create scalable simulations by **constructing** required datacenter, host, vm and cloudlets.

Tutorial-5

1. **Make** and **perform** scenario to pause and resume the simulation in cloudsim, and **create** simulation entities (a DatacenterBroker) dynamically.
2. **Organize** a case in cloudsim for simulation entities (a DatacenterBroker) in run-time using a global manager entity (GlobalBroker).

Tutorial-6

1. **Sketch** and **explain the architecture of CloudAnalyst**.
2. **Draw** and **summarize** CloudAnalyst class diagram.

Tutorial-7

1. **Make** a sample case study and **create** a scenario based on case study in CloudAnalyst to describe results in graphical way.
2. **Create** a report on graphical results generated by CloudAnalyst case study example.

Tutorial-8

1. **Sketch out** and **analyze** architecture of Microsoft Azure.
2. **Categorize** Microsoft Azure Services and **discuss** on each.
3. **Implement** and use sample cloud services with the help of Microsoft Azure.

Tutorial-9

1. **Implement** a web application using Microsoft Azure account as a cloud service by **creating** a web page and database. Also **provide** database connectivity with implemented webpage. **Demonstrate** the same over internet and **prepare** documentation for the same.