

Subject Code: 1ET2030202	Subject Title: CLOUD COMPUTING
Pre-requisite	Fundamentals of Distributed Computing

Course Objective:

The main objective of this course is:

To make the students familiar with the fundamentals and essentials components of Cloud Computing. The course aims to make the students use and adopt Cloud services and tools in their real life scenarios. The course intends to enable students exploring GoogleApps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	-	2	4	60	40	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	Introduction to Cloud Computing: NIST definition, Service/Deployment Models, Architecture, Features, Advantage/Disadvantage	2	10	
2	Cloud as a Service: Infrastructure as a Service, Platform as a Service, Software as a Service, Identity as a Service, Security as a Service, Compliance as a Service.	2	10	
3	Resource Management: Virtualization, Hypervisors, Load balancing, Server Consolidations, VM Migration	4	18	
4	SLA Management: Introduction, Traditional Approaches, Types & Life Cycle of SLA, SLA Management in Cloud	4	18	
5	Workflow Engine for Clouds: Introduction, Workflow Management Systems and Clouds, Architecture of Workflow Management Systems	3	12	
6	Cloud Security: Cloud Security Overview, Issues / Challenges, Data security, Identity & Access Management, Distributed intrusion and anomaly detection.	3	12	
7	Legal Issues in Cloud Computing: Data Privacy and Security Issues, Jurisdictional Issues, Commercial and Business Considerations	2	10	
8	Reviewing case studies (E.g. AWS, Eucalyptus) and understanding simulations tools (E.g. Cloudsim)	4	10	

Review Presentation: The student is expected to spend minimum 2 hours per week (as mentioned in the teaching and evaluation scheme) to refer at least two peer reviewed journal papers related to this domain/subject. The student is expected to identify issues/challenges and emerging trends in the domain/subject. Student is supposed to explore various video lectures (E.g. NPTEL) available in the domain/subject. Student is required to make a review-presentation on the work carried out for the same.

Recommended sites for journal papers are (1) dl.acm.org (2) springer.com (3) sciencedirect.com (4) elsevier.com (5) ieeexplore.ieee.org (6) scholar.google.co.in (7) scopus.com or others of similar repute.

Course Outcome:

Upon successful completion of this course the student would be able to:

- To explain and characterize different cloud computing models.
- To identify security concerns in cloud computing.
- To analyze the trade-offs inherent in Cloud Computing.
- To identify appropriate design choices when solving real-world cloud computing problems.
- To make recommendations on cloud computing solutions for an enterprise

List of References:

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley-India, 2010
2. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, "Cloud Computing: Principles and Paradigms", Wiley, 2011
3. Nikos Antonopoulos, Lee Gillam, "Cloud Computing: Principles, Systems and Applications", Springer, 2012
4. Ronald L. Krutz, Russell Dean Vines, "Cloud Security: A Comprehensive Guide to Secure Cloud Computing", Wiley-India, 2010
5. Velte T., Velte A., Elsenpeter R, "Cloud Computing – A practical Approach", Tata McGrawHill
6. L. Wang, R. Ranjan, J. Chen, and B. Benatallah, Cloud Computing: Methodology, Systems, and Applications, CRC Press, Boca Raton, FL, USA, ISBN: 9781439856413, October 2011.
7. Kai Hwang, Geoffrey Fox, and Jack Dongarra, "Chapter 7, Cloud Architecture and Datacenter Design" in Distributed Computing: Clusters, Grids and Clouds, May 2010

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

1. Explore various open source Cloud computing architecture (at least two), install them and compare various features available in them.
2. Installation of Simulation tool (E.g. CloudSim, AWS) and show how to create a datacenter with multiple host and run cloudlets on it.
3. Study and analyze scheduling algorithms (Cloudsim).
4. (i) Sketch the architecture and (ii) have hands on experience on one or more on the following:
 - a. Eucalyptus
 - b. Microsoft Azure
 - c. AWSCreate

One may create and configure datacenter, host, VM. One may assign and schedule jobs on them.