Course code	Cloud Computing & Virtualization	L	T	P	J	C
ITE5002		3	0	0	0	3
Pre-requisite	NIL	Syllabus version				

Course Objectives:

- To learn recent computing paradigms
- To introduce the concept of Virtualization and secured environment
- To understand Cloud programming paradigms

Expected Course Outcome:

- Design, implement and evaluate a cloud-based system, process, component, or program to meet desired needs
- An ability to use techniques, skills in secured cloud environment.
- An ability to create VM, migrate and provide QOS to the committed users.

Student Learning Outcomes (SLO): 2,5,17

Module:1	Introduction	4 hours	SLO : 2

Overview of Computing Paradigm, Cloud Computing- Types of Cloud Deployment Models - Private, Public, Hybrid, Agency Clouds - Cloud Service Models: Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS), Anything as a Service(XaaS)

Module:2	Virtualization	5 hours	SLO : 5

Types - Implementation Levels –Structures-Tools, CPU, Memory, I/O Devices, Virtual Clusters and Resource management – Virtualization for Data-center Automation

Module:3	Virtualization Techniques	7 hours	SLO : 2

Storage Virtualization – System-level or Operating Virtualization – Control-Plane Virtualization–Virtual Machine Basics – Taxonomy of Virtual machines - Server Virtualization – Physical and Logical Partitioning - Types of Server Virtualization

Module:4	Virtual Machine Management	7 hours	SLO : 17

VM Provisioning and Manageability- Virtual Machine Migration Service-Distributed Management of Virtual Machines-Scheduling Techniques-Capacity Management to meet SLA Commitment

Module:5	Cloud Environments	7 hours	SLO : 17

Cloud Environments - Case study: One cloud service provider per service model (eg. Amazon EC2, Google App Engine, Sales Force, Azure, Open Source tools) - Cloud application development using third party APIs, Working with EC2 API – Google App Engine API - Facebook API, Twitter API . HDFS, Map Reduce Programming Model.

Module:6	Security Overview	7 hours	SLO : 5

Cloud Security Challenges and Risks – Software-as-a- Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

Module:7	**Quality of Service**	**5 hours**	**SLO: 2**
(QoS) monitoring in a Cloud computing environment - Introduction to Cloud Middleware- Mobile Cloud -Sensor Cloud			
Module:8	**Expert talk on Recent Trends in Cloud Computing, Application Environments.**	**3 hours**	**SLO:17**
	Total Lecture hours:	**45 hours**	
Mode of Evaluation: Flipped Class Room, [Lecture to be videotaped], Use of physical and computer 45 models to lecture, Visit to Industry Min of 2 lectures by industry experts			
Text Book(s)			
1.	Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Cloud Computing: Principles and Paradigms, Wiley, 2013		
Reference Books			
1.	Tim Mather, Subra Kumaraswamy, and Shahed Latif," Cloud Security and Privacy",Oreilly,2009		
2.	Barrie Sosinsky, "Cloud Computing Bible" , Wiley-India, 2011		
3.	Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing: From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers,2013.		
4.	Ronald L. Krutz, Russell Dean Vines,"Cloud Security: A Comprehensive Guide to Secure Cloud Computing", Wiley-India, 2010		
5.	John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.		
6.	Rajkumar Buyya,Chirstian Vecchiola,S.Thamarai Selvi,"Mastering Cloud Computing" , Tata McGraw Hill,2013		
Recommended by Board of Studies	12-08-2017		
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