CLOUD APPLICATION DEVELOPMENT

VII Semester: CSE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ACSB17	**Core**	3	-	-	3	30	70	100

Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil	Total Classes: 45

I. COURSE OVERVIEW:

This Course emphasizes on transformation of the IT industry with high elastic scalability (EC) in the delivery of enterprise applications and capabilities across the various cloud service models. Thiscourse covers the concepts of cloud infrastructures, cloud service providers, virtualization, software-defined networks and cloud storage, cloud resource scheduling and management, programming models, and cloud security.

II. OBJECTIVES:

The course should enable the students to:

I	The fundamental concepts of various services deployed with cloud models for solving current and future challenges.
II	The principles in data centre design and services provided with virtualizationtechniques.
III	The scaling and load balancing solutions for developing business models with appropriate cloud infrastructure, services and programming models.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Choose** appropriate CSP based on user demanded services among AWS, GCP, MS Azure, and Apache Cloud Stack.	Apply
CO 2	**Identify** the cloud architecture style and infrastructure in providing services with high elastic scalability as per user requirement.	Apply
CO 3	**Summarize** Virtual Machine concepts for running different applications on different operating systems concurrently.	Understand
CO 4	**Make use of** resource scheduling and management methods for finding the best match of combined resources as per user requirement.	Apply
CO 5	**Outline** system security issues and vulnerabilities for reducing system-specific attacks under a virtualization environment.	Understand
CO 6	**Inspect** various cloud services, programming models for developing a business model according to customer requirements.	Analyze

IV. SYLLABUS:

MODULE-I	INTRODUCTION AND CLOUD APPLICATION DEVELOPMENT	Classes: 08

Introduction: Definition, Characteristics, Benefits, challenges of cloud computing, cloud models: service IaaS(infrastructure as service), PaAs(platform as a service), SaaS(software as a service), deployment models-public, private, hybrid, community; Types of cloud computing: Grid computing utility computing, cluster; computing Cloud services: Amazon, Google, Azure, online services, open source private clouds, SLA; Applications of cloud computing: Healthcare, energy systems, transportation, manufacturing, education,
government, mobile communication, application development

MODULE -II	CLOUD ARCHITECTURE, PROGRAMMING MODEL	Classes: 09

Cloud Architecture, programming model: NIST reference architecture, architectural styles of cloud
Applications, single, multi, hybrid cloud site, redundant, non redundant, 3 tier, multi tier architectures;
Programming model: Compute and data intensive.

MODULE-III	CLOUD RESOURCE VIRTUALIZATION	Classes: 09

Cloud resource virtualization: Basics of virtualization, types of virtualization techniques, merits and demerits of Virtualization.

Full vs Para - virtualization, virtual machine monitor/hypervisor; Virtual machine basics, taxonomy of virtual machines, process vs system virtual machines.

MODULE -IV	CLOUD RESOURCE MANAGEMENT AND SCHEDULING	Classes: 10

Cloud Resource Management and Scheduling: Policies and mechanisms for resource management, resource bundling, combinatorial , fair queuing, start time fair queuing, borrowed virtual time, cloud scheduling subject to deadlines, scheduling map reduce applications subject to deadlines, resource management and application scaling.

MODULE -V	CLOUD SECURITY	Classes: 09

Cloud Security: Risks, privacy and privacy impacts assessments; Multi-tenancy issues, security in VM, OS, virtualization system security issues and vulnerabilities; Virtualization system-specific attacks: Technologies for virtualization-based security enhancement, legal.

Text Books:

1. Dan Marinescu, "Cloud Computing: Theory and Practice", M K Publishers, 1st Edition, 2013,
2. Kai Hwang, Jack Dongarra, Geoffrey Fox, "Distributed and Cloud Computing From Parallel Processing to the Internet of Things", M K Publishers, 1st Edition, 2011.

Reference Books:

1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, "Cloud Computing: A Practical Approach",
     McGraw Hill, 1st Edition, 2009.
2. Arshdeep Bahga, "Cloud Computing: A Hands on Approach", Vijay Madisetti Universities Publications,1 st Edition, 2013.

Web References:

1. https://www.oracle.com/in/cloud/application-development
2. http://computingcareers.acm.org/?page_id=12
3. http://en.wikibooks.org/wiki/cloud application

E-Text Books:

1. http://www.acadmix.com/eBooks_Download
2. http://www.ibm.com