4/4 B.Tech. FIRST SEMESTER
CLOUD COMPUTING

CS7T5D **Credits: 4**

(Common to CSE/IT)
Elective – II

Lecture: 4 periods/week **Internal assessment: 30 marks**
Tutorial: 1 period /week **Semester end examination: 70 marks**

Course Context and Overview: This course introduces the fundamental concepts of Cloud Computing. With this foundation students can gain knowledge on various types of clouds and their creation of architecture and its management.

Prerequisites: C LANGUAGE, I/O ANALOG AND DIGITAL INTERFACING, AND PERIPHERALS

Learning Outcomes:

Ability to:

1. Understand the Basic Needs of Virtualization.
2. Describe the fundamentals of CC.
3. Analyze the SLA's for cloud Applications.
4. Discuss the security & Disaster Management in CC.
5. Apply Various Cloud Services for an Enterprise.
6. Compare various types of cloud Environments.

UNIT I:

Introduction to cloud computing- Cloud Computing in a Nutshell, Roots of Cloud Computing, Layers and Types of Clouds, Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks. Migrating into a Cloud -Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud.

UNIT II:

Enriching the 'Integration as a Service' Paradigm for the Cloud Era--The Onset of Knowledge Era ,The Evolution of SaaS, The Challenges of SaaS Paradigm, Approaching the SaaS Integration Enigma, New Integration Scenarios ,The Integration Methodologies, SaaS Integration Products and Platforms, SaaS Integration Services, Businesses-to-Business Integration (B2Bi) Services, A Framework of Sensor—Cloud Integration ,SaaS Integration Appliances. The Enterprise Cloud Computing Paradigm - Background, Issues for Enterprise Applications on the Cloud, Transition Challenges, Enterprise Cloud Technology and Market Evolution ,Business Drivers Toward a Marketplace for Enterprise Cloud Computing ,The Cloud Supply Chain.

UNITIII:

INFRASTRUCTURE AS A SERVICE (IAAS):Virtual Machines Provisioning andMigration Services- Background and Related Work, Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services ,VM Provisioning and Migration in Action, Provisioning in the Cloud Context, Future Research Directions. On the Management of Virtual Machines for Cloud Infrastructures- The Anatomy of Cloud Infrastructures, Distributed Management of Virtual Infrastructures, Scheduling Techniques for Advance Reservation of Capacity, Capacity Management to meet SLA Commitments.

UNIT IV:

Enhancing Cloud Computing Environments Using a Cluster as a Service - Related Work,RVWS Design ,Cluster as a Service: The Logical Design, Proof of Concept, Secure Distributed Data Storage in Cloud Computing - Cloud Storage: from LANs TO WANs, Technologies for Data Security in Cloud Computing ,Open Questions and Challenges.

UNIT V:

PLATFORM AND SOFTWARE AS A SERVICE - Integration of Private and PublicClouds: Technologies and Tools for Cloud Computing, Aneka Cloud Platform, Aneka Resource Provisioning Service, Hybrid Cloud Implementation, Visionary thoughts for Practitioners.

An Autonomic Cloud Engine : Comet Cloud Architecture, Autonomic Behaviour of Comet Cloud, Overview of Comet Cloud-based Applications, Implementation and Evaluation-Systems' Cloud-Based Solutions for

Business Applications: What Enterprises Demand of Cloud Computing ,Dynamic ICT Services ,Importance of Quality and Security in Clouds, Dynamic Data Centre—Producing Business-ready, Dynamic ICT Services

UNIT VI:

Understanding Scientific Applications for Cloud Environments :A Classification ofScientific Applications and Services in the Cloud , SAGA-based Scientific Applications that Utilize Clouds

The Map Reduce Programming Model and Implementations: Map Reduce Programming Model, Major Map Reduce Implementations for the Cloud, Map Reduce Impacts and Research Directions.

UNIT VII:

Managing the Cloud: Administrating the cloud, Management Responsibilities, life cyclemanagement, cloud management products, Standards.

Cloud Security: Securing the cloud, security boundary, security mapping, securing data-brokered cloud storage access, storage location and tenancy, Encryption.

Introducing service oriented architecture.

UNIT VIII:

Moving Applications to cloud: Applications in cloud, Functionality mapping, applicationattributes, cloud service attributes, system abstraction,.

Working with cloud based storage: cloud storage definition, unmanaged cloud storage, managed cloud storage, creating cloud storage containers, cloud backup types.

Working with mobile devices and web services: Feature phones and the cloud, using smart phones with cloud-Android, iphone, MobileMe. Understanding mobile web service types-mobile interoperability, Performing service discovery, using SMS.

Learning Resources

Text Books:

1. Rajkumar Buyya ,James Broberg ,Andrzej Goscinski CLOUD COMPUTING Principles and Paradigms, Wiley Publishing inc; 1 edition

2.Barrie Sosinsky Cloud Computing Bible ,wiley publishing inc 1 edition.

Reference Books:

1. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Onlinem, Michael Miller, , Que Publishing, August 2008.

2. Cloud Computing for Dummies, Judith Hurwitz , Robin Bloor , Marcia Kaufman ,Fern Halper, Wiley publishing inc.; For Dummies; 1 edition

3.Cloud Application Architecture- George Reese, O'Reilly Media; 1 edition

4. Cloud computing best practices, Haley Beard second edition, Emereo Pty Ltd; 2 edition