4/4 B.Tech. FIRST SEMESTER

IT7T5B   **CLOUD COMPUTING**   **Credits: 4**
                                    (Common to CSE/IT)

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

Objectives:

To provide an idea on

- Cloud Computing concepts, technologies, architecture and applications.
- Frontier areas of Cloud Computing and information systems.
- Scientific Applications for Cloud Environments.
- Applications with cloud based storage, mobile devices and web services.

Outcomes:

Students will be able to

- Understand the applications for state-of-the-art cloud computing.
- Get acquaintance on architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS.
- Understand the core issues of cloud computing such as security, privacy, and interoperability.
- Develop the appropriate cloud computing solutions and recommendations according to the applications used.

Syllabus:

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.

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, SaaS Integration Services and products, SaaS Integration Appliances.The Enterprise Cloud Computing Paradigm - Background, Enterprise Cloud Technology and Market Evolution.

UNIT III
INFRASTRUCTURE AS A SERVICE (IAAS): Virtual Machines Provisioning and Migration 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. On the Management of Virtual Machines for

Cloud Infrastructures- The Anatomy of Cloud Infrastructures, Distributed Management of Virtual Infrastructures.

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 .

 T-Systems' Cloud-Based Solutions for Business Applications What Enterprises Demand of Cloud Computing, Dynamic ICT Services.

UNIT V

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

An Autonomic Cloud Engine: Comet Cloud Architecture, Autonomic Behavior of Comet Cloud, Overview of -based Applications, Implementation and Evaluation.

UNIT VI

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

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

UNIT VII

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

Cloud Security: Securing the cloud, boundary, mapping, -brokered cloud storage access, storage location and tenancy, Encryption. Introducing service oriented architecture.

UNIT VIII

Moving Applications to cloud: Applications in cloud, Functionality mapping, application attributes, 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.

Text Books:

1. RajkumarBuyya ,JamesBroberg ,AndrzejGoscinski CLOUD COMPUTING Principles and Paradigms , Wiley Publishing inc.
2. Barrie Sosinsky Cloud Computing Bible ,WileyPublishing inc.

Reference Books:

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

2.Judith Hurwitz , Robin Bloor , Marcia Kaufman ,Fern Halper Cloud Computing for Dummies. Wiley publishing inc.
3.Cloud Application Architecture- George Reese.
4.Haley Beard Cloud computing best practices.