# BCSE1207: CLOUD COMPUTING

**Objective:** *This course covers aims to explain various technologies related to Cloud Computing and their practical implementations, discuss different architectural models of cloud computing, the concepts of virtualization and cloud orchestration*

**Credits: 03** **Semester V** **L–T–P: 3–0–0**

| Module No. | Content | Teaching Hours |
|---|---|---|
| I | **Overview of Cloud Computing -** Brief history and Evolution of Cloud Computing, Traditional vs. Cloud Computing, Importance of Cloud Computing, Benefits and Challenges of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing, Role of Open Standards Cloud **Computing Architecture:** Cloud computing stack Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services Service Models (XaaS) Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS) Deployment Models Public cloud, Private cloud, Hybrid cloud, Community cloud. **Infrastructure as a Service(IaaS):** Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM) Resource Virtualization Server, Storage, Network Virtual Machine (resource) provisioning and manageability, storage as a service, Data storage in cloud computing (storage as a service) Case Study: Amazon EC2. **Platform as a Service(PaaS):** Introduction to PaaS What is PaaS, Service Oriented Architecture (SOA) Cloud Platform and Management Computation Storage, Case study: Microsoft Azure as PaaS, Introduction, Service Offered, Creation of DB instance. | 12 |
| II | **Software as a Service (SaaS):** Introduction to SaaS, Web services, Web 2.0, Web OS, Open SaaS, SaaS with SOA Overview of Multi-Cloud Management Systems - Explain concept of multicloud management, Challenges in managing heterogeneous clouds, benefits of multi-cloud management systems. **Energy Efficiency in Clouds:** Data Center Power Consumption, Green Data Centers, VM Migration, Pre-copy Migration, Post-Copy Migration and Live Migration. **Overview of Cloud Security -** Security concerns in Traditional IT, Challenges in Cloud Computing in terms of Application, Server, and Network Security. Security Concepts in VM, Abuse and Nefarious Use of Cloud Computing, Insecure Interfaces and APIs (Malicious Insiders, Shared Technology Issues, Data Loss or Leakage, Account or Service Hijacking, Unknown Risk Profile), Attacks in Cloud Computing **Cloud Security:** Infrastructure Security, Network level security, Host level security, Application level security Data security and Storage Data privacy and security Issues, Jurisdictional issues raised by Data Location Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, IAM User, Groups and their Roles. **Service Management in Cloud Computing:** Service Level Agreements(SLAs), Billing & Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously Managing Data Looking at Data, Scalability & Cloud Services Database & Data Stores in Cloud Large Scale Data Processing. | 12 |

## TextBooks:

- Raj Kumar Buyya, James Broberg, Andrezei M. Goscinski, “Cloud Computing”: Principles and paradigms,2011.

## Reference Book:

- Anthony T. Velte, Toby J. Velte, and Robert Elsenpeter Cloud Computing: A Practical Approach,2010.
- McGraw Hill. Rittinghouse, John, W, Cloud computing: Implementation, management and security.
- Barrie Sosinsky, Cloud Computing Bible, Wiley.2011.
- Rhoton, John, Cloud Computing Architected: Solution Design Handbook.
- Krutz, Ronald L.; Vines, Russell Dean, Cloud Security, A comprehensive Guide to Secure Cloud Computing.