

### 5MCACC3: CLOUD COMPUTING

**Total No. of Hours: 52**

**Hours/Week: 04**

**Course Objective:** To explore massive parallel architecture and distributed computing that enable cloud technology.

**Course Outcome:** Students will be able to

**CO1:** Learn basics of Cloud computing

**CO2:** Understand the importance of virtualization

**CO3:** Knowledge of various cloud computing services

**CO4:** Understand the key concepts of Cloud Deployment using AWS as case studies

Unit I	<b>Distributed System Models and Enabling Technologies:</b> Scalable Computing Service over the Internet: The Age of Internet Computing, scalable computing Trends and New Paradigms, Internet of Things and Cyber-Physical Systems. System Models for Distributed and Cloud Computing: Clusters of Cooperative Computers, Grid Computing Infrastructures, Peer-to-Peer Network Families, Cloud Computing over the Internet. Software Environments for Distributed Systems and Clouds: Service-Oriented Architecture (SOA), Trends towards Distributed Operating Systems, Parallel and Distributed Programming Models. Performance, Security, and Energy-Efficiency: Performance Metrics and Scalability Analysis, Fault-Tolerance and System Availability, Network Threats and Data Integrity, Energy-Efficiency in Distributed Computing.	12 hrs
Unit II	<b>Computer Clusters and Virtualization of clusters and data centers:</b> Clustering for massive parallelism: Cluster Development Trends, Design Objective of Computer Clusters, Fundamental Cluster Design issues. Virtual machines and Virtualization of clusters and Data centers: Implementation levels of virtualization: levels of virtualization. Implementation, VMM Design requirements and providers, Virtualization support at the OS level, Middleware Support for Virtualization. Virtualization Structure, CPU, Memory, I/O Devices and Data Center Automation.	10 hrs
Unit III	<b>Computing clouds and Service Oriented Architecture:</b> Cloud computing and Service Models: Public, Private, and Hybrid Clouds, Cloud Ecosystem and Enabling Technologies, Infrastructure-as-a-Service (IaaS), Platform- and Software-as-a-Service (PaaS, SaaS). Data Center Design, Interconnection of Modular Data Centers, Management issues. Generic Cloud architecture Design, Layered Cloud Architectural development, Virtualization Support and Disaster Recovery, Architectural Design Challenges	10 hrs
Unit IV	<b>Intercloud Resource Management, Cloud Programming and Environment:</b> Extended Cloud Computing Services, Platform deployment, global exchange of cloud Resources, Cloud Security and Trust Management, Programming support of Google App Engines, Case Study: Amazon Open Source Cloud Software Environment. Case Study: Nimbus	10 hrs
Unit V	<b>Ubiquitous Clouds and the Internet of Things:</b> Performance of Distributed Systems and the Cloud Data-intensive Scalable Computing(DISC), Quality of Service in Cloud computing, Benchmarking MPI, Azure, EC2,MapReduce, and Hadoop. Online social and Professional Networking: Online Social Network Characteristics, Graph-Theoretic Analysis of Social networks, Communities and Applications of Social Networks, Facebook: The World's Largest Content-Sharing Network, Twitter for Micro blogging, News and Alert Services.	10 hrs

## REFERENCE BOOKS

- [1] Kai Hwang, Jack Dungaree, and Geoffrey Fox, “*Distributed and Cloud Computing*”, MK Publishers, 2012.
- [2] Michael Miller, “*Cloud Computing-Web-Based Applications that change the Way you work and collaborate Online*”, Pearson Publication, 2012.
- [3] Anthony T. Volte, Toby J. Volte, Robert Elsenpeter, “*Cloud Computing, A Practical Approach*”, McGraw Hill, 2010.