MCA-E03 **Cloud Computing** L=3, T=1

Course Objectives: To study the fundamental concepts of cloud computing, enabling technologies, cloud service models and security concerns.

UNIT - I

Cloud Computing: Definition, roots of cloud computing, characteristics, cloud architecture, deployment models, service models. Virtualization: benefits & drawbacks of virtualization, server virtualization, virtualization of - operating system, platform, CPU, network, application, memory and I/O devices etc.

UNIT - II

Cloud Computing Service Platforms – compute services, storage services, database services, application services, queuing services, e-mail services, notification services, media services, content delivery services, analytics services, deployment & management services, identity & access management services and their case studies.

UNIT - III

Cloud Technology: Introduction to Cloud Technologies, Study of Hypervisors Compare SOAP and REST Web-services, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services, Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization Multitenant software: Multi-entity support, Multi-schema approach, Multitenance using cloud data stores, Data access control for enterprise applications, Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo.

UNIT - IV

Cloud security fundamentals: issues, threats, data security and information security, Vulnerability assessment tool for cloud, Privacy and Security in cloud, Cloud computing security architecture: Architectural Considerations-General Issues,Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control-Identity management, Access control, Autonomic Security Cloud computing security challenges: Virtualization security management, virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud.

Text Books:

1. Arshdeep Bahga, Vijay Madisetti, Cloud Computing – A Hands-on Approach, University Press.

2. Rajkumar Buyya, James Broberg, Andrzej Goscinski, Cloud Computing – Principles and Paradigms, Wiley India Pvt. Ltd
3. S. Acharya, Data Analytics Using R, McGraw Hill Education (India) Private Limited.
4. Cloud Computing for Dummies by Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper (Wiley India Edition)
5. Enterprise Cloud Computing by Gautam Shroff, Cambridge
6. Cloud Security by Ronald Krutz and Russell Dean Vines, Wiley-India

Reference Books:

1. Kai Hwang, Geoffrey C.Fox, and Jack J. Dongarra, Distributed and Cloud Computing, Elsevier India Private Limited
2. Saurabh Kumar, Cloud Computing, Wiley India Pvt. Ltd.
3. Shailendra Singh, Cloud Computing, Oxford
4. Coulouris, Dollimore and Kindber, Distributed System: Concept and Design, Addison Wesley
5. Michael Miller, Cloud Computing, Dorling Kindersley India
6. Anthony T. Velte, Toby J. Velte and Robert Elsenpeter, Cloud computing: A practical Approach, McGraw Hill
7. Google Apps by Scott Granneman,Pearson
8. Cloud Security & Privacy by Tim Malhar, S.Kumaraswammy, S.Latif (SPD,O'REILLY)
9. Cloud Computing: A Practical Approach, Antohy T Velte, et.al McGraw Hill.
10. Cloud Computing Bible by Barrie Sosinsky, Wiley India
11. Stefano Ferretti et.al., QoS–aware Clouds", 2010 IEEE 3rd International Conference on Cloud Computing

Course Outcomes:

B the end of the course, the students will be able to:
CO1: understand core issues of cloud computing and enabling technologies;
CO2: design services based on cloud computing platforms;
CO3: evaluate the cloud technologies.
CO4: analyse the cloud securities.

NOTE: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and the candidate is required to attempt one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5-10 parts, out of the entire syllabus. In all, five questions are to be attempted.