L	P	C
3	-	3

20MC211 CLOUD COMPUTING

Course Description and Objectives:

This course deals with a new type of a computing model, which enables information, software, and shared resources to be provisioned over the network as services in an on-demand manner. The objective of this course is to enable the student to understand parallel and distributed computing, virtualization, architecture of cloud, Aneka, Thread programming, Concurrent programming and MapReduce programming.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Analyze the trade-offs among deploying of applications in the cloud and the local infrastructure	**2**
2	Evaluate the concepts of various virtualization technologies	**4**
3	Deploy applications over commercial cloud computing infrastructures	**5**
4	Identify security and privacy issues in cloud computing	**6.8**

Skills:

- Developing cloud applications by solving real-world problems.
- Building an own cloud computing environment.
- Compare and evaluate Parallel Vs Distributed architectures.

Activities:

- Deploy applications over commercial cloud computing infrastructures such as Amazon Web Services, Windows Azure, and Google AppEngine.
- Program data intensive parallel applications in the cloud.
- Analyze the performance, scalability, and availability of the underlying cloud technologies and software.
- Solve a real-world problem using cloud computing through group collaboration.

Syllabus

UNIT – 1 **9 Hours**

AN OVERVIEW OF CLOUD COMPUTING: Cloud computing at a glance, Historical developments, Building cloud computing environments, computing platforms and technologies. Parallel Vs Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing, Technologies for Distributed Computing.

UNIT – 2 **9 Hours**

CLOUD COMPUTING ARCHITECTURE: Cloud Reference Model, Types of Clouds, Economics of Clouds, Open Challenges; Characteristics, Virtualization techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.

UNIT – 3 **9 Hours**

ANEKA: Cloud Application Platform, Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud Programming and Management;
Programming Applications with Threads, Multithreading with Aneka, Programming Applications with Aneka Threads.

UNIT – 4 **9 Hours**

CLOUD PLATFORMS IN INDUSTRY AND APPLICATIONS: Amazon Web Services, Google AppEngine, Microsoft Azure; Scientific Applications – Healthcare, Biology, Geo-Science, Business Applications – CRM and ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming.

UNIT – 5 **9 Hours**

ADVANCED TOPICS IN CLOUD COMPUTING: Energy Efficiency in Clouds, Market Based Management of Clouds, Federated Clouds/Inter-Cloud, Third Party Cloud Services.

Text Book:

Rajkumar Buyya, Christian Vecchiola, and S. Thamarai Selvi, "Mastering Cloud Computing", 1st Edition, Mc Graw Hill Publishing, 2013.

Reference Books:

1. RajKumar Buyya, Broberg J and Goscinski A, "Cloud Computing - Principles and Paradigms", 1st Edition, Wiley, 2011.
2. Rittinghouse J W, and Ransome J F, "Cloud Computing - Implementation, Management, and Security", 1st Edition, CRC Press, 2009.