MCA I Semester 2

Subject Name: Cloud Computing **Subject Code:** MTCA23207

Type of course: Professional Core Course

Prerequisite (if any):

- Basic knowledge of networks, servers, storage, applications, and services, Understanding of process and thread management

List of Courses where this course will be prerequisite:

- Disaster Recovery
- Data Backup
- Big Data Analytics

Rationale: Knowledge of this course will be used in different areas like Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS), Big Data Analytics, Cloud Storage, Disaster Recovery, Data backup

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks		Practical Marks		Total
L	T	P	C	TEE	CAT	TEP	CAP	
2	1	0	3	60	40	0	0	100

CAT: Continuous Assessment Theory comprised of CA1 and CA2 **CA1:** Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CAP:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Content	Teaching Hrs.	Module Weightage
1	**Introduction to Cloud Computing:** Network Centric Computing Distributed Computing Overview, Cloud Computing, Layers and Types of Clouds, Cloud Infrastructure. Cloud computing • About cloud • About computing • Definition of cloud computing • Central Ideas Behind CloudComputing Characteristics of Cloud Computing, Challenges of Cloud Computing, Security risk of Cloud Computing, Advantages and Disadvantages of Cloud Computing	6	20%
2	**Components of Cloud Computing Architecture** • Client Infrastructure • Cloud access device • Application • Services **Runtime Cloud** • Storage • Infrastructure • Security	3	10%
3	**Cloud Services:** **Cloud Service Model** • SaaS: Brief Introduction ,Advantages and Disadvantages • PaaS:Brief Introduction ,Advantages and Disadvantages • IaaS:Brief Introduction, Advantages and Disadvantages Difference between SaaS, PaaS,IaaS **Deployment Models** • Public Cloud • Private Cloud • Hybrid Cloud • Community Cloud	6	20%
4	**Introduction of Virtualization:** Virtualization Technology, Overview of X86 Virtualization. **Working of Virtualization**	6	20%

	Types of Virtualization: • Desktop virtualization, • Network Virtualization, • Storage Virtualization, • Data virtualization • Hardware Virtualization • Software Virtualization **Advantages and Disadvantage of Virtualization** **Characteristic and Applications of Virtualization** **Technologies of virtualization :** • Hypervisors • Type 1 Hypervisor • Type 2 Hypervisor • Choosing the right hypervisor • (Xen, VMM)		
5	**Cloud infrastructure and architecture:** • Cloud Data Center Architecture • Region • Availability zone • Point of presence • Conceptual view of network in cloud computing • Service level agreement **SLA with Cloud Service Providers:** The concept of SLA, SLA Aspects and Requirements, Service Availability, Cloud Outages, Credit calculation for SLA Breaches, Sample SLA for Amazon, Rackspace, Google, HP etc.	5	17%
6	**Cloud Security** • Infrastructure Security • Data Security and Storage • Identity and Access Management (IAM) • Access Control • Authentication in Cloud	4	13%
7	**(For Tutorial/Practical Only)** Introduction to Eucalyptus, Eucalyptus Architecture, Advantages, Disadvantage, Docker Overview, Docker Architecture, Docker Client / Docker CLI, Docker Images, Docker Containers, Docker Registries, Dockerfile, Docker Compose, Containerize an application		

Suggested Specification table with Marks (Theory):

%Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	15	15	15	15

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr. No.	Title of book / Article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1.	Cloud Computing Fundamentals, Industry Approach and Trends:	Rishabh Sharma	Wiley Publication. (ISBN: 978-81-265-5306-8)	2015	2nd Edition
2.	Cloud Computing :Black Book	KailashJayaswal, Jagannath Kallakurchi, Donald J Houde, Dr.Deven Shah	Dreamtech Publications (ISBN 978-93-5119-418-7)	2014	2nd Edition
3.	Cloud Computing: Principles and Paradigms	Rajkumar Buyya, James Broberg, And rzejGoscinski	Wiley Publication. (ISBN-13 978-8126541256)	2013	1st Edition

4.	Cloud Computing: Master the Concepts, Architecture and Applications with Real- world examples and Case studies	Kamal Kant Hiran, RuchiDoshi, TemitayoFagbola, MehulMahrishi, Dr Maria- Alexandra Paun, Deepak Modi	BPB Publications ISBN (978-9388511407)		

Course Outcomes:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % Weightage
CO-1	Understand the basics of Distributed Computing, Cloud Computing	20
CO-2	Analyze Cloud Computing Architectures and Components	10
CO-3	Explore Cloud Service Models and Deployment Models, benefits and challenges associated with these models.	20
CO-4	Understand the concepts of virtualization and the types of Virtualization Techniques	20
CO-5	Understand the Cloud infrastructure and architecture, and to understand how SLAs govern the relationship between service providers and users	17
CO-6	Understand and apply key principles and best practices to secure cloud environments, data, and services	13

Mapping with POs: