# **Distributed Systems and Cloud Computing**

L	Р	U
3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code	
CSE/IT/CST/ITE	7	PCE	PCE-4	CIE-407T	

#### Marking Scheme:

Teachers Continuous Evaluation: 25 marks
Term end Theory Examinations: 75 marks

### Instructions for paper setter:

- 1. There should be 9 questions in the term end examinations question paper.
- 2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
- 3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
- 4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
- 5. The requirement of (scientific) calculators / log-tables / data tables may be specified if required.

## Course Objectives :

1.	This course provides an insight into Distributed systems.				
2.	The course Discusses important paradigms in distributed systems				
3.	The course helps the students to understand process synchronization				
4.	The course tells about basics of cloud computing and cloud migration				
Course Outcomes (CO)					

### Course Outcomes (CO)

CO 1	Select appropriate distributed system and inter process communication method
CO 2	Understand various process synchronization problems in distributed systems
CO 3	Create distributed file systems using Hadoop
CO 4	Choose appropriate cloud migration approach for the organization

Course	Outcomes (CO) to Progra	mme Outcomes (PO) ma	nning (scale 1: low, 2: Mediu	m 3· High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	2	2	3	-	1	-	-		1		-	1
CO 2	3	3	3	3	1	-	-		1	-	-	1
CO 3	2	-	3	2	3	-	-	-	1	-	-	1
CO 4	2	2	-	-	-	2	2	-	-	-	-	2

### UNIT-I

**Introduction to Distributed Systems:** Characteristics of Distributed Systems-Introduction, Examples of Distributed systems (Client server, peer to peer, grid and cloud computing), Advantages of distributed systems, System models -Introduction, Architectural and Fundamental models, Networking and Internetworking, Interposes Communication (message passing and shared memory), Distributed objects and Remote Method Invocation, RPC, Events and notifications, Case study-Java RMI.

# UNIT-II

**Synchronization:** Time and Global States-Introduction, Logical Clocks, Synchronizing physical clocks events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging, Coordination and Agreement: Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

### UNIT-III

**Distributed File Systems:** Introduction – File Models – File accessing, sharing and caching – File Replication – Atomic transactions Case Study HADOOP. : Resource and process management – Task assignment approach – Load balancing approach – Load sharing approach

### UNIT - IV

Cloud Computing, Roots of Cloud Computing, Layers and Types of Clouds, Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service, Hardware as a service, platform as a Service, Software as a service, Challenges and Risks. Migrating into a Cloud:-Introduction, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud

### Textbook(s):

- Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson
- \* R. Buyya, CLOUD COMPUTING Principles and Paradigms, Willey
- Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

### References:

- Distributed Systems Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
- Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani and Mukesh Singhal, Cambridge, rp 2010.
- Gerard Tel, "Introduction to Distributed algorithms", Cambridge University Press, USA, 2000.