



**GUJARAT TECHNOLOGICAL UNIVERSITY**

**Syllabus for Integrated MSc, 7<sup>th</sup> Semester**

**Branch: Computer Science**

**Subject Name: Distributed System**

**Subject Code: 1370301**

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA (M)	PA (I)	ESE (V)	
4	0	2	5	70	30	20	30	150

**Content:**

Sr. No.	Content	Teaching Hours	Module Weightage
1.	<b>Basics of Distributed System:</b> Defining Distributed System, Goals of Distributed System, Types of Distributed System, Centralized, Decentralized and Hybrid Architecture, Significance of Middleware, Self-Management in Distributed System	08	10%
2.	<b>Processes and Communication in Distributed System:</b> Basics of Thread, Role of Virtualization in Distributed System, Architecture of Virtual Machines, Managing Clients and Servers in Distributed System, Understanding Code Migration; Fundamentals of Communication in Distributed System, Remote Procedure Call (RPC), Ways of Communication: Message-oriented, Stream-oriented and Multicasting	08	25%
3.	<b>Naming:</b> Basics of Naming: Name, identifier and addresses, Types of Naming: Flat, Structured and Attribute-based, Approaches for implementation of different naming mechanisms	06	10%
4.	<b>Synchronization:</b> Need of Synchronization in Distributed System, Clock Synchronization and its approaches, Logical Clocks, Mechanisms for implementing Mutual Exclusion, Global positioning of Nodes, Study of Election Algorithms	08	20%
5.	<b>Consistency, Replication and Fault Tolerance:</b> Need of Consistency and Replication in Distributed System, Types of Consistency Models: Data-centric and Client-centric, Fundamentals of Replica Management, Protocols for managing Consistency; Basics of Fault Tolerance mechanism, Process Resilience, Client-Server and Group Communication, Mechanisms for Distributed Commit, Approaches for Recovery	14	25%
6.	<b>Security:</b> Requirement of Security in Distributed System, Secure Channels, Access Control, Security Management in Distributed System	12	10%

**Reference Books:**

1. Andrew S. Tannenbaum and Maarten Van Steen, “Distributed Systems: Principles and Paradigms”, Second Edition, Pearson, 2007.
2. George Coulouris, Jean Dollimore, Tim Kindberg, and Gordon Blair, “Distributed Systems: Concepts and Design”, Fifth Edition, Addison Wesley, 2011.



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**Course Outcome:**

CO-1	Students will gain a thorough understanding of the foundational concepts of distributed systems.
CO-2	Students will develop the ability to manage processes and communication in distributed environments.
CO-3	Students will understand the critical need for synchronization in distributed systems and will be able to implement the same.
CO-4	Recognize security threats and apply cryptography methods for security in Distributed Systems.
CO-5	Students will analyze the approaches used for consistency, replication, and fault tolerance.