FACULTY OF COMPUTER APPLICATIONS
Bachelor Of Science (Information Technology)
B.Sc.IT

Sem. : 5

Subject Code : 05BS0501

Subject : Distributed Computing

Course Objectives :

1. Understand the fundamental concepts and principles of distributed computing, including distributed systems, architectures, and models.
2. Explore the challenges and trade-offs involved in IPC, including performance, synchronization, and data consistency.
3. Develop a comprehensive understanding of the client-server architecture and its role in distributed computing.
4. Understand the concept of group communication and its significance in distributed systems.
5. Learn about different distributed object technologies and Java RMI framework.

Prerequisites : Basics of Networking and Operating System

Unit No	Topics Covered	No of lectures required
1	**Distributed Computing** An Introduction, Definitions, The History of Distributed Computing, Different Forms of Computing, Strengths and Weaknesses of Distributed Computing, Basics of Operating Systems, Network Basics, The Architecture of Distributed Applications **Distributed Computing Paradigms** Paradigms and Abstraction, An Example Application, Paradigms for Distributed Applications	12
2	**Inter-process Communications** An Archetypal IPC Program Interface, Event Synchronization, Timeouts and Threading, Deadlocks	10

	and Timeouts, Data Representation, Data Encoding, Text-Based Protocols, Request Response Protocols, Event Diagram and Sequence Diagram, Connection-Oriented versus Connectionless IPC	
3	**The Client-Server Paradigm** Background, Client-Server Paradigm Issues, Software Engineering for a Network Service, Connection-Oriented and Connectionless Servers, Iterative Server and Concurrent Server, Stateful Servers	**8**
4	**Group Communication** Unicasting versus Multicasting, An Archetypal Multicast API, Connectionless versus Connection Oriented Multicast, Reliable Multicasting versus Unreliable Multicasting, The Java Basic Multicast API, Reliable Multicast API	**10**
5	**Distributed Objects** Message Passing versus Distributed Objects, An Archetypal Distributed Object Architecture, Distributed Object Systems, Remote Procedure Calls, Remote Method Invocation, The Java RMI Architecture, The API for the Java RMI, A Sample RMI Application, Steps for Building an RMI Application, Testing and Debugging, Comparison of RMI And Socket APIs	**10**

Course Outcomes: (Students will be able to)

1. Analyze various distributed computing paradigms.
2. Understand inter process communication interface.
3. Analyze client server paradigm
4. Understand the concepts of group communication
5. Learn distributed objects concept.

Course Outcomes – Program Outcomes Mapping Table :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H			H		M		
CO2	H			M				L
CO3		H		M		M		
CO4	H			M	L			
CO5		H		H		L		

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Text Book :

1) "Distributed Computing Principles and Applications", M. L. Liu, Pearson Education , 1st Edition.

Reference Books :

1) "Distributed Systems: Computing over Networks", Crichlow, PHI , 2nd Edition

2) "Distributed Systems - Principles and Paradigms", Tanenbaum, Sten, PHI , 2nd Edition

3) "Distributed Systems Architecture - A Middleware Approach", Puder, Science & Technology Books

Web References :

1. **https://www.freecodecamp.org/news/a-thorough-introduction-to-distributed-systems-3b91562c9b3c/**
2. **https://towardsdatascience.com/the-beginners-guide-to-distributed-computing-6d6833796318**
3. **https://www.tutorialspoint.com/Distributed-Systems**

App References :

1. **Simplilearn**
2. **GeeksforGeeks**

Syllabus Coverage from text /reference book & web/app reference:

Unit #	Chapter Numbers
1	1,3
2	2
3	5
4	6
5	7