

**IV/IV B. TECH. FIRST SEMESTER
DISTRIBUTED SYSTEMS (Elective-II)****Course Code: CS 7T5C****Credits: 3****Lecture:3 periods/week****Internal assessment: 30 Marks****Tutorial: 1period/week****Semester end examination: 70 Marks****Prerequisites:** Discrete Mathematics, Computer Networks.

Course Objectives:

The main objective of this course is to understand the hardware and software issues in modern distributed systems. Students will also learn distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems. Examples from current popular distributed systems such as peer-to-peer (P2P) systems will be analyzed.

Course Outcomes:

At the end of this course student will:

CO1) Understand the conceptual model of a distributed system and its architectural models

CO2) Exemplify Inter process communication mechanisms

CO3) Suggest appropriate algorithm for a given application in Distributed Systems

CO4) Outline various Consistency Models and replication management techniques with examples

CO5) Understand various mechanisms for software fault tolerance & security in Distributed Systems.

Syllabus:**UNIT 1**

Introduction Of Distributed System: Goals, Types of Distributed systems.

Architectures: Architectural Styles, System architectures, Self management in distributed systems.

UNIT 2

Processes: Threads, Virtualization, Clients, Servers, Code Migration, Software Agents.

Communication: Fundamentals, Remote Procedure Call, Message Oriented Communication,

Stream-Oriented Communication, Multicast Communication.

UNIT 3

Naming: Names, Identifiers and Addresses, Flat Naming, Structured Naming, Attribute-Based Naming

Synchronization: Clock Synchronization, Logical Clocks, Mutual Exclusion, Global Positioning of nodes, Election Algorithms.

UNIT 4

Consistency and Replication: Introduction, Data-Centric Consistency Models, Client Centric Consistency Models, Replica Management, Consistency Protocols, Examples.

UNIT 5

Fault Tolerance: Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, Recovery.

Security: Introduction, Secure channels, Access Control, Security Management

Learning Resource

Text Books

Distributed Systems – Principles and Paradigms, Andrew S. Tanenbaum, Maarten Van Steen, 2/e, PHI.

References

1. Distributed Systems Concepts and Design, George Couloris, Jean Dollimore, Tim Kindberg, Gordon Blair, 4/e, PEARSON.
2. Distributed Operating Systems Concepts and Design, Pradeep K. Sinha, PHI.