PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)

Kanuru, Vijayawada-520007

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (Data Science)

III B. Tech – II Semester CSE (Data Science)

Distributed Systems

Course Code	20DS4601C	Year	III	Semester	II
Course Category	PEC	Branch	CSE (Data Science)	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Operating Systems, Computer Networks
Continuous Internal Evaluation	30	SemesterEnd Examination	70	Total Marks	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Describe the fundamental principles, characteristics, and models of distributed systems	L2
CO2	Apply different approaches and techniques for enabling communication and coordination in distributed systems	L3
CO3	Apply various middleware technologies in designing Distributed systems	L3
CO4	Analyze the sharing of data in a distributed environment using various distributed algorithms	L4

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Contribution of Course Outcomes towards achievement of Program Outcomes& Strength of correlations (3: High,2: Medium, 1: Low)														
CO1	2													
CO2	3													
CO3	3											1		
CO4		3										1		

	Syllabus	
Unit No.	**Contents**	**Mapped CO**
I	**Characterization Of Distributed Systems:** Introduction, Examples of Distributed Systems, Trends in Distributed Systems, Focus on Resource Sharing, Challenges **System Models:** Introduction, Physical models, Architectural models, Fundamental models.	CO1, CO2
II	**Interprocess Communication:** Introduction, The API for the Internet Protocols, External Data Representation and Marshaling, Multicast Communication, Network virtualization: Overlay Networks. **Remote Invocation:** Introduction, Request-Reply Protocols, Remote Procedure Call, Remote Method Invocation. **Indirect Communication:** Introduction, Group Communication, Publish-Subscribe Systems, Message Queues, Shared Memory Approaches.	CO1, CO2
III	**Operating System Support:** Introduction, The Operating System Layer, Protection, Processes and Threads, Communication and Invocation, Operating System Architecture, and Virtualization at the Operating System Level. **Distributed Objects and Components:** Introduction, Distributed Objects, Case study: CORBA, From Objects to Components.	CO1, CO3
IV	**Time And Global States:** Introduction, Clocks, Events, and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging **Coordination And Agreement:** Introduction, Distributed Mutual Exclusion, Elections, Coordination and Agreement in Group Communication, Consensus and related problems	CO1, CO3, CO4
V	**Distributed Transactions:** Introduction, Flat and Nested Distributed transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery **Replication**: Introduction, System Model and the Role of Group Communication, Fault-Tolerant Services.	CO1, CO4

Learning Resources
Text Books
1. Distributed System: Concepts and Design, Coulouris, Dollimore, Kindberg, 2017, Pearson Education.
Reference Books
1. Distributed Operating System, Tanenbaum S, 2005, Pearson Education. 2. Distributed System: Concepts and Design, P K Sinha, 2008, PHI. 3. Advanced Concepts in Operating Systems, Mukesh Singhal & Niranjan G Shivaratri, 2017, Tata McGraw Hill
e- Resources & other digital material
1. www.distributedsystemscourse.com 2. https://ocw.mit.edu/ 3. https://cgi.luddy.indiana.edu/~prateeks/dist-sys-course.html 4. https://archive.nptel.ac.in/courses/106/106/106106168/ 5. https://onlinecourses.nptel.ac.in/noc21_cs87/preview