DISTRIBUTED SYSTEMS

(Professional Elective – I)

Course Code	20IT4501B	Year	III	Semester	I
Course Category	PE -I	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Computer Networks
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level
Upon Successful completion of course, the student will be able to		
CO1	Understand the conceptual model and architectural model of a distributed system	L2
CO2	Apply the principles of remote invocation methods and file service architectures	L3
CO3	Use concurrency control and synchronization mechanisms in real world scenarios.	L3
CO4	Analyze concurrency control and synchronization mechanisms.	L4

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

Syllabus		
Unit No	**Contents**	**Mapped CO**
I	**Introduction**: Examples of Distributed Systems, Trends in Distributed Systems, Focus on resource sharing, Challenges. System Models: Introduction, physical model, Architectural models.	**CO1**
II	**Inter process Communication**: Introduction, The API for internet protocols, External data representation and Multicast communication. Network virtualization: Overlay networks. Remote Invocation: Introduction, Request-reply protocols, Remote procedure call, Remote method invocation. Indirect Communication: Group communication, Publish-subscribe systems, Message queues, Shared memory approaches.	**CO1** **CO2**
III	**Peer to peer services and file system**: Peer-to-peer Systems, Introduction, Napster and its legacy, Peer-to-peer Middleware, Routing overlays. Distributed File Systems: Introduction, File service architecture, Name Services: Introduction, Domain Name System, Directory Services.	**CO1** **CO2**
IV	**Time and Global States**: Introduction, Clocks, events and process state, synchronizing physical clocks, Logical time and logical clocks, Global states 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 distribution transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Replication, fault tolerant services, transactions with replicated data.	**CO1** **CO3** **CO4**

Learning Resources
Text Books
1. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012
References
1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India,2007.   2. Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Pearson Education, 2007.   3. Liu M.L., "Distributed Computing, Principles and Applications", Pearson Education, 2004.   4. Nancy A Lynch, "Distributed Algorithms", Morgan Kaufman Publishers, USA, 2003.
E- Resources and other Digital Material
1. https://nptel.ac.in/courses/106/106/106106168/   2. https://www.ejbtutorial.com/distributed-systems/introduction-to-distributed-systems