ITA5006	**Distributed Operating Systems**	L	T	P	J	C
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Pre-requisite	**Nil**	**Syllabus version**				
		v. 1.0				

Course Objectives:

1. Understanding the foundations of Distributed Systems.
2. Understanding the system level and support required for distributed operating system.
3. Understanding the issues involved in study process and resource management.
4. Understanding and to resolve the issues in fault tolerance and recovering the error using suitable approaches.

Expected Course Outcomes:

1. Demonstrate knowledge of the process synchronization.
2. Analyze the architecture of distributed systems and issues in distributed operating systems.
3. Analyze and identify the limitations of distributed systems.
4. Use and apply deadlock handling strategies in distributed environment.
5. Analyze and test algorithm for distributed shared memory.
6. Analyze the performance of load distribution algorithms and to resolve the issues in load distribution.
7. Design a protocol to ensure failure recovery and fault tolerance in distributed operating system.
8. Design and develop domain specific application for distributed operating system.

Student Learning Outcomes (SLO)	**2, 11, 18**	
Module:1	**Fundamentals of Process Synchronization**	**4 hours**

Overview – Synchronization Mechanisms – The Critical-Section Problem, Peterson's Solution, Semaphores, Classic Problems of Synchronization, Process Scheduling algorithms.

Module:2	**Distributed Operating Systems**	**4 hours**

Architectures of Distributed Systems, issues in distributed operating systems, communication networks, communication primitives.

Module:3	**Theoretical Foundations**	**5 hours**

Inherent limitations of a distributed system, lamp ports logical clocks, vector clocks, causal ordering of messages, global state

Module:4	**Distributed Deadlock Detection**	**5 hours**

Deadlock handling strategies in distributed systems, issues in deadlock detection and resolution, centralized deadlock detection algorithms, path-pushing algorithm, Edge-chasing algorithm.

Module:5	**Distributed Shared Memory**	**4 hours**

Architecture, algorithms for implementing DSM, memory coherence protocols. Case studies: IVY, mirage.

Module:6	Distributed Scheduling	3 hours
Issues in Load distributing, Load distribution algorithms, performance comparison		
Module:7	Failure Recovery & Fault Tolerance	3 hours
Classification of failures, backward and forward error recovery approaches, Fault Tolerance issues, commit protocols		
Module:8	Contemporary issues	2 hours
Expert Talk		
	Total Lecture hours:	30 hours

Text Book(s)

1.	MukeshSinghal&Niranjan G. Shivaratri, Advanced concepts in Operating Systems: Distributed, Database and Multiprocessor operating systems, 2017, 1st Edition, McGraw-HillEducation

Reference Books

1.	Silberschatz, P.B. Galvin & G. Gagne, Operating System Concepts, 2013, 9th Edition, John Wiley.
2.	Pradeep K. Sinha, Distributed Operating Systems: concepts and design, 2009, Prentice Hall India Learning Private Limited.
3.	Andrew S. Tanenbaum, Modern Operating System, 2016, 4th Edition, Pearson Education India.

Recommended by Board of Studies	05-03-2016		
Approved by Academic Council	40th	Date	18-03-2016