

OLMCA504	Operating Systems	L	T	P	C
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Pre-requisite	NIL	Syllabus version			
		1.0			
Course Objectives:					
1. To understand the basic components of a computer operating system, and the interactions among the various components. 2. To understand the different services provided by operating system at different level. 3. To understand the essential properties of different types of operating systems.					
Course Outcomes:					
1. Understand the common features of an operating system and what an operating system does for the user. 2. Analyze concurrently executing processes and examine the issues of multicore systems and parallel programming systems. 3. Develop various applications with deadlock handling capability. 4. Understand the memory management techniques to improve the utilization of the CPU. 5. Develop effective file system management techniques for the modern computer systems. 6. Develop protection and security techniques for the modern computer systems. Understand the principles of distributed systems and develop network based operating systems.					
Module:1	Operating-System Structures				
Computer-System Organization-Computer-System-Architecture-Operating-System Structure -Virtualization -Kernel Data Structures - Computing Environments - Open-Source Operating Systems-Operating-System Services – System Calls-Types of System Calls - System Boot.					
Module:2	Interprocess Communication-Basics				
Process Concept - Process Scheduling -Operations on Processes - Interprocess Communication examples -Multithreading Models- Thread Libraries - CPU Scheduling - Scheduling Algorithms.					
Module:3	Process Synchronization & Deadlocks				
The Critical-Section Problem - Peterson's Solution - Synchronization Hardware - Mutex Locks – Semaphores - Classic Problems of Synchronization- Monitors - Deadlock Characterization -Methods for Handling Deadlocks- Deadlock Prevention - Deadlock Avoidance - Deadlock Detection - Recovery from Deadlock.					
Module:4	Memory Management & Virtual Memory				
Background - Swapping - Contiguous Memory Allocation – Segmentation – Paging - Structure of the Page Table- Virtual Memory basics - Demand Paging - Copy-on-Write - Page Replacement - Allocation of Frames – Thrashing.					
Module:5	Storage Management				
Mass-Storage Structure overview - Disk Structure - Disk Scheduling- Disk Management - File Concept - Access Methods - Directory and Disk Structure- File-System Mounting- File-System Implementation- Directory Implementation- Allocation Methods.					
Module:6	Protection & Security				
Goals of Protection - Principles of Protection - Domain of Protection - Access Matrix - Implementation of the Access Matrix- Access Control - The Security Problem- Program Threats -System and Network Threats- Cryptography as a Security Tool.					
Module:7	Distributed Systems				
Advantages of Distributed Systems-Types of Network based Operating Systems -Network Structure-Communication Structure -Communication Protocols.					
	Total Lecture hours:			120 hours	

Text Book(s)			
1.	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating system concepts, 2013, Ninth Edition, Wiley publications.		
Reference Books			
1.	W. Stallings Operating Systems: Internals and Design Principles, Seventh Edition, 2013, Pearson Education publications.		
2	Andrew S. Tanenbaum, Herbert BOS, Modern Operating Systems, 2015, Fourth Edition, Pearson Education publications.		
Mode of Evaluation: Quiz / Assignment / Mid-Term, FAT			
Recommended by Board of Studies		15.11.2021	
Approved by Academic Council		No. 64	Date 16-12-2021