23CS22T1 - OPERATING SYSTEMS

(Common to CSE and IT)

Course Category:	Professional Core	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	3-0-0
Prerequisite:	• Awareness of hardware components and their functionalities (e.g., CPU, memory, storage devices, I/O devices)	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	30 70 100
Objectives:	**Students undergoing this course are expected:** • Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection. • Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system. • Illustrate different conditions for deadlock and their possible solutions.		

Course Outcomes	**Upon successful completion of the course, the students will be able to:**	
	CO1	Describe the basics of the operating systems. (L1)
	CO2	Understand the mechanisms of OS to handle processes, threads, and their communication. (L2)
	CO3	Make use of process scheduling algorithms and synchronization techniques and deadlock mechanisms to achieve better performance of a computer system. (L3)
	CO4	Analyze the memory management and its allocation policies. (L4)
	CO5	Gain proficiency in file system implementation techniques such as allocation methods, free space management, file system mounting, and file sharing. (L3)
ourse Content	**UNIT-I** **Operating Systems Overview:** Introduction, Operating system functions, Operating systems operations. **System Structures:** Operating System Services, User and Operating-System Interface, system calls, Types of System Calls, system programs, Operating system Design and Implementation, Operating system structure. **UNIT-II** **Processes:** Process Concept, Process scheduling, Operations on processes, Inter-process communication. **Threads and Concurrency:** Multithreading models, Thread libraries, Threading issues. **CPU Scheduling:** Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling.	

	UNIT-III **Synchronization Tools:** The Critical Section Problem, Peterson's Solution, Mutex Locks, Semaphores, Monitors, Classic problems of Synchronization. **Deadlocks:** system Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock. **UNIT-IV** **Memory-Management Strategies:** Introduction, Contiguous memory allocation, Paging, Structure of the Page Table, Swapping. **Virtual Memory Management:** Introduction, Demand paging, Copy-on-write, Page replacement, Allocation of frames, Thrashing. **Storage Management:** Overview of Mass Storage Structure, HDD Scheduling, RAID. **UNIT-V** **File System:** File System Interface: File concept, Access methods, Directory Structure; File system Implementation: File-system structure, File-system Operations, Directory implementation, Allocation method, Free space management; File-System Internals: File System Mounting, Partitions and Mounting, File Sharing. **Protection:** Goals of protection.
Text Books & References Books	**TEXTBOOKS:** 1. Operating System Concepts, Silberschatz A, Galvin P B, Gagne G, 10th Edition, Wiley, 2018. **REFERENCE BOOKS:** 1. Modern Operating Systems, Tanenbaum A S, 4th Edition, Pearson, 2016 2. Operating Systems -Internals and Design Principles, Stallings W, 9th edition, Pearson, 2018 3. Operating Systems: A Concept-Based Approach, D.M Dhamdhere, 3rd Edition, McGraw-Hill, 2013
E-Resources	1. https://nptel.ac.in/courses/106/106/106106144/ 2. http://peterindia.net/OperatingSystems.html