PVP 23

PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)

Kanuru, Vijayawada-520007

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)

III B Tech – I Semester

Operating Systems

Course Code	23AM3503	**Year**	III	**Semester**	I
Course Category	PCC	**Branch**	CSE (AI&ML)	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Data Structures and Computer Organization.
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

	Course Outcomes	
Upon Successful completion of course, the student will be able to		
CO1	Describe the core functionalities of operating systems to ensure efficient management of processes, memory, storage, and file systems.	**L2**
CO2	Apply CPU scheduling, process synchronization, and deadlock handling techniques for efficient process management.	**L3**
CO3	Utilize memory management techniques and file system operations to optimize system performance and ensure efficient storage and retrieval of data.	**L3**
CO4	Analyze the effectiveness of scheduling, synchronization, memory allocation, and file protection mechanisms to evaluate system performance and resource utilization in multiprogramming environments.	**L4**

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations
(3:High, 2: Moderate, 1:Low)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	2												
CO2	3												
CO3	3												
CO4		3									2		

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Syllabus		
Unit No.	**CONTENTS**	**Mapped CO**
I	**Operating Systems Overview:** Introduction, Operating System Functions, Operating Systems Operations, Computing Environments, Free and Open-Source Operating Systems. **System Structures:** Operating System Services, User and Operating-System Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation.	CO1
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.	CO1, CO2, CO4
III	**Synchronization Tools:** The Critical Section Problem, Peterson's Solution, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors. **Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.	CO1, CO2, CO4
IV	**Memory-Management Strategies**: Introduction, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table. **Virtual Memory Management**: Introduction, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing. **Storage Management:** Overview of Mass Storage Structure, HDD Scheduling.	CO1, CO3, CO4
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, Principles of Protection, Protection Rings, Domain of Protection, Access Matrix**.**	CO1, CO3, CO4

Learning Resources

Text Books

1. Operating System Concepts, Silberschatz A., Galvin P. B., Gagne G., 10th Edition, 2018, Wiley.
2. Modern Operating Systems, Tanenbaum A. S., 4th Edition, 2016, Pearson.

Reference Books

1. Operating Systems – Internals and Design Principles, Stallings W., 9th Edition, 2018, Pearson.
2. Operating Systems: A Concept-Based Approach, D. M. Dhamdhere, 3rd Edition, 2013, McGraw-Hill.

E-Resources & other digital material

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1. https://archive.nptel.ac.in/courses/106/105/106105214/
2. http://peterindia.net/OperatingSystems.html
3. https://www.geeksforgeeks.org/operating-systems/operating-systems/
4. https://www.techtarget.com/whatis/definition/operating-system-OS
5. https://onlinecourses.nptel.ac.in/noc25_cs141/preview
6. https://onlinecourses.nptel.ac.in/noc25_cs94/preview