21CS403PC	OPERATING SYSTEMS	L	T	P	C
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PREREQUISITES:

- A course on "Data Structures".
- A course on "Computer Organization and Architecture".

COURSE OBJECTIVES: The Objectives of this course is to provide the student.

- To understand Structures (basic concepts &functions) of Operating Systems and to analyze the different CPU scheduling policies.
- To summarize various approaches to solve the problem of Deadlocks, Process Synchronization and IPC Mechanisms.
- To Impart Various Memory Management and File System Operations

COURSE OUTCOMES: At the end of the course, the student will be able to

CO1: Identify and analyze the different structures and CPU scheduling policies of operating Systems.
CO2: Analyze synchronization problems and Implement Deadlocks, Management policy
CO3: Recognize and resolve user problems with standard operating system environments.
CO4: Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

UNIT - I

Operating System - Introduction, Structures - Simple Batch, Multi-programmed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls

UNIT - II

Process and CPU Scheduling - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Inter-Process Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling, Concurrency Control.
System call interface for process management-fork, exit, wait, waitpid, exec

UNIT - III

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock
Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors
Inter-process Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT - IV

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT - V

File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

TEXT BOOKS:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Operating System Principles, 7th Edition, John Wiley, 2005
2. W.R. Stevens, Advanced programming in the UNIX environment, Pearson education, 2013

REFERENCE BOOKS:

1. Stallings, Operating Systems – Internals and Design Principles Stallings, Pearson Education, Fifth Edition India - 2006
2. Deitel & Deitel, Operating systems, Pearson Education, 3rd edition, 2008
3. Andrew S. Tanenbaum,Modern Operating Systems, Andrew S. Tanenbaum , Prentice Hall of India 2nd edition, 2007
4. Operating Systems – A Concept Based Approach, D. M. Dhamdhere, 2nd Edition, McGraw Hill, 2006
5. UNIX programming environment, Kernighan and Pike, Pearson Education-1984