

Pre-requisites: C programming, Computer Organizational and Architecture

Objectives:

- To understand concepts of OS, process & process scheduling.
- To understand process synchronization and deadlock handling methods.
- To understand various memory management techniques.
- To learn about file system design and implementation and disk Management.

Course Outcomes:

S.NO	Outcomes	Mapping to POs
CO-1	Familiarize with the basic concepts of OS, process, and process scheduling.	PO1, PO2, PO3
CO-2	Learn about process synchronization and deadlock handling methods.	PO2, PO3, PO4
CO-3	Understand the concept of memory management and virtual memory.	PO2, PO3
CO-4	Learn about various file systems and disk management techniques.	PO2, PO3, PO4

Syllabus

UNIT I

Lectures: 5

Introduction: Introduction to OS, Operating system functions, evaluation of OS, OS Services, OS Structures, System Calls, Building and booting OS, Processes, Threads, and Multithreading. Different types of OS: batch, multi-programmed, time-sharing, real-time, distributed, parallel.

UNIT II

Lectures: 7

Processes: Concept of processes, operations on processes, inter-process communication, Communication in Client-Server Systems, Process scheduling criteria, preemptive & non-preemptive scheduling, and various scheduling algorithms.

UNIT III

Lectures: 10

Process Synchronization: background, critical section problem, critical region, synchronization hardware, classical synchronization problems, semaphores, Monitors.

Deadlocks: system model, deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.

UNIT IV

Lectures: 10

Memory Management: background, logical vs. physical address space, swapping, contiguous memory allocation, paging, segmentation.

Virtual Memory: background, demand paging, page replacement, page replacement algorithms, allocation of frames, thrashing.

UNIT V

Lectures: 10

File Systems: File concept, Access Methods, Directory structure, File system mounting, File System structure, File system Implementation, Allocation methods, Free space management

Disk Management: disk structure, disk scheduling (FCFS, SSTF, SCAN, C-SCAN)

OS Security: Domain of Protection, Access matrix, Implementation of Access matrix, System security

Text/Reference Books:

- 1) *Operating System Concepts* by Silberschatz A. and Peterson J. L., Wiley
- 2) *Operating Systems* by Dhamdhere, TMH
- 3) *Operating Systems* by Deitel, Deitel & Choffnes.
- 4) *Operating Systems* by Stalling, Pearson