

**CB/CD/CM/
CO/CS/IT224**

OPERATING SYSTEMS

**L T P C Int Ext
3 - - 3.0 30 70**

Semester IV [Second Year]

COURSE OBJECTIVES:

The objectives of the course are:

1. To introduce the structure and functions of the operating system.
2. To provide the knowledge of how the operating system manages the resources
3. To expose the students to the issues related to executing multiple processes in the system

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Describe the structure, operations and services provided by the Operating System.
2. Comprehend the concepts of process & threads, inter-process communication and multi-threading issues.
3. Analyze the performance of CPU scheduling algorithms.
4. Illustrate the problem of synchronization and deadlocks.
5. Differentiate the effectiveness and the hardware support required for contiguous, non-contiguous, and virtual memory management.
6. Explain the function, implementation of file systems and performance characteristics of mass storage devices

UNIT I

[CO:1,2] (12)

Introduction: What Operating System Do, Operating-System Operations, Resource Management, Security and protection, Virtualization, Types of Operating Systems, Kernel Data Structures.

Operating System Structures: Operating System Services, User and Operating System Interface, System Calls, Operating Systems Structure.

Processes: Process Concept, Process Scheduling, Operations on Processes, Inter process Communication, IPC in shared-memory Systems, and IPC in Message-passing Systems.

UNIT II

[CO:3,4] (13)

Threads and Concurrency: Overview, Multicore Programming, Multithreading Models, Implicit Threading, Threading Issues.

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, ThreadScheduling, Multi-Processor Scheduling, Real-Time CPU Scheduling.

Process Synchronization: Background, The Critical-Section Problem, Peterson solution, Hardware support for Synchronization, Mutex Locks, Semaphores, Classic Problems of Synchronization.

UNIT III

[CO:4,5] (13)

Dead Locks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, DeadlockPrevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Main Memory: Background, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Swapping.

Virtual-Memory: Background, Demand Paging, Page Replacement Algorithms, Thrashing.

UNIT IV

[CO:6] (10)

Mass-Storage Structure: Overview of Mass-Storage Structure, HDD Scheduling.

Files System Interface: File Concept, Access Methods, Directory Structure, Protection.

File-Systems Implementation: File-System Structure, File-System operations, Directory Implementation, Allocation Methods, and Free-Space Management.

LEARNING RESOURCES:

TEXT BOOK:

Operating System Concepts-Abraham Silberchatz, Peter B Galvin, Greg Gange Tenth Edition, WILEY.

REFERENCE BOOK(s):

1. Operating Systems, Internal and Design Principles, Stallings, 8th Edition-2015, Pearson education/PHI.
2. Operating system, A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tenenbaum 4th Edition Pearson/PHI.
4. An Introduction to Operating Systems, Concepts and Practice, 4th Edition, PHI, 2013- Pramod Chandra P. Bhatt.
5. Operating Systems- A concept based approach -DM Dhamdhare -3rd Edition TMH