



**Operating System
Operating System
[CORE COURSE]**

Semester: IV

Credits: 3

Subject Code: BC42103

Lectures: 48

Course Outcomes:

At the end of this course ,the learner will be able to,

- Identify the services provided by Operating System
- Recognize the scheduling concept
- Discuss design issues related to memory management and various related algorithms.
- Discuss design issues related to File management and various related algorithms

Unit 1: Introduction to Operating System and Structure

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- What is operating system
- Computer system architecture
- Services provided by OS
- Types of OS
- Operating System Structure -- Simple structure -Layered approach -Micro kernels -Modules
- Virtual Machines – Introduction, Benefits
- User operating system Interface
- System Calls- -Process or job control -Device Management - File Management
- System Program
 - Operating System Structure

Unit 2: Process Management and CPU Scheduling

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- **Process Management:**
- The process - Process states - Process control block
- Process Scheduling
- Scheduling queues - Schedulers -Context Switch
- Operation on Process –
- Process Creation -Process Termination
- Interprocess Communication –
- Shared memory system - Message passing systems.
- Critical section problem
- Semaphores – - Concept - Implementation –
- Types of Semaphores
- Classical Problems of synchronization --Bounded buffer problem - Readers & writers problem - Dining Philosophers problem
- **CPU Scheduling**

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- Scheduling Concepts -- CPU- I/O Burst Cycle –
- CPU Scheduler -Preemptive and Non-preemptive scheduling - Dispatcher
- Scheduling criteria
- Scheduling Algorithms -- FCFS - SJF (Preemptive& non-preemptive) - Priority Scheduling (Preemptive& Non- preemptive) - Round Robin Scheduling - Multilevel Queues - Multilevel Feedback queues

Unit 3: Deadlock and Memory Management

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- Deadlock Characterization
- Necessary Condition
- Deadlock Handling Technique–
- Deadlock Prevention
- Deadlock Avoidance –
- Safe State - Resource allocation graph algorithm - Bankers algorithm - Deadlock Detection
- Recovery from Deadlock --Process Termination -Resource Preemption
- Introduction to Memory Management
 - Background --Basic hardware - Address binding - Logical versus physical address space - Dynamic loading - Dynamic linking and shared libraries
 - Swapping
 - Contiguous Memory Allocation –
 - Memory mapping and protection
 - Memory allocation
 - Fragmentation
 - Paging
 - Segmentation
 - Virtual Memory Management
 - Demand paging - Performance of demand paging
 - Page replacement -- FIFO - OPT - LRU

Unit 4: File System and I/O system

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- Introduction & File concepts (file attributes, Operations on files)
- Access methods -- Sequential access - Direct access
- File structure -- Allocation methods - Contiguous allocation - Linked Allocation - Indexed Allocation
- Free Space Management -- Bit Vector - Linked List – Grouping
- Introduction
- I/O Hardware
- Application of I/O Interface
- Kernel I/O Subsystem

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- Disk Scheduling -- FCFS - Shortest Seek time first - SCAN - C- SCAN

#12 hours for Library work, assignments practical or field work

Recommended Text Books:

- Milan Milenkovic, *Operating Systems*, Tata McGraw Hill Edition, 2007.

Reference Books:

- Silberchatz, Galvin, Gagne, *Operating System Concepts*, (8th Edition).
- Pabitra Pal Choudhary, *Operating Systems : Principles and Design*, (PHI Learning Private Limited)

Websites:

- <https://www.tutorialspoint.com/>

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Head of the Department	Prof. Smita Borkar		
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Faculty*	Prof. Deepali Gupta		
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