<table>
<tr><td colspan="6">Devi Ahilya Vishwavidhyalaya, Indore, India
Institute of Engineering & Technology</td><td>II Year B.Tech.
(Computer Science & Engineering)</td></tr>
<tr><td>Course Code & Name</td><td colspan="5">Instructions Hours per Semester and Credits</td></tr>
<tr><td rowspan="2">4RCPC4
Operating System</td><td colspan="2">Classroom Instruction (CI)</td><td>Lab Instruction (LI)</td><td>Term Work (TW) and Self Learning (SL)</td><td>Total no. of Hours Per semester</td><td>Total Credits (Total Hours/30)</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>TW+SL</td><td rowspan="2">120</td><td rowspan="2">4</td></tr>
<tr><td>30</td><td>10</td><td>20</td><td>60</td></tr>
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Course Objectives

1. Understand the fundamental role of an operating system in managing hardware and software resources to facilitate efficient computing operations
2. Gain a comprehensive understanding of process management concepts
3. Master the techniques and algorithms for process synchronization and deadlock prevention
4. Acquire proficiency in memory management techniques such as allocation, deallocation, and protection
5. Learn advanced disk management techniques and address other critical issues

COURSE CONTENTS

UNIT- I

Introduction: Role of OS: Types of OS, Batch Systems; Multiprogramming; Time Sharing; Distributed & Real time OS. Computer structure and OS: System Architecture – I/O, Storage, Processors; System components- OS Services, System Calls, System Programs; System Design, Implementation and Generation.

UNIT- II

Process Management: Concepts of process: Process status, Process description, Process model. Process Scheduling: Concepts, Scheduler organization, preemptive and non- preemptive scheduler strategies, scheduling algorithms: FCFS, SJN, Priority Scheduling, Round Robin Scheduling, Multiple Processor scheduling, Thread Concepts and Multiple threaded OS.

UNIT- III

Process Synchronization and Deadlock: Process Co-operation, Concepts of Inter-process communication, Process Synchronization, Synchronization Issues, Critical Section problem, Mutual exclusion Primitives and Algorithms, Process Synchronization with semaphores. Concepts of Deadlock, Conditions for Deadlocks, Resource Concepts & Abstractions, Deadlock Prevention, Avoidance and Recovery, Banker Algorithms for Deadlock Avoidance

UNIT- IV

Memory Management and File system: Paging, Segmentation and Contiguous memory allocation. Virtual Memory: Demand Paging, Page replacement and Frame Allocation policies, Thrashing. File System: Concepts, Access Method, Directory Structure, and File System Management.

UNIT- V

Disk management and other issues: Disk management: Disk Structure and Scheduling. File systems, and operating system support for distributed systems. Protection and Security related issues. Case studies of contemporary operating systems.

Course Outcome:

Students earned credits which will develop ability to fulfil following course objective: -

CO. No.	CO.	PO.
CO1.	Understand the fundamental role of an operating system in managing hardware and software resources to facilitate efficient computing operations.	PO1, PO3, PO4, PO5, PO12
CO2.	Gain a comprehensive understanding of process management concepts, including process creation, scheduling, synchronization, and termination, essential for effective utilization of CPU resources.	PO1, PO3, PO5, PO6, PO12
CO3.	Master the techniques and algorithms for process synchronization and deadlock prevention, ensuring efficient and concurrent execution of multiple processes within an operating system environment.	PO3, PO4, PO5, PO6, PO7, PO9, PO12
CO4	Acquire proficiency in memory management techniques such as allocation, deallocation, and protection, along with file system concepts and operations critical for efficient data storage and retrieval in an operating system.	PO3, PO4, PO5, PO9, PO12
CO5	Learn advanced disk management techniques and address other critical issues such as device management, I/O operations, and performance optimization to enhance the overall efficiency and reliability of an operating system.	PO3, PO6, PO7, PO8, PO12

BOOKS RECOMMENDED:

[1] Silberschatz, Galvin and Gagne, Operating System Principles, 7th Ed. Addison Wesley.
[2] Gary Nutt, Operating Systems, 3rd Ed. Pearson Education, India
[3] Tanenbaum, Modern Operating Systems, PHI.
[4] W. Stalling, Operating Systems, Macmillan.
[5] H. M. Dietel, Operating Systems, Addison Wesley Longman.
[6] Maurice J. Bach, The design of Unix Operating system, Pearson Education, India.
[7] Sumitabha Das, Unix Concepts & Applications: includes SCO Unix & Linux, Tata McGraw Hill.

CO-PO Relationship

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	3	3	-	-	-	-	-	3	2	3	2
CO2	2	3	3	-	3	3	-	-	-	-	3	1	3	2
CO3	-	-	3	2	3	3	2		3	-	3	-	3	2
CO4	-	-	3	3	3	-	-	-	3	-	3	2	3	2
CO5	-	-	3	-	-	2	2	3	-	-	3	1	3	2

1. * CO (rows) mention nil/very small/insignificant contribution to the PO (column)