Program	Bachelor of Technology (B.Tech.)	Semester - 4
Type of Course	Core Courses	
Prerequisite	03080101-T - PROGRAMMING IN C	
Rationale	The goal of this course is to provide students with an understanding of basic concepts in the theory of computation. At the end of this course students will: understand key mechanisms in design of operating systems modules understand process management, concurrent processes and threads, memory management, virtual memory concepts, deadlocks compare performance of processor scheduling algorithms produce algorithmic solutions to process synchronization problems use modern operating system calls such as Linux process and synchronization libraries practice with operating system concepts such as process management, synchronization, networked processes and file systems	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
Lecture	Tutorial	Lab	Credit	T	T	P	P	
3	0	2	4	70	30	50	-	150

SEE - Semester End Examination, T - Internal Theory, P - Internal Practical

Course Content			T - Teaching Hours	W - Weightage

Sr.	Topics	T	W
1	**Introduction** What is an O.S, Evolution of OS, OS Services, Types Of OS: Batch Processing, Time Sharing, and Real-time Operating Systems, Concepts of OS, Different Views of OS, Processes and Communication, Manage Memory, brief introduction about the Linux and Unix Operating System, Input Output Management	12	20
2	**Process Management & Communication** Process, Process Control Block, Process States, Threads, Types of Threads, Multithreading, Classical IPC Problems, Reader's and writer Problem, Dinning Philosopher Problem, etc., Scheduling, Scheduling Algorithms, Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer-Consumer Problem, Semaphores, Event Counters, Monitor, Message Passing	18	25
3	**Deadlock** Deadlock Problem, Deadlock Characterization-Detection, recovery, avoidance, ignorance., Banker's algorithm for single & multiple resources, Deadlock Prevention	12	20
4	**Memory Management** Paging: Principle Of Operation, Page Allocation, H/W Support For Paging, Multiprogramming With Fixed partitions, Segmentation, Swapping, Virtual Memory: Concept, Performance Of Demand Paging, Page Replacement Algorithms, Thrashing, Locality	10	20
5	**Unix/Linux Operating System & File System**	8	15

Course Content

		T - Teaching Hours | W - Weightage		

Sr.	Topics	T	W
	Introduction to Unix and its file system, Introduction to Linux and its file structure, Some commands, Features and disadvantages		
	Total	**60**	**100**

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate
Weightage	20	30	15	15	20

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:

CO1	Understand critical mechanisms in the design of operating systems modules.
CO2	Understand process management, concurrent processes, and threads, memory management, virtual memory concepts, deadlocks
CO3	Compare the performance of processor scheduling algorithms
CO4	Analyze different IPC problems and their solutions.
CO5	Explain the difference between Linux and Windows Operating Systems.

Reference Books

1.	**Operating System by Tanenbaum (TextBook)** By Tanenbaum | Pearson publication

List of Practical

1.	Write a C program to implement the FCFS Scheduling Algorithm.
2.	Write a C program to implement the SJF Scheduling Algorithm.
3.	Write a C program to implement Priority Scheduling Algorithm.
4.	Write a C program to implement Round robin Scheduling Algorithm.
5.	Write a C program to implement First Fit Allocation Algorithm
6.	Write a C program to implement Best Fit Allocation Algorithm.
7.	Write a C program to implement Next Fit Allocation Algorithm.
8.	Write a C program to implement Worst Fit Allocation Algorithm.
9.	Perform any 10 basic Linux commands