

Semester: 4				
Programme : B.Sc. Computer Science (Hons)				
Course : Minor				
Paper code: B2CS230412T / B2CS230412P			Credits: 4	
Hours/week : 5				
Category: Core/MDC/SEC/VAC : MDC				
Theory / Practical / Composite : Composite				
No of Modules : 1				
<p>Course Overview: This course introduces the fundamental concepts of Operating Systems (OS) and their role in managing computer hardware and software resources. It covers the basic functions and types of operating systems, including concepts such as multiprogramming, multitasking, batch processing, and time sharing. The course also explains the organization of operating systems, including kernels, processor modes, and system calls. Students will learn about process management, threads, and scheduling algorithms, as well as memory management techniques such as physical and virtual address spaces. The course concludes with an introduction to concurrent processes and deadlocks, providing a foundation for understanding how modern operating systems ensure efficient and reliable system performance.</p>				
Course Outcome:				
1. Explain the basic concepts, functions, and different types of operating systems.				
2. Describe the organization and structure of an operating system, including kernels, processor modes, and system calls.				
3. Analyse the concepts of process management, including process states, threads, and system resources.				
4. Evaluate different process scheduling algorithms used for efficient CPU utilization.				
5. Explain memory management concepts such as physical and virtual address spaces and basic memory allocation strategies.				
6. Identify issues related to concurrent processes and deadlocks and understand their impact on system performance.				
<p>Prerequisites: Students should have a basic understanding of computer fundamentals, including basic knowledge of computer hardware, programming concepts, and data structures. Familiarity with how computers execute programs and basic problem-solving skills will help in understanding operating system concepts.</p>				
SYLLABUS				
UNIT/Module	CONTENT	HOURS or NUMBER OF CLASSES	CO Mapping	COGNITIVE LEVEL
I.	Introduction to operating systems: OS functions, types of operating systems, concurrent processing, multiprogramming, multitasking, batch	4	CO1	K1–K2 (Remember/Understand)

	processing, time sharing.			
II.	Introduction to Organization of OS - Processor and user modes, kernels, system calls and introduction to system programs	4	CO2	K1–K2 (Remember/Understand)
III.	Process Management – State of the process, types of resources, process state, threads, Process Scheduling algorithms.	10	CO3,CO4	K2,K3,K4 (Understand/Apply/Analyse)
IV.	Memory Management - Physical and virtual address space, Introduction to memory allocation strategies.	8	CO5	K2–K3 (Understand/Apply)
V.	Introduction to Concurrent Processes and deadlock.	4	CO6	K3,K4,K5,K6 (Apply/Analyse/Evaluate/Create)
Text Books				
1. Operating System Concepts – Abraham Silberschatz, Peter B. Galvin, Greg Gagne , Wiley.				
2. Modern Operating Systems – Andrew S. Tanenbaum and Herbert Bos , Pearson.				
3. Operating Systems: Internals and Design Principles – William Stallings , Pearson.				
Suggested readings				
1. Operating Systems – Harvey M. Deitel and Paul J. Deitel, Pearson.				
2. Schaum's Outline of Operating Systems – J. Archer Harris , McGraw-Hill.				
Web Resources				
1. NPTTEL – Introduction to Operating Systems (IIT Madras) https://onlinecourses.nptel.ac.in/noc24_cs80/preview Provides structured lectures, assignments, and course materials on OS concepts such as processes, scheduling, memory management, and deadlocks				
2. MIT OpenCourseWare – Operating System Engineering https://ocw.mit.edu/courses/6-828-operating-system-engineering/				
Evaluation :	Theory CIA: 12 Attendance: 3 Semester Exam: 45	Practical CA: 38 Attendance: 2		
Paper Structure for Theory Semester Exam Module : Answer 3 out of 5 of 15 marks each				

Course outcomes (COs) and Cognitive Level Mapping

COs	CO Description	Cognitive levels
CO1	Explain the basic concepts, functions, and types of operating systems.	K1–K2 (Remember/Understand)
CO2	Describe the organization of operating systems including processor modes, kernels, system calls, and system programs.	K1–K2 (Remember/Understand)
CO3	Analyze the concepts of process management including process states, resources, and threads	K2,K3,K4 (Understand/Apply/Analyse)
CO4	Evaluate different process scheduling algorithms for effective CPU utilization.	K3,K4,K5 (Apply/Analyse/Evaluate)
CO5	Explain memory management concepts such as physical and virtual address spaces and memory allocation strategies.	K2–K3 (Understand/Apply)
CO6	Analyze and evaluate issues related to concurrent processes and deadlocks in operating systems.	K3,K4,K5 (Apply/Analyse/Evaluate)