

FOURTH SEMESTER

Details of Course:

Course Title	Course Structure			Pre-Requisite
MC 202 : Operating System	L 3	T 0	P 2	Nil

Course Objective: To familiarize with the fundamental principles of the operating system, its services and functionalities, the concepts of processes, synchronization and scheduling, memory management and need for protection in computer systems.

Course Outcome (CO):

CO1	Describe the design principles and basic elements like processes, threads, memory, files, I/O devices etc. of the operating system.
CO2	Compare the performance and design trade-offs of design options and issues involved in process scheduling and synchronization and deadlock management.
CO3	Explain the concepts of memory management techniques and compare the design trade-offs of methods for allocating space to files and processes for main memory, virtual memory, and hard disk management.
CO4	Implementing operating system concepts and system calls.
CO5	Contrast the various types of operating systems and their functionalities.

S. No.	Contents	Contact hours
1.	Operating System – Introduction and Evolution of Operating System (OS) - Batch, Interactive, Time-Sharing, Real-Time System, System protection. Computer-System Organization and Architecture, OS Structure - System Components, System structure, OS Services, User - OS Interface, System Calls.	8
2.	Process Management I - Process concept, Inter Process Communication, Process operations. Process Threads - Introduction and Multithreading Models. CPU Scheduling - Scheduling Concept, Performance Criteria, Scheduling Algorithms, Multiple-Processor Scheduling.	8
3.	Process Management II - Process Concurrency - Producer Consumer Problem, Critical Section problem and Solution, Mutex Locks, Semaphores, Classical problems in Concurrency. Deadlock Management - System Model, Deadlock Characterization, Prevention, Avoidance, Banker's Algorithm, Deadlock Detection, Recovery from deadlock.	9

4.	Memory Management - Basics, Memory protection, Multiprogramming with fixed partition and variable partition, Multiple base register, Paging, Segmentation, Page Table Structure. Virtual Memory - Basic concepts, Demand paging, Copy-on-write, Performance, Page replacement algorithms, Thrashing.	9
5.	Disk Management - Disk Structure and its attachments, Disk Scheduling Algorithms. File Management - File Concept and Access Methods, File System structure and its Implementation, Directory Structure and its implementation. I/O Management - I/O devices and organization, I/O functions, I/O Buffering. Case studies – Windows Linux and Unix	8
	Total	42

Suggested Books:

S. No.	Name of Books/Authors/Publishers	Year of Publication
1.	Abraham Silberschatz, Peter B. Galvin, "Operating System Concepts"	9th Edition/ 2013
2.	Andrew Tanenbaum, Albert Woodhull, "Operating Systems Design and Implementation"	3rd Edition / 2015
3.	William Stallings, "Operating Systems: Internals and Design Principles"	9th Edition / 2018