

UNIVERSITY OF MADRAS

B.Sc. DEGREE PROGRAMME IN COMPUTER SCIENCE

SYLLABUS WITH EFFECT FROM 2023-2024

Year: III

Semester: V

OPERATING SYSTEM Common for B.C.A. , B.Sc.-CSc		325C5A
Credits: 3	Lecture Hours:5 per week	
Learning Objectives: (for teachers: what they have to do in the class/lab/field) • To understand the fundamental concepts and role of Operating System. • To learn the Process Management and Scheduling Algorithms • To understand the Memory Management policies • To gain insight on I/O and File management techniques		
Course Outcomes: (for students: To know what they are going to learn) 1. Understand the structure and functions of Operating System 2. Compare the performance of Scheduling Algorithms 3. Analyse resource management techniques		

Units	Contents
I	Introduction: Views - Types of System - OS Structure – Operations - Services – Interface- System Calls - System Structure - System Design and Implementation. Process Management: Process – ProcessScheduling - Inter-process Communication. CPU Scheduling: CPU Schedulers - Scheduling Criteria -Scheduling Algorithms.
II	Process Synchronization: Critical- Section Problem - Synchronization Hardware Semaphores – ClassicalProblems of Synchronization - Monitors. Deadlocks: Characterization - Methods for Handling Deadlocks- Deadlock Prevention - Avoidance - Detection - Recovery.
III	Memory Management: Hardware - Address Binding – Address Space - Dynamic Loading and Linking - Swapping – Contiguous Allocation - Segmentation - Paging – Structure of the Page Table.
IV	Virtual Memory Management: Demand Paging - Page Replacement Algorithms - Thrashing. File System:File Concept -. Access Methods - Directory and Disk Structure - Protection - File System Structures -Allocation Methods - Free Space Management.
V	I/O Systems: Overview - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Transforming 1/0 Requests to Hardware Operations - Performance. System Protection: Goals - Domain - Access matrix. System Security: The Security Problem - Threats – Encryption- User Authentication.

TEXT BOOK:

- Abraham Silberschatz, Peter B Galvin, Greg Gagne, “Operating System Concepts”, Wiley India Pvt. Ltd 2018, 9th Edition,.

REFERENCES:

- William Stallings, “Operating Systems Internals and Design Principles”, Pearson, 2018, 9th Edition.
- Andrew S. Tanenbaum, Herbert Bos, “Modern Operating Systems”, Pearson 2014, 4th Edition.

WEB REFERENCES:

NPTEL & MOOC courses titled Operating Systems – <https://nptel.ac.in/courses/106106144/>