UNIVERSITY OF MADRAS
B.Sc. DEGREE PROGRAMME IN COMPUTER SCIENCE
SYLLABUS WITH EFFECT FROM 2023-2024

Year: III
Semester: V

OPERATING SYSTEM (325C5A)
Common for B.C.A., B.Sc.-CSc

Credits: 3
Lecture Hours: 5 per week

LEARNING OBJECTIVES:
• Understand fundamental concepts and role of Operating System
• Learn Process Management and Scheduling Algorithms
• Understand Memory Management policies
• Gain insight on I/O and File management techniques

COURSE OUTCOMES:
1. Understand structure and functions of Operating System
2. Compare performance of Scheduling Algorithms
3. Analyse resource management techniques

UNIT (1)I
• Introduction: Views, Types of System, OS Structure, Operations, Services,
Interface, System Calls, System Structure, System Design and Implementation
• Process Management: Process, Process Scheduling, Inter-process Communication
• CPU Scheduling: CPU Schedulers, Scheduling Criteria, Scheduling Algorithms

UNIT (2)II
• Process Synchronization: Critical-Section Problem, Synchronization Hardware
Semaphores, Classical Problems of Synchronization, Monitors
• Deadlocks: Characterization, Methods for Handling Deadlocks, Deadlock Prevention,
Avoidance, Detection, Recovery

UNIT (3)III
• Memory Management: Hardware, Address Binding, Address Space, Dynamic Loading and
Linking, Swapping, Contiguous Allocation, Segmentation, Paging, Structure of the
Page Table

UNIT (4)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

UNIT (5)V
• I/O Systems: Overview, I/O Hardware, Application I/O Interface, Kernel I/O
Subsystem, Transforming I/O Requests to Hardware Operations, Performance
• System Protection: Goals, Domain, Access matrix

- System Security: The Security Problem, Threats, Encryption, User Authentication

TEXTBOOK:
Operating System Concepts by Abraham Silberschatz, Peter B Galvin, Greg Gagne
(Wiley India, 2018, 9th Edition)

REFERENCES:
1. Operating Systems Internals and Design Principles by William Stallings (Pearson, 2018, 9th Edition)
2. Modern Operating Systems by Andrew S. Tanenbaum, Herbert Bos (Pearson, 2014, 4th Edition)

WEB RESOURCES:
NPTEL & MOOC courses: https://nptel.ac.in/courses/106106144/