

CS8493 OPERATING SYSTEMS

DETAILED SYLLABUS

OBJECTIVES:

- To understand the basic concepts and functions of operating systems.
- To understand Processes and Threads
- To analyze Scheduling algorithms.
- To understand the concept of Deadlocks.
- To analyze various memory management schemes.
- To understand I/O management and File systems.
- To be familiar with the basics of Linux system and Mobile OS like iOS and Android.

UNIT I OPERATING SYSTEM OVERVIEW

Computer System Overview-Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System- Computer System Organization Operating System Structure and Operations- System Calls, System Programs, OS Generation and System Boot.

UNIT II PROCESS MANAGEMENT

Processes - Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication; CPU Scheduling - Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real time scheduling; Threads- Overview, Multithreading models, Threading issues; Process Synchronization - The critical-section problem, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Critical regions, Monitors; Deadlock – System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT III STORAGE MANAGEMENT

Main Memory – Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, 32- and 64-bit architecture Examples; Virtual Memory – Background, Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

UNIT IV FILE SYSTEMS AND I/O SYSTEMS

Mass Storage system – Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management, swap space management; File-System Interface - File concept, Access methods, Directory Structure, Directory organization, File system mounting, File Sharing and Protection; File System Implementation- File System Structure, Directory implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance.

UNIT V CASE STUDY

Linux System - Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, Input-Output Management, File System, Interprocess Communication; Mobile OS - iOS and Android - Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, File System.

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, —Operating System ConceptsII, 9th Edition, John Wiley and Sons Inc., 2012.

REFERENCES:

1. Ramaz Elmasri, A. Gil Carrick, David Levine, —Operating Systems – A Spiral ApproachII, Tata McGraw Hill Edition, 2010.
2. Achyut S. Godbole, Atul Kahate, — Operating SystemsII, McGraw Hill Education, 2016.
3. Andrew S. Tanenbaum, —Modern Operating SystemsII, Second Edition, Pearson Education, 2004.
4. Gary Nutt, —Operating SystemsII, Third Edition, Pearson Education, 2004.
5. Harvey M. Deital, —Operating SystemsII, Third Edition, Pearson Education, 2004.
6. Daniel P Bovet and Marco Cesati, —Understanding the Linux kernelIII, 3rd edition, O'Reilly, 2005.
7. Neil Smyth, —iPhone iOS 4 Development Essentials – Xcodell, Fourth Edition, Payload media, 2011.