

**CS22401**

## **OPERATING SYSTEMS**

(Common to CS and AD)

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### **OBJECTIVES**

- To understand the basics and functions of operating systems.
- To analyze scheduling algorithms and process synchronization
- To understand the concept of deadlocks and analyze various memory management schemes
- To be familiar with I/O management and file systems.
- To be familiar with the Influential Operating Systems

### **UNIT I INTRODUCTION**

**9**

Computer System - Organization and Architecture- Operating System Overview - Evolution of Operating System- Operating System Structures – Operating System Services - User and Operating System Interface - System Calls – System Programs - Design and Implementation - Operating System Generation and System Boot.

### **UNIT II PROCESS MANAGEMENT AND PROCESS SYNCHRONIZATION**

**9**

Processes - Process Concept - Process Scheduling - Operations on Processes - Inter-process Communication- CPU Scheduling - Scheduling criteria - Scheduling algorithms. Threads - Multithread Models – Threading issues. Process Synchronization - The Critical-Section problem - Synchronization hardware – Semaphores – Mutex - Classical problems of synchronization – Monitors.

### **UNIT III DEADLOCK AND MEMORY MANAGEMENT**

**9**

Deadlock - Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock. Memory- Memory Partitioning - Memory Allocation Algorithms – Segmentation – Paging. Virtual Memory - Demand Paging – Copy on Write - Page Replacement Algorithms - Allocation of Frames – Thrashing.

### **UNIT IV STORAGE MANAGEMENT**

**9**

Mass Storage system – Disk Structure - Disk Scheduling and 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; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem.

### **UNIT V INFLUENTIAL OPERATING SYSTEMS**

**9**

Feature Migration-Early Systems- Atlas- XDS-940- THE- RC 4000- CTSS- MULTICS- IBM OS/360- TOPS-20- MS/DOS- Macintosh Operating System- Mach-Case Study-The Linux System

**TOTAL (L:45): 45 PERIODS**

**OUTCOMES:**

<b>CO</b>	<b>CO statements</b> <b>Upon successful completion of the course, the students should be able to</b>	<b>RBT level</b>
<b>CO1</b>	Infer the OS features and operations while working in operating system	<b>2</b>
<b>CO2</b>	Analyze various scheduling algorithms and process synchronization	<b>4</b>
<b>CO3</b>	Evaluate the performance of various memory management techniques	<b>5</b>
<b>CO4</b>	Design a simple file system and analyze the performance	<b>4</b>
<b>CO5</b>	Work with some popular operating systems like Linux, Windows	<b>5</b>

1- Remember, 2- Understand, 3- Apply, 4- Analyse, 5- Evaluate, 6- Create

**TEXT BOOKS**

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 10th Edition, John Wiley and Sons Inc., 2018.
2. Andrew S Tanenbaum, "Modern Operating Systems", Pearson, 5th Edition, 2022 New Delhi.

**REFERNCES**

1. Ramaz Elmasri, A. Gil Carrick, David Levine, “ Operating Systems – A Spiral Approach”, Tata McGraw Hill Edition, 2010.
2. William Stallings, "Operating Systems: Internals and Design Principles", 7 th Edition, Prentice Hall, 2018
3. Achyut S.Godbole, Atul Kahate, “Operating Systems”, McGraw Hill Education, 2016
4. Neil Smyth, —iPhone iOS 4 Development Essentials – Xcode, Fourth Edition, Payload media, 2011.