

# CE 2203 OPERATING SYSTEMS

## Teaching Scheme

Lectures : 3 Hrs/week

## Examination Scheme

In Semester : 50 Marks

End Semester : 50 Marks

Credits : 3

## Prerequisites:

1. Fundamentals of Programming Languages – II (ES 1202)
2. Digital Systems and Computer Organization (CE 2104)

## Course Objectives:

To facilitate the learner -

1. To understand basic concepts of Operating Systems.
2. To understand process life-cycle and scheduling algorithms.
3. To analyze memory management strategies.
4. To understand File System concepts.
5. To learn operating system for managing resources such as I/O, CPU, memory etc.
6. To understand Inter-process Communication and deadlock concepts.

## Course Outcomes:

By taking this course, the learner will be able -

1. To Build the basic knowledge of operating system.
2. To Apply the process concepts and compare the CPU scheduling algorithms.
3. To Analyze memory management strategies.
4. To Apply the file attributes and different access modes on various types of file.
5. To Make use of the knowledge of storage devices for disk management.
6. To Examine the concepts of Inter-process Communication.

## Unit 1: Introduction to Operating Systems

(06)

Introduction to Operating System (OS), Evolution of OS, Functions of OS, Types of OS, OS Concepts, Process, Files, Shell and its types, System Calls, Virtual Machine, Case Study of UNIX Operating System.

## Unit 2: Process and CPU Scheduling

(08)

Process Concept, Operations On Processes, Creation, Termination, States, Transition and Context Switching, Scheduling Criteria, Scheduling Algorithm, First-Come First-Serve (FCFS), Shortest Job First (SJF), Round-Robin (RR), Introduction to Threads and Benefits, Case Study of Unix Process Management.

## Unit 3: Memory Management

(08)

Contiguous and Non-Contiguous Memory, Swapping, Paging, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms- First-In First-Out (FIFO), Least Recently Used (LRU), Optimal, Allocation of Frames and Trashing.

**Unit 4: Introduction to the File System****(06)**

File Concepts, File Attributes, File Operations, File Types, File Sharing, File Structure, Mounting and Un-Mounting, Directory Overview, Types of Directories, Types of Users, Access Modes, Free space management, Case Study of UNIX File Structure.

**Unit 5: I/O Management and Disk Scheduling****(06)**

I/O Devices, Organization of I/O Functions, Operating System Design Issues Related to I/O, I/O Buffering, Disk Scheduling - First Come-First Serve (FCFS), SCAN, Circular SCAN (C-SCAN), Shortest Seek Time First (SSTF).

**Unit 6: Inter-Process Communication (IPC)****(08)**

Critical Section Problem, Hardware Support for Mutual Exclusion, Semaphores, Classical Problems of Synchronization, Monitors, Deadlocks, Methods of Handling Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

**Text Books:**

1. William Stallings, "Operating System-Internals and Design Principles ", Prentice Hall India,(5/e) ISBN: 81-297-0 1 094-3.
2. Silberschatz, Galvin, Gagnes, "Operating System Concepts", John Wiley & Sons, (6/e), ISBN: 9971-51-388-9.
3. Maurice J. Bach, "The Design of the Unix Operating System", Pearson Education, ISBN: 81-7758-770-6.

**References:**

1. Evi Nemeth, Garth Snyder, Tren Hein, Ben Whaley, "Unix and Linux System Administration Handbook", (4/e), ISBN: 978-81-317-6177-9. (2011).
2. Milan Milenkovic, "Operating Systems", TMH,(2/e), ISBN: 0-07-044700-4.
3. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall India, (2/e), ISBN: 81-203-2063-8.