OPERATING SYSTEMS

Subject Code: UGCS5T0418   L   T   P   C
III Year / I Semester   3   0   0   3

Prerequisites:
Knowledge is also assumed of basic concepts in data structures, programming languages, and computer architecture.

Course Objectives:
The students will learn the following:
1. Study the basic principles and functionality of operating systems
2. Understand the concepts of CPU scheduling, concurrent processes, deadlock
3. Identify the significance of file systems, virtual memory
4. Understand disk scheduling, memory management, and device management

SYLLABUS:

UNIT I: **8 hrs.**
Introduction: Concept of Operating Systems, Operating Systems Objectives and Functions, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Protection and Security, Case study on UNIX and WINDOWS Operating System.

UNIT II: **8 hrs.**
Process Management – Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms (FCFS, SJF, Priority, RR, Multilevel queue Scheduling), and their evaluation.

UNIT III: **8 hrs.**
Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Producer Consumer problem, Readers & Writers Problem, Dining Philosopher Problem

UNIT IV: **8 hrs.**
Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

UNIT V: **7 hrs.**
Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, Virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing

UNIT VI: **9 hrs.**

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks

Course Outcomes:

Upon the completion of the course, the students will be able to:

CO 1   Understand the fundamental concepts of operating systems and its services.

CO 2   Demonstration the principles of process management and analyze performance of process scheduling algorithms.

CO 3   Illustrate the importance of process coordination and solve process synchronization problems to avoid deadlocks.

CO 4   Analyze various memory allocation and access time by making use of various memory management techniques.

Mapping of COs to POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	3	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	3	-	-

TEXT BOOKS:
1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 9th Edition, John Wiley publishers, 2012.
2. Operating Systems' – Internal and Design Principles, Stallings, Sixth Edition, Pearson education, 2005.

REFERENCES:
1. http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc-BANG/Operating%20Systems/New_index1.html
2. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, Tata Mcgraw Hill, 2012.
3. Operating System, A Design Approach-Crowley, 3rd Edition, Tata Mcgraw Hill, 2009.
4. Modern Operating Systems, Andrew S Tanenbaum 3rd edition Prentice-Hall, Inc, 2008
5. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley, 2002