ADVANCED OPERATING SYSTEMS

Course Code: 13CS2105 **L P C**
4 0 3

Prerequisites: Operating Systems.

Course Outcomes:

At the end of the course, a student will be able to:

CO1: Infer operating system operations, services, and structure and system calls.

CO2: Analyze various process management concepts including scheduling, synchronization, and deadlocks

CO3: Distinguish between main memory and virtual memory management concept

CO4: Discuss issues related to file system interface and implementation.

CO5: Summarize the goals and design issues of Distributed Operating Systems and discuss synchronization and deadlocks in the distributed systems.

UNIT-I

INTRODUCTION & SYSTEM STRUCTURES: Overview of computer operating systems, computer system organization, computer system architecture, operating systems operations, protection and security, distributed systems, special purpose systems, operating systems services, systems calls and its types, operating systems structure, operating systems generation.

UNIT-II

PROCESS CONCEPT – Process, Process Control Blocks, Operations on Processes, Interprocess Communication, Scheduling Criteria, Scheduling algorithms and their evaluation, Multiprocessor scheduling, Thread scheduling.

SYNCHRONIZATION: The Critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions.

DEADLOCKS: System model, deadlock characterization, Methods for Handling Deadlock, deadlock prevention, detection and Avoidance, recovery from deadlock.

UNIT-III

MEMORY MANAGEMENT STRATEGIES: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation.

VIRTUAL-MEMORY MANAGEMENT: virtual memory, demand paging, Copy on write, page-Replacement algorithms, Allocation of Frames, Thrashing.

UNIT-IV

FILE SYSTEMS: File Concept, Access Methods, Directory Structure, File System Mounting.

IMPLEMENTING FILE SYSTEMS: File system structure, File System Implementation, Directory Implementation, Allocation Methods, Free-space Management, Efficiency and performance, Log-Structured File Systems, Network File Systems.

UNIT-V

INTRODUCTION TO DISTRIBUTED SYSTEMS: Goals of distributed system, hardware and software concepts, design issues.

SYNCHRONIZATION IN DISTRIBUTED SYSTEMS: Clock synchronization, Mutual exclusion, Election algorithms, the Bully algorithm, a ring algorithm, atomic transactions, Deadlocks: deadlock in distributed systems, Distributed deadlock prevention, and distributed dead lock detection.

Text Books:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne" Operating System Principles", 8th Edition, John Wiley & Sons, 2010.
2. Andrew S.Tanenbaum, "Distributing Operating system", PHI Publications.

References:

1. Stallings , "Operating Systems – Internals and Design Principles", 6th Edition, Pearson Education/PHI, 2009.
2. Charles Crowley , "Operating System - A Design Oriented Approach", 1st Edition, TMH, 1998.
3. Andrew S Tanenbaum , "Modern Operating Systems", 3rd Edition, Pearson/PHI,2008.
4. Dhamdhere , "Operating Systems – A concept based approach", 2nd Edition, TMH, 2006.
5. Daniel P Bovet and Marco Cesati,"Understanding the Linux Kernel ", 3rd Edition, O'Reilly, 2005.
6. Pradeep K. Sinha , "Distributed Operating Systems – Concepts and Design",2nd Edition, IEEE 1997.