ADVANCED OPERATING SYSTEMS

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

Prerequisites: Operating Systems.

Course Educational Objectives:

Gives the idea about the CPU scheduling and memory scheduling and now they implemented using respective algorithms.

Course Outcomes:

- Student may have the idea about resource sharing, multitasking, multiprocessing etc.
- Student will gain the knowledge on various Operating systems like windows and unix.
- Student will gain knowledge on various internals of operating system.
- Describe, contrast and compare differing structures for operating systems
- Understand and analyze theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files.

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.