CSH104: ADVANCED OPERATING SYSTEMS

Hours/Week: 4 I.A. Marks: 30

Credits: 4 Exam. Marks: 70

Course Learning Objectives: Students will try to learn,

1. Explore the structure of OS and basic architectural components involved in OS design.
2. Analyze and design the applications to run in parallel either using process or thread models of different OS.
3. Study the various device and resource management techniques for timesharing and distributed systems.
4. Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system. Interpret the mechanisms adopted for file sharing in distributed Applications.

Course Outcomes: After completing the course, the students will be able to,

CO1: Understand the structure of OS and basic architectural components involved in OS design.
CO2:Analyze and design the applications to run in parallel either using process or thread models of differentOS.
CO3:Study the various device and resource management techniques for time sharing and distributed systems.
CO4:Recognize the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.
CO5: Interpret the mechanisms adopted for file sharing in distributed Applications.
CO6: Evaluate the requirement for process synchronization and coordination handledby OS.
CO7: Collecting and understanding the various security aspects of operating system.

UNIT-I **12Hrs.**

Operating System Overview : Operating System Objectives and Functions, The Evolution of Operating Systems, Major Achievements, Developments Leading to Modern Operating Systems, Microsoft Windows Overview, Traditional UNIX Systems, Modern UNIX Systems, Linux. Process description & control : What is a Process?, Process States, Process Description, Process Control, Process Synchronization – The Critical Section Problem, Peterson's Problem, Semaphores, Classic Problems of Synchronization.

UNIT-II **12Hrs.**

CPU Scheduling: Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiprocessor Scheduling, Real-Time Scheduling, Linux Scheduling, Windows Vista Scheduling.

Virtual Memory : Hardware and Control Structures, Operating System Software, UNIX and Solaris Memory Management, Linux Memory Management, Windows Vista Memory Management, Summary.

UNIT-III **12Hrs.**

Threads, SMP, and Microkernel: Processes and Threads, Symmetric Multiprocessing (SMP), Microkernels, Windows Vista Thread and SMP Management, Solaris Thread and SMP Management, Linux Process and ThreadManagement:

Distributed Process Management: Process Migration, Distributed Global States, Distributed Mutual Exclusion, Distributed Deadlock. Distributed File Systems: Naming and Transparency, Remote File Access, Stateful verses Stateless Service, File Replication.

UNIT-IV **12Hrs.**

Kernel Organization: Using Kernel Services, Daemons, Starting the Kernel, Control in the Machine, Modules and Device Management, Module Organization, Module Installation and Removal, Process and Resource Management, Running Process Manager, Creating a new Task, IPC and Synchronization, The Scheduler, Memory Manager, The Virtual Address Space, The Page Fault Handler, FileManagement.

The windows NT/2000/XP kernel: Introduction, The NT kernel, Objects, Threads, Multiplication Synchronization, Traps, Interrupts and Exceptions, The NT executive , Security: Security Threats, Attacks, and Assets, Intruders, Malicious Software Overview, Viruses, Worms, and Bots, Rootkits.

REFERENCE BOOKS:

1. William Stallings, Operating Systems: Internals and Design Principles, 6th Edition, Prentice Hall, 2013.
2. Gary Nutt, Operating Systems, 3rd Edition, Pearson, 2014.
3. Silberschatz, Galvin, Gagne, Operating System Concepts, 8th Edition, Wiley,2008
4. Andrew S. Tanenbaum, Albert S. Woodhull, Operating Systems, Design and Implementation, 3rd Edition, Prentice Hall,2006.
5. Pradeep K Sinha: Distributed Operating, PHI, 2015.