

MCA302 OPERATING SYSTEMS

L	T	P	Cr
3	0	2	4.0

Course Objective: Role and purpose of the operating system, Functionality of a typical operating system, managing atomic access to OS objects.

Operating System Principles: Structuring methods (monolithic, layered, modular, microkernel models), processes, and resources, Concepts of APIs, Device organization, interrupts: methods and implementations, Concept of user/system state and protection, transition to kernel mode.

Concurrency: Implementing synchronization primitives, Multiprocessor issues (spin locks, reentrancy).

Scheduling and Dispatch: Dispatching and context switching, Preemptive and non-preemptive scheduling, Schedulers and policies, Processes and threads

Memory Management: Review of physical memory and memory management hardware, Working sets and thrashing, Caching, Paging and virtual memory, Virtual file systems.

File Systems: Files: data, metadata, operations, organization, buffering, sequential, nonsequential, Directories: contents and structure, Naming, searching, access, backups, Journaling and log-structured file systems.

Deadlock: Introduction, Analysis of conditions, Prevention & avoidance, Detection & recovery.

Security and Protection: Overview of system security, Security methods and devices, Protection, access control, and authentication.

Virtual Machines: Types of virtualization (including Hardware/Software, OS, Server, Service, Network).

Device Management: Characteristics of serial and parallel devices, Buffering strategies, Direct memory access, Disk structure, Disk scheduling algorithms.

Laboratory Work: To explore different operating systems like Linux, Windows etc. To implement main algorithms related to key concepts in the operating systems using a high level language.

Recommended Books

1. Silberschatz, A., Galvin, P.B. and Gagne, G., Operating System Concepts, John Wiley (2013), 9th ed.
2. Stallings, Willam, Operating Systems Internals and Design Principles, Prentice Hall, (2014), 7th ed.
3. Dhamdhere, D.M., Operating Systems: A Concept Based Approach, McGraw Hill

