Paper-II (MCA-302) : Operating systems

Unit I

Introduction to Operating Systems, Computer System Structures and Operating System Structures

Introduction to Operating Systems: What is an operating system? Mainframe systems, desktop systems, multiprocessor systems, distributed systems, clustered systems, real-time systems, handheld systems. Feature migration and computing Environments.

Computer System Structures: Computer system operation. I/O structure, storage structure, storage hierarchy, hardware protection, network structure.

Operating System Structures: System components, operating system services. System calls, system programs, system structure, virtual machines.

Unit II

Processes and Threads

Processes: Process concept, process scheduling, operations on processes, cooperating processes, inter-process communication, communication in client-server systems.

Threads: Overview, multithreading models, threading issues.

Unit III

CPU Scheduling, Process Synchronization and Deadlocks

CPU Scheduling: Basic Concepts, scheduling criteria, scheduling algorithms, multiple-processor scheduling, real-time scheduling, algorithm evaluation.

Process Synchronization: The critical section problem, synchronization hardware, semaphores, classical problems of synchronization, monitors.

Deadlocks: System model, deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.

Unit IV

Storage Management

Memory Management: Swapping, contiguous memory allocation, paging, segmentation, segmentation with paging.

Virtual Memory: Demand paging, process creation, page replacement, allocation of frames, thrashing.

File System Interface: File concept, access methods, directory structure, file system mounting, file sharing, protection.

File-System Implementation: File system structure, file-system implementation, directory implementation, allocation methods, free space management, efficiency and performance.

Unit V

Protection and Security

Protection: Goals of protection, domain of protection, access matrix, implementation of access matrix, revocation of access rights.

Security: The security problem, user authentication, program threats, system threats, security systems and facilities, intrusion detection, cryptography.