

OPERATING SYSTEMS

Course Code : CSE 404**Credit Units: 03****Total Hours: 30****Course Objective:**

Operating Systems serve as one of the most important courses for undergraduate students, since it provides the students with a new sight to envision every computerized systems especially general purpose computers. Therefore, the students are supposed to study, practice and discuss on the major fields discussed in the course to ensure the success of the education process. The outcome of this course implicitly and explicitly affects the abilities the students to understand, analyze and overcome the challenges they face with in the other courses and the real world.

Course Contents:**Module I: Introduction to operating system: (6 Hours)**

Operating system overview-objectives and functions, Batch processing, multiprogramming, Time Sharing and Real Time System, multiprocessor system, Distributed system. Operating System structure, Operating System Services, System Program and System calls.

Module II: Process Management: (10 Hours)

Process: Process concept, State model, process scheduling, CPU Scheduling, Scheduling Algorithms-Non Preemptive and preemptive Strategies, Multiprocessor Scheduling. Process Synchronization – The critical-section problem, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization: Producer Consumer Problem, Reader writer's problem. Critical regions, Monitors. Threads.

Deadlock: Deadlock – System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

Module III: Memory Management: (6 Hours)

Main Memory: Contiguous Allocation, Advantages and disadvantages, Fragmentation, Paging, Segmentation, Virtual memory concept, Demand paging, paged replaced algorithm, Allocation of frames, Thrashing.

Module IV: Device management: (4 Hours)

Mass Storage system: Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management, Disk space management.

Module V: File System and I/O System: (4 Hours)

File System: File Concept, File Organization and Access Mechanism, File Directories, Allocation method.

I/O Systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem,

Module VI: Industrial Visit

Visit to industry in the field of Computer Science & Engineering.

Course Outcomes:

At the end of the course, the students should be able to:

- Analyze various scheduling algorithms.
- Understand deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Understand the functionality of file systems.

Examination Scheme:

Components	A	CT	S/V/Q/HA	ESE
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:

Text:

- Milenekovic, “Operating System Concepts”, McGraw Hill
- A. Silberschatz, P.B. Galvin “Operating System Concepts”, John Willey & son

References:

- Dietel, “An introduction to operating system”, Addison Wesley
- Tannenbaum, “Operating system design and implementation”, PHI
- Operating System, A Modern Perspection, Gary Nutt, Pearson Edu. 2000
- A. S Tanenbaum, Modern Operating System, 2nd Edition, PHI.
- Willam Stalling “ Operating system” Pearson Education
- B. W. Kernighan & R. Pike, “The UNIX Programming Environment” Prentice Hall of India, 2000
- Sumitabha Das “ Your UNIX The ultimate guide” Tata Mcgraw Hill
- “Design of UNIX Operating System “ The Bach Prentice – Hall of India.