EC-221 Operating Systems

Credits : 4(3 + 1)
Prerequisite : EC-111 Algorithms and Computing

Goals :

To teach students about the fundamental concepts of operating systems covering evolution of operating systems, simple and multiprogramming systems, structures, services, operating system structures, process management, storage management, security and protection, and performance evaluation.

Text Books

- Abraham Silberschatz, Peter Baer Galvin and Greg Gagne: Operating System Concepts, 7th Edition John Wiley and Sons, (Latest Issue).
- William Stallings: Operating Systems (Internals and Design Principles), 5th Edition, Prentice Hall, 2005.

References:

- Andrew S. Tanenbaum and Albert S. Woodhull: Operating systems – Design and Implementation, Prentice Hall, (Latest Issue).

Topics

- **Basic Concepts :** early operating systems, buffering and spooling, multiprogramming, time sharing, distributes systems, real time systems, single user systems (6 Hours)
- **Computer System Architecture:** interrupt based systems, I/O structure, dual-mode protection, hardware protection, general system architecture, symmetric and asymmetric processing (8 Hours)
- **Computer System Structures:** system components, operating-system services, system calls, system programs, system structure, virtual machines, system design and implementation, system generation (6 Hours)
- **Processes**: process concept, concurrent processes, scheduling concepts, CPU scheduling, scheduling algorithms, multiple processor scheduling, algorithm evaluation (7 Hours)
- **Threads:** overview, benefits, user/kernel threads, threading models, issues). (4 Hours)
- **Memory Management:** swapping, single-partition allocation, multiple-partition allocation, multiple base registers, paging, segmentation, paged segmentation (8 Hours)
- **CS Problem and Resolution:** introduction, problem, race condition, solutions (3 Hours)
- **Deadlocks:** problem, models, characterization, RA graph, methods of handling deadlocks (3 Hours)
- **Advanced Topics:** demand paging, performance of demand paging, disk scheduling, file operations (6 Hours)

Computer Usage

Case study of Windows 2000/XP, Linux, Windows NT, Solaris, and Java operating systems
Three hours per week are utilized for Lab work.