

ICS 212 Operating Systems [3-1-0-4]

Course Objectives • To introduce the Fundamental concept of OS, and how OS works; • To study the Building blocks of OS, Components of OS

Course Outcomes: • Students will be able to design an OS, • Students will be able to implement various components of OS, • Students will be able to implement a small OS

Syllabus:

Operating system overview: Computer System Organization, Operating System structure, operations of OS, process management, memory management, storage management, protection and security, distributed systems.

Processes: Process concept, Process scheduling, Operations on processes, Cooperating processes, inter-process communication

Threads: Overview, Multi-threading models, threading issues, P threads, Windows XP threads

CPU Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, multiprocessor scheduling

Process synchronization: The critical section problem, Peterson's solution, synchronization hardware, Semaphores, Monitors. Synchronization examples

Deadlocks: Methods for handling deadlocks, Deadlock prevention, deadlock avoidance, Deadlock recovery

Memory management: Swapping, Paging, Segmentation, Virtual memory, Demand paging, Page replacement

I/O Systems: I/O hardware, Application I/O interface, Kernel I/O subsystem, transforming I/O requests to hardware operations

Text Books/References

1. William Stallings, Operating systems: Internals & design principles, Pearson, Seventh edition, 2014.
2. Andrew S. Tanenbaum, Modern Operating Systems, Pearson Fourth Edition, 2016.
3. Charles Crowley, Operating Systems - Design Oriented Approach, Mc. Graw Hill Education, First edition, 2017.
4. Abraham Silberschatz, Galvin, Gagne Operating System Concepts, Wiley, Ninth Edition, 2016.