

CSE 4733 – Operating Systems

Textbook: William Stallings, *Operating Systems: Internals and Design Principles*, Fifth Edition, Prentice Hall, 1998.

**Course Outline:**

1. Processes:
  - 1.1 Process States
  - 1.2 Process Description (process control block)
  - 1.3 Process control (creation, termination, context switching, mode switching)
  
2. Threads, SMP, Microkernels
  - 2.1 User level threads
  - 2.2 Kernel level threads
  - 2.3 Symmetric Multiprocessing (SMP)
  - 2.4 Microkernel organization
  
3. Concurrency
  - 3.1 Principles of concurrency
  - 3.2 Hardware-based mutual exclusion
  - 3.3 Semaphores
  - 3.4 Readers/Writers problem
  - 3.5 Producers/consumers problem
  - 3.6 Principles of deadlock
  - 3.7 Deadlock prevention, avoidance, detection
  - 3.8 Banker's algorithm
  - 3.9 Dining philosophers problem
  
4. Memory Management
  - 4.1 Memory partitioning and Fragmentation
  - 4.2 Paging
  - 4.3 Segmentation
  - 4.4 Virtual memory hardware
  - 4.5 Virtual memory software
  - 4.6 Placement and replacement policies and algorithms
  
5. Uniprocessor Scheduling
  - 5.1 Scheduling criteria
  - 5.2 Priorities
  - 5.3 Scheduling algorithms
  - 5.4 Performance comparison of scheduling algorithms
  
6. I/O Management and Disk Scheduling
  - 6.1 Programmed I/O, Interrupt-driven I/O, and Direct memory access (DMA)
  - 6.2 I/O Buffering
  - 6.3 Disk scheduling policies
  - 6.4 RAID
  - 6.5 Disk Cache
  
7. File Organization
  - 7.1 File directories
  - 7.2 Secondary storage management