Introduction to Operating System

Semester III	Subject Code: BC31603	Lectures: 60

Objectives:

The course is designed to equip students with,

- Making computers more convenient to use
- The efficiency to allocate resources to processes
- The Understanding of the memory management techniques
- The knowledge of disk scheduling

Unit 1: Introduction to Operating System	02

- Operating system; Types
- Services provided by OS
- System Calls
  - Process or job control
  - Device Management
  - File Management
  - System Program

Unit 2: Process Management and CPU Scheduling	18

- What is Process
- Process State
- Process Control Block
- Context Switch
- Operation on Process; create, terminate
- Critical section problem
- Semaphores
- Classical Problems of synchronization
  - Bounded buffer problem
  - Readers & writers problem
  - Dining Philosophers problem
- What is CPU scheduling?
- Scheduling Concepts

• CPU- I/O Burst Cycle • Types of CPU Scheduler • Preemptive and Non-preemptive scheduling • Dispatcher • Scheduling criteria (Terminologies used in scheduling) • Scheduling Algorithms ➢ FCFS ➢ SJF (Preemptive & non-preemptive) ➢ Priority Scheduling (Preemptive & Non preemptive) ➢ Round Robin Scheduling • Case Study on CPU Scheduling algorithm	

Unit 3: Deadlock	**10**
• Introduction • Deadlock Characterization • Necessary Condition • Resource allocation graph • Deadlock Prevention • Deadlock Avoidance ➢ Safe State ➢ Resource allocation graph algorithm ➢ Bankers algorithm • Deadlock Detection • Recovery from deadlock • Process Termination • Case Study on Bankers algorithm	

Unit 4:- Memory Management	**10**
• Introduction to memory management ➢ Address Binding ➢ Dynamic Loading ➢ Dynamic Linking • Overlays • Logical vs. physical addresses • Swapping • Contiguous memory allocation ➢ Single Partition Allocation	

➢ Multiple Partition Allocation ➢ External and Internal Fragmentation • Paging • Segmentation • Segmentation with paging • Virtual memory • Demand paging • Page replacement algorithms ➢ FIFO ➢ LRU ➢ Optimal • Case Study on Page replacement algorithm	

Unit 5: File and I/O System	**08**
• Introduction & File concepts (file attributes, Operations on files) • Access methods ➢ Sequential access ➢ Direct access • File and Directory structure • Allocation methods ➢ Contiguous allocation ➢ Linked Allocation ➢ Indexed Allocation • I/O Hardware • Application of I/O Interface • Kernel I/O Subsystem • Disk Scheduling ➢ FCFS ➢ Shortest Seek time first ➢ SCAN ➢ C- SCAN • Case Study on Disk Scheduling algorithm	

***Contact hours – 12 hours**

Text Books:

1. *Introduction to Operating System,* Gajanan Deshmukh, Nirali Prakashan, June 2014
2. *Introduction to Operating System,* Harshita vachhani, Vision Publication- 2014
3. *Introduction to Operating System,* Mrs. Sharada patil,, Tech-Max Publication Nov 2010

Recommended Reference Books

1. D. M. Dhamdhere, *System Programming and Operating System* Tata McG.
2. Silberschatz, Galvin, Gagne, *Operating System Concepts*