

CSPC3002 OPERATING SYSTEMS (3-0-0)

Course Objectives:

- To provide knowledge about the services rendered by operating systems
- To provide a detailed discussion of the various memory management techniques
- To discuss the various file-system design and implementation issues
- To discuss how the protection domains help to achieve security in a system

Module-I (10hours)

Introduction to OS- About an OS, Simple batch system, multiprogramming and time-sharing system.

Operating system structure- operating system services, system components, protection system, OS service, System call

Process Management- Process Concepts, Process Scheduling, Operation on process, IPC, multi-threading models, Threading issues, Process Scheduling Algorithms.

Module-II (10hours)

Process Coordination & Synchronization- Critical Section Problem, Peterson's solution, Synchronization hardware, Semaphores, Classical problems of Synchronization.

Dead-locks – System model, Deadlock Characterization, Methods for handling Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Module-III (08 hours)

Memory Management-Memory Management Strategies, Logical v/s Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation

Virtual Memory-Background, Demand Paging, Page Replacement Algorithm, Allocation of Frame, Thrashing, Demand segmentation

Module-IV (08 hours)

Storage Management- File System concept, Access Methods, File System Structure, implementation, Efficiency & Performance, Recovery, Overview of Storage Structure, Disk Structure, Disk Scheduling, Disk Management, Swap Space Management, I/O System overview, I/O Hardware, application I/O interface, Kernel I/O subsystem, Transforming I/O request to H/W operation.

Module-V (04hours)

Distributed systems - Distributed file systems, Distributed operating systems, Real time systems.

Outcomes

- CO1: Ability to comprehend the techniques used to implement the process manager.
CO2: Ability to comprehend virtual memory abstractions in operating systems.
CO3: Ability to design and develop file system interfaces, etc.
CO4: Ability to comprehend the techniques used to implement the process manager.
CO5: Ability to comprehend virtual memory abstractions in operating systems.

Books:

1. Silberschatz, Galvin, Gagne, "Operating System Concepts", John Wiley and Sons, 10th edition.
2. Stallings, "Operating Systems –Internals and Design Principles", 9/E, Pearson Publications, 2018.
3. Andrew S. Tanenbaum, "Modern Operating Systems", 4/E, Pearson Publications.