# CSCA 422: OPERATING SYSTEMS

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**Pre-requisite:**

- Familiarity with Fundamentals of Computers

**Objectives:**

- To Understand the Basic features of Operating System
- To Introduce Different Functions of Operating Systems
- To Introduce Various Types of Operating Systems

**Outcomes:**

- Ability to understand various functions of operating systems.
- Analyze various memory management and process management functions.
- Ability to install and configure various operating systems.

**Module-I: introduction** (9 Hrs)

Types of operating systems-operating systems Structures-Systems components operating systems services-System calls-Systems programs-Processes-process concept- process scheduling-operation on processes-co-operating processes-Inter process communications-CPU Scheduling-Scheduling criteria-Scheduling algorithms-Multiple-processor Scheduling.

**Module-II: Process Synchronization** (9 Hrs)

Critical Section problem – Semaphores-Classical problems of synchronization-critical Regions-Monitors-Deadlock Characterization-Deadlock Handling-Deadlock Prevention-Deadlock Avoidance-Deadlock Detection-Deadlock Recovery –Threads- Multithreading Models.

**Module-III: Memory Management** (9 Hrs)

Memory Management-Swapping-Contiguous Memory Allocation-Paging-Segmentation-Virtual Memory-Demand Paging-Page Replacement-Thrashing.

**Module-IV: Disk Scheduling and Distributed Systems** (9 Hrs)

Disk Structures-Disk Scheduling-File Systems Interface-File Concepts-Access Methods-Directory Structures-File System Implementation-File Systems Structures-Directory Implementation-Allocation Methods-Free Space Management-Distributed File Systems-Naming and Transparency-Remote File Accesses- Stateful Versus Stateless Service-File replication.

**Module-V: Case Studies** (9 Hrs)

Linux System-design Principles- process Management-File Systems- MS Windows -Systems Structures-Process management-memory Management-Android OS-Virtual machine OS.

**Text Books:**

1. Abraham Silberschatz Peter B Galvin, G. Gagne," Operating Systems Concepts", 7th Edition, Addison Wesley, 2010.
2. Andrew S. Tanenbaum, "Modern operating Systems", 3rd Edition, PHI Learning Pvt. Ltd., 2008.