

**Objective(s)**

After completing the course the student shall be able to understand core operating system concepts, Different techniques for process scheduling, memory management, Commands and Programming in linux environment

**Unit I**

Introduction, Role of an OS computer system, types of operating system. Operating system structures, System documents, OS services, system calls, system structure, concept of virtual machines.

**Unit II****Process management**

Process concept, process scheduling, cooperating processes, Inter process communication.

**CPU scheduling**

Basic concept, scheduling criteria, scheduling algorithms

**Unit III****Process synchronization**

Critical section problem, synchronization hardware, semaphores, classical problems of synchronization, critical regions, monitors.

**Deadlocks**

Deadlock characteristics, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlocks, combined approach for deadlock handling.

**Unit IV****Memory Management**

Logical versus Physical Address space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging

**Virtual Memory**

Demand Paging, Performance of Demand Paging, Page Replacement, Page-replacement algorithms, Allocation of frames, Thrashing, Other Considerations, Demand segmentation

**File-System Interface**

File concept, Access methods, Directory Structure, Protection, Consistency

**File-System Implementation**

File-System Structure, allocation methods, Free-space Management, Directory Implementation, Efficiency and performance

**Unit V****I/O subsystems**

I/O Hardware, Application I/O interface

**Protection**

Goals of protection, domain of protection, access matrix, implementation of access matrix, revocation of access rights, capability based systems, languages based protection.

## **Security**

The problem, authentication, one-time password program threats, system threats, threat monitoring, encryption, computer security classification

## **Case studies (UNIX, LINUX, WinNT)**

## **Reference Book(s)**

1. Operating System Concept: Silberschatz, Galvin, 5ed. Addison Wesley.
2. Operating system Concepts: Milan Malinkovic, TMH, 2nd ed.
3. Operating System: William Stallings, PHI, 2nd ed.

## **Practical(s):**

1. Installation of Linux operating system
2. File and Directory related commands
3. File permissions and related commands
4. File text manipulation, compression and comparison
5. Process related commands
6. I/O redirection and piping
7. Using gcc and java compiler in linux
8. Editors(Vim, Emacs)
9. Bash shell scripting - I
10. Bash shell scripting - II
11. Understanding of signals and traps
12. Study system calls related to process & process control
13. Inter process communication (POSIX-IPC) using pipe
14. Inter process communication (POSIX-IPC) using shared memory
15. Study system calls related to semaphore