

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