

Operating Systems

Course Objective

This course involves study of concepts and components of general-purpose operating systems. These include the study of processes and process synchronization, multithreaded applications, deadlocks, memory management, and file systems. Objective is to prepare strong foundation before learning any specific operating system like Linux or Windows. Mastering theoretical foundations and having practical experience in all facets of operating systems work will achieve this.

Course Content

Overview

O.S. Fundamentals
Evolution of operating systems
Types of OS
Monolithic Vs Microkernel
Hardware & O.S.
Processor, Memory
Buses, I/O Devices

Processes

Process Life Cycle
Process State Diagram
Processes & Threads
SMP issues
Concurrency
Mutual Exclusion
Semaphores
Reader/ Writer Problem
Deadlock & Starvation

IPC

Reference:

Modern Operating Systems
Andrew Tanenbaum

Operating Systems
William Stallings

Prerequisite:

C programming
Algorithms & Data Structures

Scheduling

Scheduling in UP/ MP/ RTOS
Scheduling Policies
Scheduling Mechanisms
Thread Scheduling

Memory Management

Paging
Virtual Memory
Page Fault Handling
Page replacement Algorithms
Belady's Anomaly
Design issues for paging subsystem

File Systems

File Organization
File Directories
Shared Files
FS Reliability & performance
FS on disk layout
FS Policies & Mechanisms