Approval: 1st Convocation adhoc Meeting

Course Name: Operating Systems
Course Code: CS 306
Credit: 3-0-0-3
Category:
Prerequisites:

Objective: This course aims to teach the student basics of issues in Operating Systems design and implementation as it provides a usable and programmable interface to users while managing computing resources efficiently. This imparts knowledge essential for any programmer so to understand how any particular program element/feature actually works and can be expected to behave. The focus is on teaching the base theory and concepts while keeping in perspective history of how concepts developed and their relevance/importance in current computing. Concepts are illustrated with detailed case studies from existing OS kernels.

Course contents:

Introduction - Review of Computer Organization and Architecture, OS Concepts, Structure and Operations - Process Mgmt, Memory Mgmt. and Storage Mgmt.

Process Management - Processes - Concept, Scheduling - different scheduling algorithms, Need for synchronization, Process Synchronization - Critical Section, Mutexes, Semaphores, Mailboxes, Monitors, Inter-process Communication, Deadlock and its prevention.

Memory Management - Physical memory vs Virtual memory, Swapping, Paging and Page tables, Segmentation, Address translation and MMU, Caches, Page misses and TLB, Handling page miss and Page replacement.

File Systems and I/O Management - Concept of File and File System, Structure of FS, Allocation and management of Free space, brief review of mass storage structure and its relation to FS implementation. Generic I/O interface presented by OS for FS, Network - Device handling.

Protection and Security as applicable to Process, Memory and File Management. Virtualization.

Case study of an OS (including details of data structures and algorithms at the kernel level).