SCOPE GLOBAL SKILLS UNIVERSITY

NH-12, Hoshangabad Road, Near Misrod, Bhopal-462026

BACHELOR OF COMPUTER APPLICATION (IT)

Syllabus

(with effect from 2023-24 Academic Year)

Course Learning Outcomes (CLO)

After the completion of this course, a student shall be able to do the following:

- Describe the importance of computer system resources and the role of operating system in their management policies and algorithms.
- Specify objectives of modern operating systems and describe how operating systems have evolved over time.
- Understand various process management concepts and can compare various scheduling techniques, synchronization, and deadlocks.
- Describe the concepts of memory management techniques.
- Identify the best suited process management technique for any process.
- Describe various file operations, file allocation methods and disk space management.
- To understand and identify potential threats to operating systems and the security features to guard against them.
- Learn about Linux Operating System

Module	Topics
I	**Introduction to Operating System:** What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems- Batch Systems, Multiprogramming Systems, Multiprocessing Systems, Time Sharing Systems, Distributed OS, Real time systems. Operating System for Personal Computers, Workstations and Hand-held Devices. Applications of various operating system in real world. Some prevalent operating systems - Windows, UNIX/Linux, Android etc.
II	**Process Management:** Process Concepts, Process State Diagram, Process Control Block. **Process Scheduling:** Scheduling Criteria, Types of scheduling. Scheduling Algorithms: FCFS SJF SRTN, RR, Priority. Multiple-Processor, Real-Time, Multilevel Queue and Multilevel Feedback Queue Scheduling. **Inter-process Communication and Synchronization**: The need for inter-process synchronization, Concept of mutual exclusion, binary and counting semaphores, hardware support for mutual exclusion, queuing implementation of semaphores, Classical problems in concurrent programming, Dining Philosopher's problem, Bounded Buffer Problem, Readers and Writers problem, Critical section, critical region and conditional critical region, Monitors and messages. **Deadlocks:** Concepts of deadlock detection, deadlock prevention, deadlock avoidance. Banker's Algorithm
III	**Memory Management:** Introduction, Address Binding, Logical versus Physical Address Space, Swapping, Contiguous & Non-Contiguous Allocation, Fragmentation (Internal & External), Compaction, Paging, Segmentation, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms. **File Management:** Concept of File System (File Attributes, Operations, Types), Functions of File System, Types of File System, Access Methods (Sequential, Direct & other methods), Directory Structure (Single-Level, Two-Level, Tree-Structured, Acyclic-Graph, General Graph), Allocation Methods (Contiguous, Linked, Indexed)
IV	**Disk Management:** Structure, Disk Scheduling Algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK), Swap Space Management, Disk Reliability, Recovery. Security: Security Threats, Security policy mechanism, Protection, Trusted Systems, Authentication and Internal Access Authorization, Windows Security.
V	**LINUX:** Introduction, History and features of Linux, advantages, hardware requirements for installation, Linux architecture, file system of Linux – boot block, super block, inode table, data blocks. Linux standard directories, Linux kernel, Partitioning the hard drive for Linux, installing the Linux system, system - startup and shut-down process, init and run levels. Process, Swap, Partition, fdisk, checking disk free spaces. Difference between CLI OS & GUI OS, Windows *vis* Linux, Importance of Linux Kernel, Files and Directories. Concept of Open Source Software.

Reference Books:

- Linux by Sumitabh Das
- A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications.
- Operating System by Peterson
- A.S . Tanenbaum, Modem Operating Systems, 3rd Edition, Pearson Education.