OPERATING SYSTEMS

III Semester: CSE(AI & ML) / CSE (CS) / CSE(DS)

IV Semester: CSE / IT/ CSIT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACSC12	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

Prerequisites:

I. COURSE OVERVIEW:

Operating system is system software that manages computer hardware, software resources, and provides common services for computer programs. This course provides a comprehensive introduction to operating systems design concepts, data structures and algorithms. It is designed to provide in-depth critique on the problems of resource management, scheduling, concurrency, synchronization, memory management, file management, peripheral management, protection and security. It deals with the transfer of programs in and out of memory; organizes processing time between programs and users. Various applications of operating systems include security, job accounting, error detection aids, coordination between other software's and users.

II. COURSE OBJECTIVES:

The students will try to learn:

I. Understand the functionalities of main components in operating systems.
II. Analyze the algorithms used in memory and process management.
III. Understand the clock synchronization protocols
IV. Interpret the concepts of input and output storage for file management.

III. SYLLABUS:

MODULE – I: INTRODUCTION

Operating systems objectives and functions: Computer system architecture, operating systems structure, operating systems operations; Evolution of operating systems: Simple batch, multi programmed, time shared, personal computer, parallel distributed systems, real time systems, special purpose systems, operating system services, user operating systems interface; Systems calls: Types of systems calls, system programs, protection and security, operating system design and implementation, operating systems structure, virtual machines.

MODULE – II: PROCESS AND CPU SCHEDULING, PROCESS COORDINATION

Process concepts: The process, process state, process control block, threads; Process scheduling: Scheduling queues, schedulers, context switch, preemptive scheduling, dispatcher, scheduling criteria, scheduling algorithms, multiple processor scheduling; Real time scheduling; Thread scheduling; Case studies Linux windows; Process synchronization, the critical section problem; Peterson's solution, synchronization hardware, semaphores and classic problems of synchronization, monitors

MODULE – III: MEMORY MANAGEMENT AND VIRTUAL MEMORY

Logical and physical address space: Swapping, contiguous memory allocation, paging, structure of page table.

Segmentation: Segmentation with paging, virtual memory, demand paging; Performance of demand paging: Page replacement, page replacement algorithms, allocation of frames, thrashing.

MODULE – IV: FILE SYSTEM INTERFACE, MASS-STORAGE STRUCTURE

The concept of a file, access methods, directory structure, file system mounting, file sharing, protection, file system structure, file system implementation, allocation methods, free space management, directory implementation, efficiency and performance; Overview of mass storage structure: Disk structure, disk attachment, disk scheduling, disk management, swap space management; Dynamic memory allocation: Basic concepts; Library functions.

MODULE – V: DEADLOCKS, PROTECTION

System model: Deadlock characterization, methods of handling deadlocks, deadlock prevention, dead lock avoidance, dead lock detection and recovery form deadlock system protection, goals of protection, principles of protection, domain of protection, access matrix, implementation of access matrix, access control, revocation of access rights, capability based systems, language based protection.

IV. TEXT BOOKS:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Principles", Wiley Student Edition, 8th Edition, 2010.
2. William Stallings, "Operating System- Internals and Design Principles", Pearson Education, 6th Edition, 2002.

V. REFERENCE BOOKS:

1. Andrew S Tanenbaum, "Modern Operating Systems", PHI, 3rd Edition, 2007.
2. D. M. Dhamdhere, "Operating Systems a Concept Based Approach", Tata McGraw-Hill, 2nd Edition, 2006.

VI. WEB REFERENCES:

1. www.smartzworld.com/notes/operatingsystems
2. www.scoopworld.in
3. www.sxecw.edu.in
4. www.technofest2u.blogspot.com