CP305: OPERATING SYSTEMS

CREDITS = 6 (L=4, T=0, P=2)

Course Objective:
To impart knowledge of operating system from user and design perspectives

Teaching and Assessment Scheme:

Teaching Scheme			Credits	Marks Distribution				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE	CE	ESE	CE	
4	0	2	6	70	30	30	20	150

Course Contents:

Unit No.	**Topics**	**Teaching Hours**
1	**Introduction:** Functions of operating systems, processes, files, command interpreter, Different types of operating systems, operating system interface. Operating system structure: Monolithic, Layered, Hexo-kernels, Virtual Machines and Client-Server.	06
2	**Processes and their implementation and Deadlocks:** Process states and state transition diagram, Inter process communication: shared memory and message passing, Race condition, critical sections, mutual exclusion, semaphores and monitors. Need for Test-and-Set instruction. Threads and thread implementation. Process scheduling: Objectives, First come first serve, Round-robin, shortest job first, and priority-based scheduling. Examples. Thread Scheduling; Deadlocks, Definition and simple examples, Deadlock Detection, Recovery, Prevention and Avoidance.	18
3	**Memory management:** Fixed and variable size partitions, protection of user address space, Swapping, virtual memory systems, demand paging, working set, page replacement strategies, Segmentation. Examples	16
4	**File system:** Files, Directories and Special files, access methods, Implementing Files and Shared Files, Log-Structured File Systems, Journaling File Systems, Virtual File Systems, disk space management and file space allocation methods, file system security, reliability and performance, File-System Backups, File-System Consistency, Reliability and Performance, Defragmenting Disks, Examples and Case Studies.	10

5	**Input and output:** Basic concepts, I/O software layers: interrupt handlers, device drivers, and device-independent I/O software. Disk arm scheduling algorithms, clocks, power management.	06
6	**Security & Protection:** Security Environment, Design Principles Of Security, User Authentication, Protection Mechanism: Protection Domain, Access Control List.	04
	TOTAL	**60**

List of Reference Books:

1. Andrew S. Tanenbaum, “*Modern Operating Systems*”, Prentice Hall International
2. Silberschatz and Galvin, “*Operating System Concepts*”, John Willey and Sons
3. William Stallings,“*Operating Systems*” Prentice Hall of India
4. D.M.Dhamdhere, “*Operating Systems*”, Tata McGraw Hill

Course Outcomes (COs): After learning the course students will be able to

1. Understand various Operating Systems concepts such as process, system calls, multiprocessing, race and dead-locks etc.
2. Analyze various scheduling algorithms
3. Apprehend virtual memory management, and compare various paging and segmentation schemes.
4. Analyze file systems from user and design perspective.
5. Analyze protection and security mechanisms of OS
6. Experiment with low level implantation of OS concepts, at lab and mini-projects level.