INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

OPERATING SYSTEMS								
III Semester: CSE / CSE (CS) / CSE(DS) / CSE (AI & ML) / IT								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ACSD09	**Core**	3	0	0	3	40	60	100
Contact Classes: 48	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 48**		
Prerequisite: Python Programming								

I. COURSE OVERVIEW:

Operating system course gives you skills and ways to think about common services for computer programs. It is designed to provide an in-depth critique of 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; and organizes processing time between programs and users. Learned knowledge will be implemented in the design and development of hybrid operating systems, command control systems, and real-time environments.

II. COURSE OBJECTIVES:

The students will try to learn

I. The principles of operating systems, services and functionalities with its evolution.
II. The structures, functions and components of modern operating systems
III. The conventional hardware at different OS abstraction levels.
IV. The essential skills to examine issues and methods employed in design of operating systems with identification of various functionalities.

III. COURSE OUTCOMES:

At the end of the course, students should be able to:

CO1	Demonstrate different architectures used in the design of modern operating systems.
CO2	Solve problems related to process scheduling, synchronization, and deadlock handling in uniprocessor and multi-processing systems.
CO3	Implement memory allocation algorithms for effective utilization of resources.
CO4	Select various page replacement algorithms applied for the allocation of frames...
CO5	Analyze different file allocation methods and disk scheduling algorithms applied for efficient utilization of storage.
CO6	Outline mechanisms used in the protection of resources in real-time environment

IV. COURSE CONTENT:

MODULE – I: INTRODUCTION (10)

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 (09)

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 (10)
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 (9)
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 (10)
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.

V. 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.

VI. 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.

VII. ELECTRONICS RESOURCES:

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

VIII. MATERIALS ONLINE

1. Course template
2. Tutorial question bank
3. Tech-talk topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. PowerPoint presentation
11. E-Learning Readiness Videos (ELRV)