



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

ESSENTIALS OF OPERATING SYSTEMS								
VI Semester: CSE / IT								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	Total
ACSE31	Elective	2	0	0	2	40	60	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 48			
Prerequisite: Nil								

I. COURSE OVERVIEW:

This course provides students with a fundamental understanding of Operating System concepts essential for modern computing systems. It introduces the role of operating systems in managing hardware resources, processes, memory, files, and I/O devices. The course covers core OS services such as process management, CPU scheduling, memory management, file systems, and security mechanisms. Emphasis is placed on understanding how operating systems support multitasking, concurrency, and efficient resource utilization. Real-world examples from Linux and Windows systems are used to illustrate OS principles. The course equips students from non-CSE branches with essential OS knowledge relevant to software usage, system performance, and application development.

II. COURSE OBJECTIVES:

The students will try to learn:

- I The fundamental concepts, structure, and functions of operating systems.
- II The process management concepts including process scheduling and synchronization.
- III The memory management techniques such as paging and virtual memory.
- IV File systems, I/O management, and basic operating system security concepts.

III. COURSE OUTCOMES:

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

- CO1 Understand the basic functions and structure of an operating system.
- CO2 Explain process management, CPU scheduling, and synchronization mechanisms.
- CO3 Analyze memory management techniques including paging and virtual memory.
- CO4 Describe file system organization and I/O management operations.
- CO5 Identify operating system security issues and protection mechanisms.
- CO6 Relate operating system concepts to real-world computing environments such as desktops and servers.

IV. COURSE CONTENT:

MODULE – I: INTRODUCTION TO OPERATING SYSTEMS (9)

Overview of software architecture definition and importance role of a software architect architectural patterns vs. design patterns, architectural styles layered architecture, client-server architecture, event-driven architecture, microservices architecture case studies in software architecture real-world examples analysis and discussion.

MODULE – II: PROCESS MANAGEMENT (10)

Process concept, process states, process control block, CPU scheduling criteria, scheduling algorithms (FCFS, SJF, Priority, Round Robin), threads, inter-process communication, process synchronization, critical section problem, semaphores.

MODULE – III: MEMORY MANAGEMENT (10)

Memory management requirements, contiguous memory allocation, paging, segmentation, virtual memory, demand paging, page replacement algorithms, memory allocation issues.

MODULE – IV: FILE SYSTEMS AND I/O MANAGEMENT (10)

File concept, file access methods, directory structures, file system implementation, free space management, disk scheduling algorithms, I/O hardware, I/O software, buffering and caching.

MODULE – V: SECURITY AND CASE STUDIES (9)

Operating system security principles, authentication and authorization, access control, protection mechanisms, malware threats overview, case studies of Linux and Windows operating systems.

V. TEXT BOOKS:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, “Operating System Concepts”, Wiley, 10th Edition, 2018.
2. Andrew S. Tanenbaum and Herbert Bos, ”Modern Operating Systems”, Pearson Education, 4th Edition, 2015. Eric Gamma, Richard Helm, Ralph Johnson, John Vlissides (Gang of Four), *Design Patterns: Elements of Reusable Object-Oriented Software*, Addison-Wesley, 1st Edition

VI. REFERENCE BOOKS:

1. William Stallings, ”Operating Systems: Internals and Design Principles”, Pearson Education, 9th Edition.
2. D.M. Dhamdhare, ”Operating Systems: A Concept-Based Approach”, McGraw-Hill., 1st Edition, 2008

VII. ELECTRONICS RESOURCES:

1. <https://www.geeksforgeeks.org/operating-systems/>
2. <https://www.nptel.ac.in/courses/106/102/106102132>
3. https://www.tutorialspoint.com/operating_system/

VIII. MATERIAL ONLINE:

1. Course Outline Description
2. Lecture notes
3. PowerPoint presentation
4. Definitions and Terminology
5. Tutorial Question Bank
6. Case Studies
7. Real life Examples
8. Complex Engineering Problems
9. Tech Talk Topics
10. Concept Video Topics
11. Open-ended Exercises
12. Assignments
13. Model Question Paper – I
14. Model Question Paper – II
15. GATE Question Bank
16. Previous Question Papers and Solutions