

Course Name: Operating Systems

Credit Hours: 2-1

Contact Hours: 2-3

Pre-requisites: None

Course Introduction:

This course provides an in-depth understanding of the design and implementation of operating systems. The course covers the basic concepts, principles, and techniques involved in the development of operating systems. Students will learn about the internal architecture of an operating system, including process management, memory management, file system management, and input/output management. The course also covers topics such as synchronization, deadlock, security, and protection in operating systems. Students will gain hands-on experience with operating system concepts through programming assignments and projects. Upon completion of this course, students will have a solid foundation in operating systems and be able to design and implement simple operating systems.

CLO No	Course Learning Outcomes	Bloom Taxonomy
CLO-1	Understand and describe the fundamental concepts of operating systems (OS)	C2 (Understand)
CLO-2	Apply concurrency concepts, including deadlock prevention, synchronization, and scheduling,	C3 (Apply)
CLO-3	Apply security and protection mechanisms in OS design	C3 (Apply)
CLO-4	Analyze and evaluate the design of operating systems using appropriate metrics.	C4 (Analyze)

Course Plan:

#	Weekly Distribution of Course Contents
Week-1	Introduction to Operating System
Week-2	Operating system structure and components
Week-3	System calls and APIs, Process management, Process states and transitions
Week-4	Process control block, Process scheduling algorithms
Week-5	Memory hierarchy, Memory allocation techniques
Week-6	Paging and segmentation, Virtual memory
Week-7	Input/output subsystem, Disk scheduling algorithms
Week-8	RAID, File System Management
Week-9	Synchronization and Deadlocks
Week-10	Interprocess Communication, Shared memory
Week-11	Message passing, Remote procedure call (RPC)
Week-12	Security threats and vulnerabilities, Access control and authentication
Week-13	Security policies and mechanisms
Week-14	Encryption and decryption techniques
Week-15	Distributed system architectures
Week-16	Comparison of operating system features and performance

Reference Materials:

20. "Operating System Concepts" by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne (10th edition, 2018)
21. "Operating Systems Internals and Design Principles" by William Stallings (9th edition, 2018)

22. "Operating System Design and Implementation" by Andrew S. Tanenbaum and Albert S. Woodhull (3rd edition, 2006)

