Course Name: CS-333, **Operating Systems**

Credit Hours: 2-1

Contact Hours: 2-3

Pre-requisites: None

Course Introduction:

In the "Operating Systems" course, students will first acquire a deep understanding of the fundamental concepts of operating systems (OS), allowing them to effectively describe the core principles and components. Building upon this foundation, students will apply their knowledge by implementing concurrency concepts, including deadlock prevention, synchronization, and scheduling, showcasing their practical skills in managing OS resources. Moreover, they will explore security and protection mechanisms within OS design and learn how to apply these critical safeguards. Finally, students will develop the ability to critically assess operating system designs using appropriate metrics, demonstrating their capacity to analyze and evaluate the effectiveness of different OS configurations and strategies.

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:

1. "Operating System Concepts" by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne (10th edition, 2018)

2. "Operating Systems Internals and Design Principles" by William Stallings (9th edition, 2018)

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