EC322: Operating Systems

Details of course: -

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Operating Systems	3	0	2	Data Structures

Course Objectives:

1. To provide students with a comprehensive understanding of operating systems' fundamental principles, architecture, and components.
2. To enable students to explore concepts related to process management, scheduling algorithms, and concurrency control.
3. To equip students with knowledge of memory management, including paging, segmentation, virtual memory, and handling memory allocation issues.
4. Introduce students to file organisation, access mechanisms, directory structures, and efficient I/O management strategies.
5. To provide insight into modern operating systems' features and design, such as Linux, Unix, and Windows.

Course Outcomes:

CO1: Describe the evolution, structure, classification and various functions of operating systems.
CO2: Illustrate process management and CPU scheduling.
CO3: Analyze deadlock, its characteristics, prevention, detection and recovery.
CO4: Assess various memory management schemes, such as virtual and cache memory, and their impact on performance.
CO5: Analyse I/O management & Disk Scheduling, file system, and implementation issues.
CO6: Explain and contrast features, functionalities, and design philosophies of modern operating systems like Windows, Linux, and Unix.

S. No.	Content	Contact Hours
Unit 1	Introduction: Operating system and function, Evolution of the operating system, Batch, Interactive, Time Sharing and Real-Time System, System protection. Operating System Structure: System Components, System Structure, Operating System Services.	6
Unit 2	Concurrent Processes: Process concept, Principle of Concurrency, Producer-Consumer Problem, Critical Section problem, Semaphores, Classical problems in Concurrency, Inter Process Communication, Process Generation, and Process Scheduling. CPU Scheduling: Scheduling Concept, Performance Criteria of Scheduling Algorithm, Evolution, Multiprocessor Scheduling.	9
Unit 3	Deadlock: System Model, Deadlock Characterization, Prevention, Avoidance and Detection, Recovery from Deadlock combined approach.	6
Unit 4	Memory Management: Base machine, Resident monitor, Multiprogramming with fixed partition, Multiprogramming with variable partition, Multiple base register, Paging, Segmentation, Virtual memory concept, Demand paging, Performance, Paged replacement algorithms, Allocation of frames, Thrashing, Cache memory organisation, Impact on performance.	9
Unit 5	I/O Management & Disk Scheduling: I/O devices and organisation of I/O function, I/O Buffering, DISK I/O, Operating System Design Issues. File System: File Concept, File Organization and Access Mechanism, File Directories, File Sharing, Implementation Issues	8
Unit 6	Case Studies: Windows, Linux and Unix	4
	Total	42

Books:-

S. No	Name of Books/Authors/Publisher
1	Operating System Concepts/Silbersachatz, Galvin, Gagne/10th Edition, Pearson, 2018.
2	ModernOperating Systems/Tannenbaum/4th Edition, Pearson, 2016.
3	Unix Concepts and Applications/ Sumitabha Das/4th Edition, McGraw Hill.
4	Operating System Concepts/Milenekovic/McGraw Hill, 1992.
5	An Introduction to Operating System/Harvey M Dietel/ Pearson Education, 2004.
6	Beginning Linux Programming/Neil Matthew, Richard Stones/4th Edition, Wiley, 2007.