

CSE11150	Operating System	L	T	P	C
Version 1.0	Contact Hours 45 Hours	3	0	0	3
Pre-requisite/Exposure	Data structures, Programming Languages, and Computer Architecture.				
Co-requisite	NIL				

Course Objectives:

- To understand the students to study the basic principles and functionality of operating systems
- To provide the students to identify the concepts of CPU scheduling, concurrent processes, deadlock
- To allow the students to identify the significance of memory management and virtual memory.
- To enhance the skill of students to identify the disk scheduling, file systems, and device management.
- To understand the students to explain the performance trade-offs inherent in advance OS implementation.

Course Outcomes:

On the completion of this course the student will be able to

CO1: Understand functionalities and features of Operating System

CO2: Analyze various scheduling algorithms and threading concepts to identify a suitable algorithm for a given criteria.

CO3: Assess various solutions for critical section problem. Applying deadlock avoidance principles and check for the occurrence of deadlock.

CO4: Explain different memory management techniques and its uses. Structuring an overview of file systems and mass storage

CO5: Understand the functionalities of modern operating system like Android, iOS, Windows 11 etc.

Course Description:

The course will begin with an overview of the structure of computer operating systems. The purpose of this course is to provide students basic knowledge of operating systems, difference between the kernel and user modes, concepts of application program interfaces, methods and implementations of interrupts. Students are introduced to the schedulers, policies, processes, threads, memory management, virtual memory, protection, access control, and authentication. Students learn system calls in different popular operating systems used in the industry. Particular emphasis will be given to three major OS subsystems: process management (processes, threads, CPU scheduling, synchronization, and deadlock), memory management (segmentation, paging, swapping), and file systems; and on modern operating system architecture.

Course Content:

Units	Lecture Hours
Unit-I: Introduction to Operating System: Introduction: Concept of Operating Systems, Operating Systems Objectives and Functions, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Protection and Security, Case study on UNIX and WINDOWS Operating System.	09
Unit-II: Introduction to Process and Process Scheduling : Process Management Process concept- process scheduling, operations, Inter process communication. Multi Threadprogramming models. Process scheduling criteria and algorithms (FCFS, SJF, Priority, RR, Multilevel queue Scheduling), and their evaluation.	09
Unit-III: Inter-process Communication and Deadlock : Process synchronization, the critical- classic problems of synchronization, monitors, Producer Consumer problem, Readers & Writers Problem, Dining Philosopher Problem . Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, and Deadlock	09
Unit-IV: Memory and File Management : Memory Management : Swapping, contiguous memory allocation, paging, structure of the page table, segmentation,Virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing. File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed),Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.	09
Unit-V: Modern OS Architectures : Case Study on: Android, Windows 11, Mac, oxygen OS and other contemporary Operating system.	09

Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Relationship between Course Outcomes (COs) and Program Outcomes (POs):

1 = Weakly Mapped

2 = Moderately Mapped 3 = Strongly Mapped

[illegible]

Course Code	Course Name	COs	P O1	P O2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
	System	CO1115	2	2	2	3	3	3	2	-	3	-	-	1	2	2	3
		0.2															
		CO1115	3	3	2	2	1	3	3	-	3	-	-	2	1	1	3
		0.3															
		CO1115	2	2	2	1	2	3	1	-	1	-	-	1	2	1	1
		0.4															
		CO1115	3	1	2	2	3	2	3	-	2	-	-	3	3	2	1
		0.5															
		CO1115	2.	2.	2.	1.	2.	2.	2.	-	2.	-	-	1.8	2.2	1.8	2.2
		0	4	0	2	8	4	4	2		2						