	ITER, SIKSHA 'O' ANUSANDHAN **Deemed to be University**		LESSON PLAN
Programme	**B.Tech.**	Academic Year	**2023-24**
Department	**CSE/CSIT**	Semester	**5th**
Instructor	**Mr.Rakesh Kumar**	Grading Pattern	**1**
Subject Code	**CSE 4049**		
Subject Name	**Design of Operating Systems**		

Text Books(s):

(1) Operating Systems: Internals and Design Principles, by William Stallings, Pearson India(WS).
(2) Unix shell programming by Yashavant Kanetkar, BPB Publications (YK).

Course Format: 3 Class/week, 1 hr/Class; 1 lab/week, 2 hr/Lab

Course Outcomes	Students will be able to	
	CO1	To understand the different components of operating System and various ways of structuring an operating system.
	CO2	To differentiate the basic design issues involved in creating process and threads.
	CO3	To analyze the mechanisms involved in handling, scheduling and synchronizing processes.
	CO4	To learn the different methods used to prevent and deal with deadlock.
	CO5	To explore various memory management, file handling and input output schemes, analyzing their effectiveness in a different scenario.
	CO6	To familiarize with unix programming environment file system, Basic command and able to apply prerequisite facets of shell programming in order to devise a shell script to solve a problem.

Lecture/ Problem Solving (PS)	**Lessons/Topics to be covered**	**Book reference (sections)**	**Mapping with COs**
Week #1:			
Lecture#1	Computer system overview: Basic element, evolution of microprocessor.	WS_1.1-1.2 (pg.29-32)	**CO1**
Lecture#2	Instruction execution, Interrupt.	WS_1.3-1.4 (pg.32-45)	**CO1**

Lecture#3	Memory Hierarchy, Cache Memory DMA, Multiprocessor and Multicore Organization.	WS_1.5-1.8 (pg. 46-57)	**CO1**
Lab#1	Introduction to Unix and Unix file system.		**CO6**
Week #2:			
Lecture#4	Operating System objective and functions, Evolution of Operating System, Major Achievement.	WS_2.1-2.3 (pg.69-91)	**CO1**
Lecture#5	Development Leading to Modern Operating System, Fault Tolerance, OS Design Considerations for Multiprocessor and Multicore.	WS_2.4-2.6 (pg.92-100)	**CO1**
Lecture#6	Overview of Microsoft Window, Tradition Unix System, Modern Unix System, Linux.	WS_2.7-2.10 (pg.101-117)	**CO1**
Lab#2	Assignment 1: Essential Unix Command.		**CO6**
Week #3:			
Lecture#7	Process Concept, Process State.	WS_3.1-3.2 (pg.131-147)	**CO2**
Lecture#8	Process Description.	WS_3.3 (pg.148-156)	**CO2**
Lecture#9	Process Control, Execution of Operating System.	WS_3.4-3.5 (pg.156-165)	**CO2**
Lab#3	Assignment 1 Contd.....		**CO6**
Week #4:			
Lecture#10	Thread Concept Overview, Type of Threads.	WS_4.1-4.2 (pg.177-189)	**CO2**
Lecture#11	Multicore and Multi-threading, Multi-threading Models.	WS_4.3 (pg.190-195)	**CO2**
Lecture#12	Types of Processor Scheduling, CPU Scheduling Basic concept, Scheduling Criteria.	WS_9.1 (pg.426-429)	**CO3**
Lab#4	Assignment 2, I/O Redirection in Unix.		**CO6**

Week #5:			
Lecture#13	Scheduling Algorithms: FCFS, SJF.	WS_9.2 (pg.430-451)	**CO3**
Lecture#14	SRTF, Priority Scheduling.	WS_9.2 (pg.430-451)	**CO3**
Lecture#15	Round Robin , Highest Response Ratio Scheduling.	WS_9.2 (pg.430-451)	**CO3**
Lab#5	Assignment 2 Contd.....		**CO6**
Week #6:			
Lecture#16	Multilevel queue scheduling, Multilevel feedback queue scheduling.	WS_9.2 (pg.430-451)	**CO3**
Lecture#17	Traditional Unix scheduling.	WS_9.3 (pg.450-454)	**CO3**
Lecture#18	Process Synchronization: Background, Critical Section Problem.	WS_5.1-5.2 (pg.224-240)	**CO3**
Lab#6	Assignment 3, Piping in Unix.		**CO6**
Week #7:			
Lecture#19	Mutual Exclusion, Software Approach: Dekker's, Peterson's algorithm.	WS_5.1 (pg.224-240)	**CO3**
Lecture#20	Mutual Exclusion: Hardware Support (compare and-swap, Exchange).	WS_5.2 (pg.241-244)	**CO3**
Lecture#21	Semaphore, Types of Semaphore, Semaphore Implementation.	WS_5.4 (pg.244-250)	**CO3**
Lab#7	Assignment 3 Contd.....		**CO6**
Week #8:			

Lecture#22	The Producer-Consumer Problem, Semaphore Solution to Bounded buffer Producer-Consumer Problem.	WS_5.4 (pg.250-257)	**CO3**
Lecture#23	Semaphore Solution to Reader Writers Problem(Readers have priority.	WS_5.7 (pg.270-272)	**CO3**
Lecture#24	Monitor, Monitor Solution to Bounded Buffer Producer-Consumer Problem.	WS_5.5 (pg.257-261)	**CO3**
Lab#8	Assignment 4, Vi king of all editor		**CO6**
Week #9:			
Lecture#25	Message Passing, Solution to Reader Writer problem using Message Passing.	WS_5.6-5.7 (pg.263-270, 273-274)	**CO3**
Lecture#26	Dining Philosopher Problem, Semaphore and Monitor Solution.	WS_6.6 (pg.309-313)	**CO3**
Lecture#27	Principles of Deadlocks: Resource Allocation Graph, Condition of Deadlock.	WS_6.1 (pg.290-299)	**CO4**
Lab#9	Assignment 4 Contd.....		**CO6**
Week #10:			
Lecture#28	Deadlock prevention, Deadlock Avoidance.	WS_6.2-6.3 (pg.299-306)	**CO4**
Lecture#29	Deadlock Avoidance Contd.....	WS_6.3 (pg.300-306)	**CO4**
Lecture#30	Deadlock Detection and Recovery.	WS_6.4 (pg.306-308)	**CO4**
Lab#10	Assignment 5, Process in Unix.		**CO6**
Week #11:			

Lecture#31	Memory Management requirements, Memory Partition.	WS_7.1-7.2 (pg.340-345)	**CO5**
Lecture#32	Memory Partition Contd.....	WS_7.2 (pg.346-354)	**CO5**
Lecture#33	Paging.	WS_7.3 (pg.355-358)	**CO5**
Lab#11	Assignment 5 Contd.....		**CO6**
Week #12:			
Lecture#34	Segmentation.	WS_7.4 (pg.358-359)	**CO5**
Lecture#35	Virtual Memory: Hardware and Control Structures.	WS_8.1 (pg.371-380)	**CO5**
Lecture#36	Hardware and Control Structures Contd.....	WS_8.1 (pg.381-388)	**CO5**
Lab#12	Assignment 6, Communication Unix Style.		**CO6**
Week #13:			
Lecture#37	Operating System Policy for Virtual Memory.	WS_8.2 (pg.388-393)	**CO5**
Lecture#38	Operating System Policy for Virtual Memory Contd.....	WS_8.2 (pg.394-407)	**CO5**
Lecture#39	I/O Devices, Organization of Input Output Function, I/O Buffering.	WS_11.1-11.4 (pg.506-516)	**CO5**
Lecture#40	Disk scheduling.	WS_11.5 (pg.517-523)	**CO6**

Lab#13	✡ End Term Project.		**CO3-CO5**