LNMIIT, Jaipur
Department of Computer Science & Engineering

Programme:	Course Title:			Course Code:
B. Tech. (CSE)	Operating system			CSE-222
Type of Course:	Prerequisites:			Total Contact Hours:
Program Core	Data Structures and Algorithms			40
Year/Semester:	Lecture Hrs/Week:	Tutorial Hrs/Week:	Practical Hrs/Week:	Credits:
2/Even	3	0	2	4

Learning Objective:

The course aims to provide a basic understanding of concepts relating to operating systems, such as concurrency and control of processes, deadlocks, memory management, disk scheduling and management and file system organization

Course outcomes (COs):

On completion of this course, the students will have the ability to:		Bloom's Level
CO-1	**Understand** fundamental concepts associated with operating systems	2
CO-2	**Review** and **analyze** the theory and **implement** the techniques of process management concepts including scheduling, synchronization, multithreading and deadlocks	2, 3, 4
CO-3	**Illustrate** and **identify** theory and **implement** the methods of different memory management techniques	2, 3, 4
CO-4	**Understand** and **classify** issues related to file systems and disk management	2

Course Topics	Lecture Hours	
UNIT – I Overview of Operating Systems (OS)		
1.1 Definition, OS operations, OS services. ✓	1	2
1.2 OS structure, System calls. ✓	1	
UNIT – II Process Management		
2.1 Process concept, Process states, Inter-process communication. ✓	3	
2.2 Threads – Multithreading models, Thread libraries. ✓	3	
2.3 Process Synchronization – Critical section problem, Peterson's solution, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Monitors.	5	18
2.4 CPU scheduling – Algorithms, Thread scheduling, Multiple-processor scheduling, Real-time CPU scheduling.	4	
2.5 Deadlocks – Prevention, Avoidance, Detection.	3	

UNIT – III Memory Management		
3.1 Basic memory concepts: Linking and Loading, Swapping, Continuous memory allocation.	2	7
3.2 Segmentation, Paging, paged Segmentation.	2	
3.3 Demand paging, Page replacement, Thrashing.	3	
UNIT-IV Storage Management		
4.1 I/O Systems – Disk scheduling, Disk management, RAID structure, Interrupts, Direct memory access.	4	8
4.2. File System – File concept, Access methods, Directory and Disk structure, File-system mounting, File sharing.	4	
UNIT-V Protection and Security		
5.1 Goals of Protection, Principles of protection, Access matrix, Access control.	2	5
5.2 The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User authentication.	3	

OS Laboratory	Lab Hours	
Experiments	20	
1. Introduction to the UNIX system, creating virtual computer.	2	
2. Introduction to basic UNIX commands and implementation of shell.	2	
3. Implement the Dinning-philosopher Problem.	2	
4. Implement the concepts of semaphore.	2	
5. Implement different process scheduling algorithm.	2	20
6. Implementation of deadlock prevention algorithm.	2	
7. Implementation of IPC using shared memory concepts.	2	
8. Create a program to demonstrate the virtual memory concepts.	2	
9. Create a program to track threads that are waiting for their alarms.	2	
10. Implement and demonstrate different page replacement policies.	2	

Textbook References:
Text Book:
1. A. Silberschatz, P.B. Galvin and G. Gagne, *Operating System Concepts*, 8th ed. Wiley, 2009.

Reference books:
1. Tanenbaum, *Modern Operating Systems,* 3rd ed. Prentice Hall, 2007.

2. W. Stallings, *Operating Systems*, 2nd ed. Prentice Hall, 1995.

3. W. R. Stevens, *Advanced Programming In The UNIX Environment*, 2nd ed. Addison-Wesley Professional, 2005.

Additional Resources:
NPTEL lectures

Evaluation Method

Item	Weightage (%)
Theory Quiz 1	10
Theory Quiz 2	10
Theory Mid-Term Exam	20
Theory End-Term Exam	40
Lab Assessment	20

*Please note, as per the existing institute's attendance policy the student should have a minimum of 75% attendance. Students who fail to attend a minimum of 75% lectures will be debarred from the End Term/Final/Comprehensive examination.

CO and PO, PSO Correlation Matrix for CSE

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1						2	1		3	3	1	3
CO2	3	3	2						2	1		3	3	1	3
CO3	3	3	1						2	1		3	3	1	3
CO4	3	2	1						2	1		3	3	1	3

CO and PO, PSO Correlation Matrix for CCE

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1						2	1		3	-	1	1
CO2	3	3	2						2	1		3	-	-	1
CO3	3	3	1						2	1		3	-	-	1
CO4	3	2	1						2	1		3	-	-	1

Last Updated On: 3rd November, 2022
Updated By: Poulami Dalapati, Praveen Kumar Chandaliya, Vikas Bajpai
Approved By: