

SGK GOVERNMENT DEGREE COLLEGE, VINUKONDA			
DEPARTMENT OF COMPUTER SCIENCE			
OPERATING SYSTEM			
II YEAR, IV SEMESTER			
LESSON PLAN			
Hour	Topic	Activity	Synopsis
1	Introduction to Operating Systems	Icebreaker: OS Trivia Quiz	Introduce the concept of an operating system and its fundamental role in computer systems.
2	Types of Operating Systems		Discuss different types of operating systems, including single-user, multi-user, real-time, and distributed operating
3	Operating System Concepts		Cover fundamental operating system concepts such as processes, threads, memory management, and file systems.
4	Operating System Services		provided by operating systems, including program execution, I/O operations, and error handling.
5	Introduction to System Calls		Introduce system calls and their role as a bridge between user programs and the operating system.
6	System Call Types: Process Control		Focus on system calls related to process control, covering process creation, termination, and scheduling.

7	System Call Types: File Management		Discuss system calls associated with file management, including file creation, reading, writing, and deletion.
8	System Call Types: Device Management	Device Interaction Challenge	Explore system calls related to device management, including device request, input/output, and status inquiries.
9	System Call Types: Information Maintenance		Cover system calls involved in obtaining system information, such as time, date, and system status.
10	System Call Types: Communication		Discuss system calls that facilitate communication between processes, like message passing and shared memory.
11	System Call Types: Security and Protection		Explain system calls related to security and protection, focusing on access control and permissions.
12	Recap and Q&A		Recapitulate the concepts covered and provide an opportunity for students to ask questions and seek clarification.
13	Process Concept		Introduce the concept of a process and its role in computing through a role play activity.

14	The Process	Process Lifecycle Discussion	Discuss the lifecycle stages of a process: creation, execution, termination, and more.
15	Process State Diagram		Visualize and explain different states a process transitions through during its execution.
16	Process Control Block		Discuss the elements of a PCB and engage in creating a sample process control block.
17	Scheduling Queues		Simulate the concept of scheduling queues and demonstrate how processes move between them.
18	Schedulers	Scheduler Selection Activity	Discuss and compare different schedulers (short-term, mid-term, long-term) and their characteristics.
19	Operations on Processes		Allow students to perform operations on processes, such as suspension, resumption, and termination.
20	Interprocess Communication		Present scenarios requiring interprocess communication and discuss possible solutions.
21	Threading Issues		Explore challenges related to threading and discuss ways to mitigate them.
22	Scheduling-Basic Concepts		Engage in a debate on the fundamental principles underlying scheduling.
23	Scheduling Criteria		Evaluate different scheduling criteria and discuss their pros and cons.

24	Scheduling Algorithms		Simulate various scheduling algorithms to understand their impact on system performance.
25	Process Synchronization		Introduce process synchronization by drawing parallels with real-life activities that require coordination.
26	The Critical-Section Problem		Present the critical-section problem and analyze scenarios to understand its challenges.
27	Synchronization Hardware		Examine hardware-based solutions for process synchronization in computer systems.
28	Semaphores		Implement semaphores and demonstrate their usage in synchronizing processes.
29	Classic Problems of Synchronization	Problem-Solving Workshop	Engage in problem-solving sessions for classic synchronization problems like the Dining Philosophers.
30	Monitors		Discuss the concept of monitors and how they aid in process synchronization.
31	Synchronization Examples	Real-world Synchronization Examples	Explore real-world examples of synchronization issues and their solutions.
32	Race Conditions		Simulate race conditions and discuss the problems they can cause in a system.

33	Mutual Exclusion		significance of mutual exclusion in concurrent programming.
34	Deadlocks	Deadlock Identification and Solutions	Identify deadlocks and brainstorm solutions to mitigate their occurrence.
35	Starvation		Discuss techniques to prevent starvation in concurrent systems and ensure fair resource allocation.
36	Recap and Q&A		Recap the learned concepts and assess understanding through a quiz on concurrency and synchronization.
37	Swapping		Simulate the swapping of processes in and out of main memory to introduce the concept of swapping.
38	Contiguous Memory Allocation	Allocation Strategy Comparison	Compare different contiguous memory allocation strategies and discuss their pros and cons.
39	Paging		Engage in an activity to map logical addresses to physical addresses using the paging technique.
40	Structure of the Page Table		Discuss the structure and design considerations of the page table in virtual memory systems.

41	Segmentation		Analyze the segmentation memory management technique and its applications in computer systems.
42	Virtual Memory	Virtual vs Physical Memory Comparison	Compare and contrast virtual memory with physical memory, emphasizing its advantages.
43	Demand Paging		Simulate demand paging scenarios and discuss how it optimizes memory usage.
44	Page-Replacement Algorithms		Evaluate various page-replacement algorithms and discuss their efficiency in different scenarios.
45	Thrashing		Explore strategies to prevent and handle thrashing in virtual memory systems.
46	Memory Fragmentation		Discuss how memory fragmentation occurs and explore potential solutions to mitigate it.
47	Memory Protection		Understand memory protection mechanisms and how they secure memory in a multi-user environment.
48	Recap and Q&A		Recap the concepts and present a challenge to solve memory management-related problems.
49	File System Interface	Understanding File Concepts	Introduce the concept of a file and various access methods for files in operating systems.

50	Access Methods		Compare different access methods like sequential, random, and indexed access for files.
51	Directory Structure		Discuss different directory structures and their implementations for efficient file organization.
52	File System Mounting		Engage in an exercise to demonstrate the mounting process of a file system in an operating system.
53	File Sharing and Protection	Sharing and Protection Analysis	Explore file sharing mechanisms and how protection is enforced to ensure data security.
54	File System Implementation		Discuss the architecture and design considerations in implementing a file system.
55	Allocation Methods		Compare various file allocation methods like contiguous, linked, and indexed allocation.
56	Free Space Management		Discuss methods to manage free space within a file system efficiently.
57	Mass-Storage Structure Overview		Examine the components and organization of mass storage in computer systems.
58	Disk Scheduling		Simulate disk scheduling algorithms and discuss their impact on disk performance.

59	Device Drivers		Discuss the role of device drivers and how they facilitate communication between hardware and the operating system.
60	Recap and Q&A		Recap the concepts and present a challenge to solve file system-related problems.