



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

OPERATING SYSTEMS LABORATORY								
III Semester: CSE / CSE (CS) / IT								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACSD10	Core	L	T	P	C	CIA	SEE	Total
		0	0	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45			Total Classes: 45			
Prerequisites: There are no prerequisites to take this course.								

I. COURSE OVERVIEW:

The course covers some of the design aspects of operating system concepts. Topics covered include process scheduling, memory management, deadlocks, disk scheduling strategies, and file allocation methods. The main objective of the course is to teach the students how to select and design algorithms that are appropriate for problems that they might encounter in real life.

II. COURSE OBJECTIVES

The students will try to learn:

- I. The functionalities of main components in operating systems and analyze the algorithms used in process management.
- II. Algorithms used in memory management and I/O management
- III. Different methods for preventing or avoiding deadlocks and File systems.

III. COURSE OUTCOMES:

At the end of the course students should be able to:

- CO1 Acquire knowledge of the operating system structure and process
- CO2 Analyze the performance of process scheduling algorithms
- CO3 Evaluate the process memory requirement and its fragmentation.
- CO4 Analyze the safe state and deadlock mechanism
- CO5 Analyze the performance of the disk scheduling algorithms
- CO6 Ability to simulate file structures and allocation methods

IV. COURSE CONTENT:

Week – 1: CPU SCHEDULING ALGORITHMS

Simulate the following non-preemptive CPU scheduling algorithms and evaluate the performance by choosing corresponding metrics.

- b. FCFS.
- c. SJF.
- d. Round Robin (pre-emptive)
- e. Priority

Week – 2: MULTI-LEVEL QUEUE SCHEDULING ALGORITHM

Simulate multi-level queue scheduling algorithm considering the following scenario. All the processes in the system are divided into two categories – system processes and user processes. System processes are to be given higher priority than user processes. Use FCFS scheduling for the processes in each queue.

Week – 3: FILE ALLOCATION STRATEGIES

Simulate the following file allocation strategies

- a) Sequential
- b) Indexed
- c) Linked

Week – 4: MEMORY MANAGEMENT TECHNIQUES

Simulate the MVT and MFT memory management techniques.

Week – 5: MEMORY MANAGEMENT TECHNIQUES

Simulate the following contiguous memory allocation techniques

- a) Worst-fit
- b) Best-fit
- c) First-fit

Week – 6: MEMORY MANAGEMENT TECHNIQUE

Simulate paging technique of memory management

Week – 7: FILE ORGANIZATION TECHNIQUES

Simulate the following file organization techniques

- a) Single level directory
- b) Two level directory
- c) Hierarchical

Week – 8: DEADLOCK MANAGEMENT

Conversion of resource allocation graph (RAG) to wait for graph (WFG) for each type of method used for storing graph.

Week – 9: DEADLOCK MANAGEMENT TECHNIQUES

Simulate Bankers algorithm for the purpose of deadlock avoidance

Week – 10: DISK SCHEDULING ALGORITHMS

Simulate disk scheduling algorithms

- a) FCFS b) SCAN c) C-SCAN

Week – 11: PAGE REPLACEMENT ALGORITHMS

Simulate page replacement algorithms

- a) FIFO b) LRU c) LFU

Week – 12: PAGE REPLACEMENT ALGORITHMS

Simulate Optimal page replacement algorithm.

Week – 13: PROCESS SYNCHRONIZATION

Simulate producer-consumer problem using semaphores

Week – 14: PROCESS SYNCHRONIZATION

Implement Reader- Writer problem using semaphore

V.TEXT BOOKS:

1. Abraham Silberschatz, Peter Galvin and Gagne, “Operating System Concepts”, Addison Wesley, 6th edition, 2002.
2. Harvey M.Deitel, ”Operating System”, Addison Wesley, 2nd edition, 2000.

VII. ELECTRONICS RESOURCES

1. <https://cs.sdsu.edu/master-exams/operating-systems-architecture/>

VIII. MATERIALS ONLINE

1. Course template
2. Lab Manual