



INSTITUTE OF AERONAUTICAL ENGINEERING

Dundigal, Hyderabad - 500 043

COMPUTER SCIENCE AND ENGINEERING

COURSE DESCRIPTION FORM

Course Title	OPERATING SYSTEMS LAB			
Course Code	A50589			
Regulation	R13 - JNTUH			
Course Structure	Lectures	Tutorials	Practicals	Credits
	-	-	3	2
Course Coordinator	Ms. G Sunitha, Associate Professor, CSE			
Team of Instructors	Mr. K Chiranjeevi, Assistant Professor, CSE Ms. M Bhavya, Assistant Professor, CSE			

I. COURSE OVERVIEW:

This lab complements the operating systems course. Students will gain practical experience with designing and implementing concepts of operating systems such as system calls, CPU scheduling, process management, memory management, file systems and deadlock handling using C language in Linux environment.

II. PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	2	3	Operating Systems, Computer Programming, Data Structures

III. MARKS DISTRIBUTION:

Sessional Marks	End Semester Exam	Total Marks
There shall be a continuous evaluation during the semester for 25 marks. Day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination conducted by the concerned teacher shall be evaluated for 10 marks.	50	75

IV. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1.	Day-to-day Evaluation	-	15
2.	Internal Practical Examination	2.5 hours	10
5.	End Semester Examination	2.5 hours	50

V. COURSE OBJECTIVES:

At the end of the course, the students will be able to:

- I. Be familiar the design aspects of operating system.

- II. Master internals of OS system call implementation.
- III. Be competent with CPU scheduling and process management.
- IV. To design and apply the memory management concepts.
- V. Be competent with internals of file systems.

VI. COURSE OUTCOMES:

At the end of the laboratory course the students are able to:

1. **Understand** and implement basic services and functionalities of the operating system using system calls.
2. **Use** modern operating system calls and synchronization libraries in software/ hardware interfaces.
3. **Understand** the benefits of thread over process and implement synchronized programs using multithreading concepts.
4. **Analyze** and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority.
5. **Implement** memory management schemes and page replacement schemes.
6. **Simulate** file allocation and organization techniques.
7. **Understand** the concepts of deadlock in operating systems and implement them in multiprogramming system.

VII. COURSE PLAN

Division of Experiments	List of Experiments																		
CPU Scheduling Algorithms	<p>Week - 1 Consider the following set of processes, with the length of the CPU burst given in milliseconds:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Process</th> <th style="text-align: center;">Burst Time</th> <th style="text-align: center;">Priority</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">P1</td> <td style="text-align: center;">10</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">P2</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">P3</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">P4</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">P5</td> <td style="text-align: center;">5</td> <td style="text-align: center;">2</td> </tr> </tbody> </table> <p>Write a C program to simulate the following non-preemptive CPU scheduling algorithms to find turnaround time and waiting time for the above problem. (a) FCFS (b) SJF</p>	Process	Burst Time	Priority	P1	10	3	P2	1	1	P3	2	3	P4	1	4	P5	5	2
	Process	Burst Time	Priority																
P1	10	3																	
P2	1	1																	
P3	2	3																	
P4	1	4																	
P5	5	2																	
<p>Week – 2</p> <p>1) Write a C program to simulate the following preemptive CPU scheduling algorithms to find turnaround time and waiting time for the above problem. (a) Round Robin (b) Priority</p> <p>2) *Write a C program to 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. The priority of each process ranges from 1 to 3. Use fixed priority scheduling for all the processes.</p>																			
File Allocation Strategies	<p>Week - 3 Write a C program to simulate the following file allocation strategies. (a) Sequential (b) Indexed (c) Linked</p>																		

Memory Management Techniques	Week - 4 1) Write a C program to simulate the MVT and MFT memory management techniques. 2) *Write a C program to simulate the following contiguous memory allocation techniques (a) Worst-fit (b) Best-fit (c) First-fit
	Week - 5 Write a C program to simulate paging technique of memory management.
File Organization Techniques	Week - 6 Write a C program to simulate the following file organization techniques (a) Single level directory (b) Two level directory
	Week - 7 Write a C program to simulate the following file organization techniques (c) Hierarchical
Deadlock Management Techniques	Week - 8 Write a C program to simulate Bankers algorithm for the purpose of deadlock avoidance.
	Week - 9 Write a C program to simulate Bankers algorithm for the purpose of deadlock prevention.
Page Replacement Algorithms	Week - 10 Write a C program to simulate page replacement algorithms (a) FIFO (b) LRU
	Week - 11 Write a C program to simulate page replacement algorithms (a) LFU *(b) Optimal
Process Synchronization	Week - 12 a) *Write a C program to simulate producer-consumer problem using semaphores. b) *Write a C program to simulate the concept of Dining-Philosophers problem.
Disk Scheduling Algorithms	Week - 13 *Write a C program to simulate disk scheduling algorithms a) FCFS (b) SCAN (c) C-SCAN

*Content beyond the university prescribed syllabi

Prepared by : Ms. G Sunitha, Associate Professor, CSE

Date : 6 June, 2015

HOD, CSE