

## Course Name: Operating System

### Course Outcomes (COs):

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

1. Explanation of the basic structure and functionality of operating system.
2. Analysis of various algorithms in process management, process scheduling and inter process communication.
3. Explanation and analysis of different deadlock prevention, avoidance and detection algorithms.
4. Explanation and analysis of different memory management algorithms.
5. Explanation of I/O systems, file system and analysis of different disk scheduling algorithms. Case study of operating systems.

<b>Model Question Paper for End Semester Examination</b>				
<b>Course Code:</b>			<b>Course Title: Operating System</b>	
<b>Duration: 3 hrs</b>			<b>Max. Marks: 100</b>	
<b>Ques Num</b>	<b>Question (Attempt any four)</b>	<b>Marks</b>	<b>CO</b>	<b>B L</b>
<b>1</b>				
<b>a</b>	What are the different services provided by an operating system? Explain any two with suitable examples.	5	CO1	1
<b>b</b>	What do you mean by system call? What are the different system calls provided by operating system?	5	CO1	1
<b>c</b>	Differentiate between distributed system and parallel systems.	5	CO1	1
<b>d</b>	Justify the statement "It is possible to support multiprogramming without using time sharing. However, it is impractical to support time sharing without using multiprogramming".	5	CO1	4
<b>e</b>	With the help of suitable example explain real time operating system. Differentiate between hard and soft real time systems.	5	CO1	2
<b>Ques Num</b>	<b>Question (Attempt any four)</b>	<b>Marks</b>	<b>CO</b>	<b>B L</b>
<b>2</b>				
<b>a</b>	Write short notes on message passing system with respect to inter-process communication. How mailboxes are used in message passing system?	5	CO2	2
<b>b</b>	With the example of suitable example explain, how semaphore is implemented for two process solution?	5	CO2	3
<b>c</b>	Explain the mechanism of scheduler. Differentiate short term and long term scheduler.	5	CO2	1

<b>d</b>	What are different process states? Differentiate between process and thread with the help of suitable example.	<b>5</b>	<b>CO2</b>	<b>1</b>																																			
<b>e</b>	What do you mean by starvation? How it can be avoided?	<b>5</b>	<b>CO2</b>	<b>2</b>																																			
<b>Ques Num 3</b>	<b>Question (Attempt any two)</b>	<b>Marks</b>	<b>CO</b>	<b>B L</b>																																			
<b>a</b>	What do you mean by deadlock? Explain resource ranking mechanism for deadlock prevention. Differentiate between preemptive and non preemptive scheduling. Describe Bankers algorithm.	<b>10</b>	<b>CO3</b>	<b>2</b>																																			
<b>b</b>	Describe segmented paging? Explain in detail. What are the various steps taken by an OS during page fault? Discuss with suitable example. How segmentation provides protection?	<b>10</b>	<b>CO4</b>	<b>2</b>																																			
<b>c</b>	<p>An OS Contains 3 resource classes. The number resources units in these classes are 7, 7 and 10, respectively. The current resource allocation state is as shown below.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th colspan="3">Allocates Resources</th> <th colspan="3">Maximum Requirement</th> </tr> <tr> <th></th> <th>R1</th> <th>R2</th> <th>R3</th> <th>R1</th> <th>R2</th> <th>R3</th> </tr> </thead> <tbody> <tr> <td>Process P1</td> <td>2</td> <td>2</td> <td>3</td> <td>3</td> <td>6</td> <td>8</td> </tr> <tr> <td>Process P2</td> <td>2</td> <td>0</td> <td>3</td> <td>4</td> <td>3</td> <td>3</td> </tr> <tr> <td>Process P3</td> <td>1</td> <td>2</td> <td>4</td> <td>3</td> <td>4</td> <td>4</td> </tr> </tbody> </table> <p>Is the current allocation state is safe? If yes then write the safe sequence. Describe deadlock detection and recover mechanism.</p>		Allocates Resources			Maximum Requirement				R1	R2	R3	R1	R2	R3	Process P1	2	2	3	3	6	8	Process P2	2	0	3	4	3	3	Process P3	1	2	4	3	4	4	<b>10</b>	<b>CO3</b>	<b>5</b>
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<b>Ques Num 4</b>	<b>Question (Attempt any two)</b>	<b>Marks</b>	<b>CO</b>	<b>B L</b>																																			
<b>a</b>	Describe virtual memory in details. Suppose we have given with the following string of the pages to be referenced. 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1 If we are given with a memory system with 3 frames then how much page faults will occur using FCFS algorithm?	<b>10</b>	<b>CO4</b>	<b>5</b>																																			
<b>b</b>	Explain the concept thrashing. Write a short note on any mechanism to avoid thrashing. Describe Compile time, Load time and Execution time binding.	<b>10</b>	<b>CO4</b>	<b>2</b>																																			
<b>c</b>	Suppose more the one user are working on same project using common files then which directory structure will be suitable to work with? Explain tree structured directory with the help of suitable example.	<b>10</b>	<b>CO5</b>	<b>2</b>																																			

<b>Ques Num 5</b>	<b>Question (Attempt any two)</b>	<b>Marks</b>	<b>CO</b>	<b>B L</b>
<b>a</b>	With the help of suitable example describe disadvantages of the linked allocation strategies. Describe associate and direct mapping of the cache memory organization.	<b>10</b>	<b>CO5</b>	<b>4</b>
<b>b</b>	Write short notes on security and protection mechanism used in memory system. How look and c-look disk scheduling are different from scan and c-scan scheduling. Give suitable example for the explanation.	<b>10</b>	<b>CO5</b>	<b>2</b>
<b>c</b>	How Indexed allocation mechanism of the file allocation strategy overcomes the problems faced in linked allocation strategy. Write a short note on FAT.	<b>10</b>	<b>CO5</b>	<b>4</b>