



**Computer Science paper-I**  
**Operating Systems-I**  
**[Discipline Specific Course]**

<b>Semester: V</b>	<b>Credits: 02</b>	<b>Subject Code: BS52201</b>	<b>Lectures: 36</b>
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**Course Outcomes:**

**At the end of this course, the learner will be able to:**

- Explain the underlying structure of the operating system
- Describe the concept of process & threads.
- Apply different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.
- Apply segmentation and paging techniques for memory management.

<b>Unit 1: Introduction to Operating Systems</b>	<b>06</b>
<ul style="list-style-type: none"> <li>● Operating Systems Overview- <ul style="list-style-type: none"> <li>○ system Overview and Functions of operating systems</li> </ul> </li> <li>● Operating system Operations</li> <li>● Structure of operating <ul style="list-style-type: none"> <li>○ System Simple structure, Layered approach, Micro kernels, Modules</li> </ul> </li> <li>● Protection and security</li> <li>● Computing Environments- <ul style="list-style-type: none"> <li>○ Traditional, mobile, distributed, Client/server, peer to peer computing, Open source operating System</li> </ul> </li> <li>● Booting</li> <li>● Operating System services</li> <li>● System calls and types of System calls and their working</li> </ul>	

<b>Unit 2: Processes and Threads</b>	<b>08</b>
<ul style="list-style-type: none"> <li>● Process Concept – <ul style="list-style-type: none"> <li>○ Definition, Process states, Process control block.</li> </ul> </li> <li>● Process Scheduling – <ul style="list-style-type: none"> <li>○ Context switch ,Scheduling queues, Schedulers</li> </ul> </li> <li>● Operations on Process – Process creation with program using fork(), Process termination .</li> <li>● Threads – <ul style="list-style-type: none"> <li>○ Definition of Threads, benefits, Multithreading models, Thread libraries.</li> </ul> </li> <li>● Inter process Communication – <ul style="list-style-type: none"> <li>○ Shared memory system, Message passing systems.</li> </ul> </li> </ul>	

<b>Unit 3: Process Scheduling</b>	<b>08</b>
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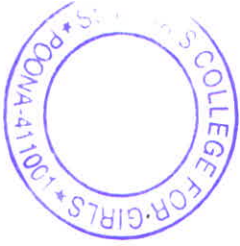




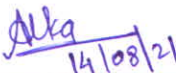

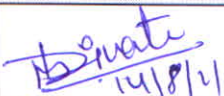
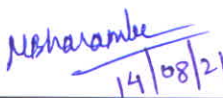
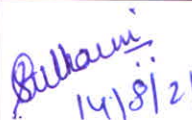
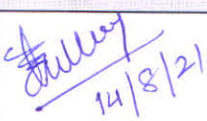
<ul style="list-style-type: none"> <li>● Process Scheduling           <ul style="list-style-type: none"> <li>● Basic Concept –               <ul style="list-style-type: none"> <li>○ CPU-I/O burst cycle, CPU scheduler, Preemptive and non Preemptive scheduling, Dispatcher</li> </ul> </li> <li>● Scheduling Criteria</li> <li>● Scheduling Algorithms –               <ul style="list-style-type: none"> <li>○ FCFS, SJF, Priority scheduling, Round-robin scheduling, Multiple queue scheduling, Multilevel feedback queue scheduling</li> <li>○ Thread Scheduling</li> </ul> </li> </ul> </li> </ul>	
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<b>Unit 4 : Process Synchronization &amp; Memory management</b>	<b>14</b>
<p>Process Synchronization</p> <ul style="list-style-type: none"> <li>● Background</li> <li>● Critical Section Problem</li> <li>● Semaphores: Usage, Implementation</li> <li>● Classic Problems of Synchronization –           <ul style="list-style-type: none"> <li>○ The bounded buffer problem,</li> <li>○ The reader writer problem</li> <li>○ The dining philosopher problem</li> </ul> </li> <li>● Memory management</li> <li>● Background –           <ul style="list-style-type: none"> <li>○ Basic hardware, Address binding, Logical versus physical address space, Dynamic loading, dynamic linking and shared libraries.</li> <li>○ Contiguous Memory Allocation –</li> <li>○ Memory mapping and protection, Memory allocation, Fragmentation</li> <li>○ Paging –</li> <li>○ Basic Method, Hardware support, Protection, Shared Pages</li> </ul> </li> <li>● Segmentation –           <ul style="list-style-type: none"> <li>○ Basic concept, Hardware</li> </ul> </li> <li>● Virtual Memory Management –           <ul style="list-style-type: none"> <li>○ Demand paging, Performance of demand paging,</li> <li>○ Page replacement – FIFO, OPT, LRU , MFU ,Second chance algorithm</li> </ul> </li> </ul>	

<b>Recommended Reference Books:</b>
<ul style="list-style-type: none"> <li>● Avi Silberschatz, PeterGalvin, GregGagne, <i>OperatingSystemConcepts</i>. WileyAsia.</li> <li>● MSinghal and NG Shivaratri, <i>Advanced Concepts in operating systems</i>, TataMcGrawHillInc,2001</li> <li>● William Stallings <i>Operating Systems: Internals and Design Principle</i>, Prentice Hall of India</li> </ul>

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