



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

Semester: V	Credits: 02	Subject Code: BS52201	Lectures: 36
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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.

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

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

Unit 3: Process Scheduling	08	
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- Process Scheduling
- Basic Concept –
 - CPU-I/O burst cycle, CPU scheduler, Preemptive and non Preemptive scheduling, Dispatcher
- Scheduling Criteria
- Scheduling Algorithms –
 - FCFS, SJF, Priority scheduling, Round-robin scheduling, Multiple queue scheduling, Multilevel feedback queue scheduling
 - Thread Scheduling

Unit 4: : Process Synchronization & Memory management

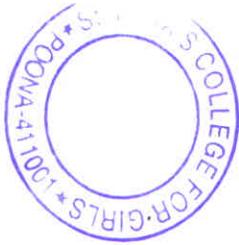
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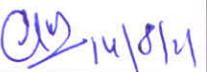
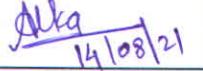
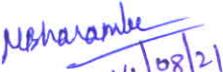
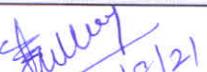
- Process Synchronization
- Background
- Critical Section Problem
- Semaphores: Usage, Implementation
- Classic Problems of Synchronization –
 - The bounded buffer problem,
 - The reader writer problem
 - The dining philosopher problem
- Memory management
- Background –
 - Basic hardware, Address binding, Logical versus physical address space, Dynamic loading, dynamic linking and shared libraries.
 - Contiguous Memory Allocation –
 - Memory mapping and protection, Memory allocation, Fragmentation
 - Paging –
 - Basic Method, Hardware support, Protection, Shared Pages
- Segmentation –
 - Basic concept, Hardware
- Virtual Memory Management –
 - Demand paging, Performance of demand paging,
 - Page replacement – FIFO, OPT, LRU , MFU ,Second chance algorithm

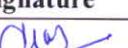
Recommended Reference Books:

- Avi Silberschatz, Peter Galvin, Greg Gagne, *Operating System Concepts*. WileyAsia.
- MSinghal and NG Shivaratri, *Advanced Concepts in operating systems*, TataMcGrawHillInc,2001
- William Stallings *Operating Systems: Internals and Design Principle*, Prentice Hall of India

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