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| Hours / Week | : | 4 | |  | Sessional Marks | : | 40 |
| Credits | : | 4 | |  | End Examination Marks | : | 60 |

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| **UNIT - I** |
| Introduction, Definition, views, OS structure, operations.  **OS Concepts**: Process, Memory and Storage Management, Protection & Security, Computing Environments.  **System Structures**: OS services, interfaces, system calls & types, OS design & Implementation, OS structures. |
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| **UNIT – II** |
| **Process Concepts**: Process states, PCB, Process Scheduling, Operations, Interprocess communication.  **Multithreaded Programming**: Multithreading models, Thread libraries, Threading issues, Examples.  **CPU Scheduling**: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Disk Scheduling algorithms. |
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| **UNIT – III** |
| **Process Synchronization**: The Critical-Section Problem, Semaphores, Monitors, Message Passing, Classical IPC problems (Readers-Writers, Dining philosophers and producer & consumer problems).  **Deadlocks**: Resources, Conditions for resource deadlocks, deadlock avoidance, deadlock prevention. Deadlock detection and recovery. |
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| **UNIT – IV** |
| **Memory Management Techniques**: Introduction, swapping, Contiguous Memory Allocation, Paging, Structure of page table, Segmentation, Examples.  **Virtual Memory Management**: Introduction, Demand Paging, Copy on write, page replacement, Frame allocation, Thrashing, Memory Mapped Files, Kernel Memory allocation, Examples. |
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| **UNIT – V** |
| **File-System Implementation**: File-System Structure, File-System Implementation Directory Implementation.  **I/O Systems**: Overview, I/O hardware, Kernel I/O subsystem  **Case Studies**: Linux, Windows XP. |
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| TEXT BOOKS |
| 1. Silberschatz A, Galvin P B , Gagne G, Operating System Principles, 7th Edition, Wiley-India 2004 |
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| REFERENCE BOOKS |
| 1. Tanenbaum AS, Modern Operating Systems, 3rd Edition, Pearson Education 2008.( for Interprocess Communication, Deadlocks, File Systems and Case studies) 2. Deitel HM, Deitel PJ and Choffnes DR, Operating Systems, 3rd Edition, Pearson Education 2004. 3. Stallings W, Operating Systems – Internals and Design Principles, 5th Edition, Prentice Hall of India 2005. |