17CS2103 - OPERATING SYSTEMS

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| **Course Category:** | Core | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture – Tutorial – Practical:** | 3-0-0 |
| **Prerequisite:** | Knowledge about Fundamentals of Computer basics | **Sessional Evaluation:**  **Univ.Exam Evaluation:**  **Total Marks:** | 40  60  100 |
| **Objectives** | * Learn OS operations and supporting structures. * Knowledge about the different scheduling algorithms and their evaluation. * Obtain exposure on deadlock handling, protection and security mechanisms. | | |

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| **Course Outcomes** | Upon successful completion of the course, the students will be able to: | |
| CO1 | Learn the Basics of Operating Systems and structures. |
| CO2 | Acquire knowledge about Inter process communication and Scheduling algorithms. |
| CO3 | StudyDeadlock handling mechanisms. |
| CO4 | Understand various Memory management techniques. |
| CO5 | Gain insights of File system operations andimplementation methods. |
| CO6 | Identify Disk Structures and various goals and principles of protection. |
| **Course Content** | UNIT - I  **Introduction:** Role of OS, Operations, Process Management, Memory and Storage Management, Protection and Security, Computing Environment.  **OS Structures:** Services, User Interfaces, System calls and types, Design and Implementation, Various structures of OS, System Boot.  UNIT – II  **Process Management:** Introduction, Process Control Block, Scheduling, Operations on Processes, Interprocess Communication, Examples of IPC systems.  **CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiprocessor Scheduling, Algorithm Evaluation.  UNIT – III  **Process Synchronization:** The Critical-Section Problem, Semaphores, Monitors, Classic Problems of Synchronization-Reader/Writers Problem, Dining – Philosophers Problem.  **Deadlocks:** System model and Characterization, Conditions for resource deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection and recovery.  UNIT – IV  **Memory Management:** Hardware and Address Binding, Swapping, Contiguous Memory Allocation, Paging and Segmentation.  **Virtual Memory:** Introduction, Demand Paging, Copy on write, Page replacement, Frame allocation, Thrashing, Kernel Memory allocation.  UNIT – V  **File system Basics:** Introduction, Access Methods, Directory structures, File Sharing and Protection.  **File System Implementation:** Structure, File System Implementation, Directory Implementation, Recovery, Overview on NFS.  UNIT – VI  **Mass Storage Management:** Overview, Disk Structure, Disk Attachment, Disk Scheduling Algorithms, Disk Management, RAID Levels.  **Protection and Security:** Goals , Principles and Domain of protection, Access Matrix and Implementation, Security Problem, Program Threats, System and Network Threats. | |
| **Text Books and References:** | **Text Books:**   1. 1.Silberschatz A, Galvin P B , Gagne G, Operating System Principles, 7th Edition   **Reference Books:**   1. Tanenbaum AS, Modern Operating Systems, 3rd Edition, Pearson Education 2008 2. Stallings W, Operating Systems – Internals and Design Principles, 5th Edition, Prentice Hall of India 2005 3. Operating System: A Design-oriented Approach by Charles Crowley | |
| **E-Resources** | 1. [**https://nptel.ac.in/courses**](https://nptel.ac.in/courses) 2. [**https://freevideolectures.com/university/iitm**](https://freevideolectures.com/university/iitm) | |