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:** | 4060100 |
| **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
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| **E-Resources** | 1. [**https://nptel.ac.in/courses**](https://nptel.ac.in/courses)
2. [**https://freevideolectures.com/university/iitm**](https://freevideolectures.com/university/iitm)
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