**OPERATING SYSTEMS**

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| **Course Code** | 23CS3401 | **Year** | II | **Semester** | II |
| **Course Category** | PC | **Branch** | **CSE/IT** | **Course Type** | **Theory** |
| **Credits** | 3 | **L – T – P** | 3-0-0 | **Prerequisites** | Data structures, Computer Organization and Architecture |
| **Continuous Evaluation:** | 30 | **Semester End Evaluation:** | 70 | **Total Marks:** | 100 |

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| **Course Outcomes** | | |
| Upon successful completion of the course, the student will be able to: | | |
| **CO1** | Understand the structure and functionalities of operating systems | L2 |
| **CO2** | Apply different algorithms of CPU scheduling, Page replacement and disk scheduling. | L3 |
| **CO3** | Apply various concepts to solve problems related to process synchronization and deadlocks. | L3 |
| **CO4** | Analyse and interpret the functionalities of operating system. | L4 |

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| **Syllabus** | | |
| **Unit No.** | **CONTENTS** | **Mapped**  **CO** |
| **I** | **Operating Systems Overview:** Introduction, Operating system functions, Operating systems operations, Computing environments, Free and Open-Source Operating Systems  **System Structures:** Operating System Services, User and Operating-System Interface, system calls, Types of System Calls, system programs, Operating system Design and Implementation. | **CO1,CO2,CO3** |
| **II** | **Processes**: Process Concept, Process scheduling, Operations on processes, Inter-process communication.  **Threads and Concurrency**: Multithreading models, Thread libraries, Threading issues.  **CPU Scheduling:** Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling. | **CO1,CO2,CO4** |
| **III** | **Synchronization Tools**: The Critical Section Problem, Peterson’s Solution, Mutex Locks, Semaphores, Monitors, Classic problems of Synchronization.  **Deadlocks:** system Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock. | **CO1,CO3,CO4** |
| **IV** | **Memory-Management Strategies:** Introduction, Contiguous memory allocation, Paging, Structure of the Page Table, Swapping.  **Virtual Memory Management**: Introduction, Demand paging, Copy-on-write, Page replacement, Allocation of frames, Thrashing  Storage Management: Overview of Mass Storage Structure, HDD Scheduling. | **CO1,CO2,**  **CO4** |
| **V** | **File System:** File System Interface: File concept, Access methods, Directory Structure; File system Implementation: File-system structure, File-system Operations, Directory implementation, Allocation method, Free space management; File-System Internals: File-System Mounting, Partitions and Mounting, File Sharing.  **Protection:** Goals of protection, Principles of protection, Protection Rings, Domain of protection, Access matrix. | **CO1,CO2,CO4** |

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| **Learning Resources** |
| **Text Books** |
| 1. Operating System Concepts, Silberschatz A, Galvin P B, Gagne G, 10th Edition, Wiley, 2018. 2. Modern Operating Systems, Tanenbaum A S, 4th Edition, Pearson , 2016 |
| **Reference Books** |
| 1. Operating Systems -Internals and Design Principles, Stallings W, 9th edition, Pearson, 2018 2. Operating Systems: A Concept Based Approach, D.M Dhamdhere, 3rd Edition, McGraw- Hill, 2013 |
| **E-Resources & other digital material** |
| 1. https://nptel.ac.in/courses/106/106/106106144/ 2. http://peterindia.net/OperatingSystems.html |