Principles of Operating Systems

Course Code	23IT2501	**Year**	III	**Semester**	I
Course Category	OE-1	**Branch**	IT	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	-
Continuous Internal Evaluation :	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to:		BL
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

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of Correlations (3:High, 2:Medium, 1:Low)

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3												
CO2	3	3	3										
CO3	3	3	3										
CO4	3	3											
Avg.,	3	3	3										

Syllabus		
Unit No.	**Contents**	**Mapped CO**
1	**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
2	**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

3	**Synchronization Tools:** The Critical Section Problem, Peterson's Solution, Mutex Locks, Semaphores, Classic problems of Synchronization, Monitors. **Deadlocks:** system Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock.	CO1,CO3, CO4
4	**Memory-Management Strategies:** Introduction, Swapping, Contiguous memory allocation, Paging, Structure of the Page Table. **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
5	**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,CO4

Learning Resources
Text Books
1. Silberschatz A, Galvin P B, Gagne G Operating System Concepts, 10th Ed., Wiley, 2018. 2. Tanenbaum A S, Modern Operating Systems, 4th Ed., Pearson , 2016
Reference Books
1. Stallings W, Operating Systems -Internals and Design Principles, 9th Ed., Pearson, 2018 2. D.M Dhamdhere, Operating Systems: A Concept Based Approach,3rd Ed., McGraw- Hill, 2013
E-Resources & other digital material
1. https://archive.nptel.ac.in/courses/106/102/106102132/ 2. http://peterindia.net/OperatingSystems.html