Operating Systems

Course Code	20CS3401	**Year**	II	**Semester**	II
Course Category	PCC	**Branch**	CSE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Data structures, Computer Organization and Architecture
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		
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	Analyze and interpret the functionalities of operating system.	**L4**

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3													
CO3													1	
CO4		3							1	1				

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Overview: Introduction**: What Operating Systems Do, Computer-System Organization, Computer-System Architecture, Operating-System Structure, Operating-System Operations **Operating System Structures:**	**CO1,CO2,CO3**

	Operating-System Services, User and Operating-System Interface, System Calls, Types of System Calls.	
II	**Process Management:** Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication. **Threads:** Overview, Multi-core Programming, Multithreading Models. **Process Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms (First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling.)	**CO1,CO2,CO4**
III	**Process Synchronization:** Background, The Critical-Section Problem, Peterson_s Solution, Synchronization Hardware, 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**
IV	**Memory Management:** **Main Memory:** Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table **Virtual Memory:** Background, Demand Paging, Copy-on-Write, Page Replacement, Basic Page Replacement, FIFO Page Replacement, Optimal Page Replacement, LRU Page Replacement, LRU-Approximation Page Replacement, Allocation of Frames, Thrashing.	**CO1, CO2,CO4**
V	**Storage Management:** **File–System Interface:** File Concept, Access Methods, Directory and Disk Structure. **File–System Implementation:** File-System Structure, File- System Implementation, Directory Implementation, Allocation Methods. **Mass-Storage Structure**: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, FCFS Scheduling, SSTF Scheduling, SCAN Scheduling, C-SCAN Scheduling, LOOK Scheduling, Selection of a Disk-Scheduling Algorithm.	**CO1, CO2,CO4**

Learning Resources

Text book

1. Operating System Concepts, Abraham Silberchatz, Peter Baer Galvin, Greg Gagne, Ninth Edition, 2016, Wiley India.

References

1. Operating Systems - Internal and Design Principles, William Stallings, Ninth Edition, 2018, Pearson.
2. Operating Systems - Harvey M.Deitel, Paul J Deitel and David R.Choffnes , Third Edition, 2019, Pearson.
3. Operating Systems - A Concept based Approach- D.M. Dhamdhere, Second Edition, 2010, McGraw Hill.

e-Resources and other Digital Material

1. https://onlinecourses.nptel.ac.in/noc19_cs50/
2. http://www.youtube.com/watch?v=MaA0vFKtew&list=PL88oxI15Wi4Kw1aEY2bC5l_4pouojjtd4