



- Constituent College of JSS Science and Technology University
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Course Title: Operating Systems	Course Code: 20CS410
Credits: 4	Contact Hours (L: T: P): 52:0:0
Type of Course: Theory	Category: Professional Core Course
CIE Marks: 50	SEE Marks: 100

Pre-Requisites: Computer Organization and Architecture, Data Structures, C Programming.

Course Objectives: The course should enable the students to:

Sl. No.	Course Objectives
1	Understand the concepts that underlie operating systems.
2	Illustrate process management, inter-process communication, process synchronization, multithreading and deadlock handling mechanisms through examples.
3	Comprehend different memory management techniques and file system.

Unit No.	Course Content	No. of Hours
1	Introduction and Operating System Structures: What operating systems do; Computer System organization; Computer System architecture; Operating System structure; Operating System operations; Process management; Memory management; Storage management; Protection and security; Computing environments Operating System structures: Operating System services; User - Operating System interface; System calls and its types System programs; Operating System design and implementation; Operating System structure; Virtual machines; Operating System generation; System boot.	10
2	Processes, Threads and CPU Scheduling: Process concept; Process scheduling; Operations on processes; Interprocess communication. Threads: Overview; Multicore programming; Multithreading models; Thread Libraries; Threading issues. CPU Scheduling: Basic concepts; Scheduling criteria; Scheduling algorithms.	11
3	Process Synchronization and Deadlocks: Basic concepts, The Critical section problem; Peterson's solution; Synchronization hardware; Semaphores; Classic problems of synchronization; Monitors. Deadlocks: System model; Deadlock characterization; Methods for handling deadlocks; Deadlock prevention; Deadlock avoidance; Deadlock detection; Recovery from deadlock.	11
4	Main Memory and Virtual Memory: Background; Swapping; Contiguous memory allocation; Paging; Structure of page table; Segmentation. Virtual Memory: Background; Demand paging; Copy-on-write; Page replacement; Allocation of frames; Thrashing.	10
5	Mass Storage Structure and File System: Overview of Mass storage structure; Disk structure; Disk attachment; Disk scheduling. File System: File concept; Access methods; Directory structure; File system mounting; File sharing; Protection. Implementing File System: File system structure; File system implementation; Directory implementation; Allocation methods; Free space management.	10

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Text Book:

Sl. No.	Author/s	Title	Publisher Details
1	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	Operating system concepts	9 th Edition, Wiley India, 2013

Reference Books:

Sl. No.	Author/s	Title	Publisher Details
1	D.M Dhamdhere	Operating systems-A concept-based Approach	4 th Edition, Tata McGraw- Hill, 2013
2	P.C.P. Bhatt	Introduction to Operating Systems	Concepts and Practice, 4 th Edition, PHI, 2014
3	William Stallings	Operating Systems: Internals and Design Principles	7 th Edition, Prentice Hall of India, 2017
4	Harvey M Deital	Operating systems	3 rd Edition, Pearson Education, 2007

Web Resources:

Sl. No.	Web Link
1	https://www.youtube.com/playlist?list=PLLDC70psjvq5hIT0kfr1sirNuees0N1bG
2	https://youtu.be/783KAB-tuE4 - NPTEL IIT, Madras

Course Outcomes:

CO1	Explain the concepts, goals, design and construction of operating systems.
CO2	Illustrate inter-process communication, multithread handling and analyse various CPU scheduling algorithms.
CO3	Solve process synchronization and Deadlock handling mechanisms.
CO4	Apply the knowledge of main memory and virtual memory to solve paging and page replacement problems.
CO5	Explain the concept of storage management, file system and analyse different disk scheduling techniques.

Mapping Course Outcomes with Program outcomes & Program Specific outcomes:

Course Outcomes	Program Outcomes												PSO's			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	-	-	-	-	-	-	-	-	-	-	-	3	-	3	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	3	3	3	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	-	3	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-	3	3	3	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3	-

1-Low association, 2- Moderate association, 3-High association