



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India

(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
CPC502	Operating System	4	-	--	4	-	--	4
		Examination Scheme						
		ISE		MSE		ESE		
		10		30		100 (60% Weightage)		

Pre-requisite Course Codes	CPC403(Computer Organization and Architecture)	
At end of successful completion of this course, student will be able to		
Course Outcomes	CO1	Describe the functions of Operating Systems.
	CO2	Compare and contrast common algorithm used for preemptive and non-preemptive scheduling.
	CO3	Demonstrate potential run time problems arising from the concurrent operations and many separate tasks.
	CO4	Defend the different ways of allocating memory tasks.
	CO5	Demonstrate file system operations.

Module No.	Unit No.	Topics	Ref.	Hrs.
1	1.1	Introduction to Operating System: Objectives and Functions of O.S., OS Services, Special purpose systems, Types Of OS,	1	4
	1.2	System Calls, types of system calls,	1	
	1.3	Operating system structure, System Boot	1,2	
2	2.1	Process Management : Process concept, operations on process, Process scheduling: basic concepts , scheduling criteria , scheduling algorithms, Preemptive, Non-preemptive, FCFS ,SJF ,SRTN ,Priority based, Round Robin ,Multilevel Queue scheduling,Operating System Examples.	1,2	5
	2.2	Synchronization: Background , the critical section problem , Peterson's Solution, Synchronization Hardware Semaphores, classic problems of Synchronization: The Producer Consumer Problem:Readers writers problem, Semaphores, Dinning Philosopher Problem	1,2	5
	2.3	Deadlock : Deadlock Problem, Deadlock Characterization, Deadlock Prevention. Deadlock avoidance Banker's algorithm for single & multiple resources , Deadlock recovery , Deadlock Detection,	1,2	4



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3	3.1	Memory Management : Memory management strategies: background , swapping ,contiguous memory allocation, paging , structure of page tables , segmentation	1,3	3
	3.2	Virtual memory management: Demand paging , copy-on write,Page replacement, FIFO, Optimal, LRU, LRU Approximation,Counting Based, , Allocation of frames , Thrashing	1,3	2
4	4.1	File Management: Files-System Structure, File System implementation, Directory implementation, Allocation Methods contiguous allocation, linked list allocation, indexed allocations, Free space management.	1,2	4
	4.2	Secondary storage : structures: Disks Scheduling Algorithm: FCFS, SSTF, SCAN, CSCAN, LOOK, Disk Management	1,2	2
	4.3	Input Output Management: Overview , I/O Hardware , Application I/O Interface	1,2	2
5	5.1	Case Study of UNIX: History of UNIX, Overview of UNIX ,UNIX File System, Data structures for process/memory management ,Process states and State Transitions, Using the System(Booting and login),Process scheduling , Memory management , Shell programming	4,5	8
	5.2	Case Study of Linux History , Design Principles , Kernel Modules , Process management , Scheduling , Memory management , File Systems ,Input and Output , Inter process communication , Network structure , Security	4,5	5
	5.3	Case study: Windows 7 : History, Design Principles , System components , environmental subsystems , File System, Networking, Programmer Interface	1	4
			Total	48

References:

- [1] Silberschatz A., Galvin P., Gagne G. "Operating Systems Principles", Willey Eight edition
- [2] William Stallings,"Operating System-Internal & Design Principles", Pearson
- [3] Andrew S. Tanenbaum, "Modern Operating System", Prentice Hall.
- [4] Maurice J. Bach,"The Design of Unix Operating System", Prentice Hall.
- [5] Unix and Shell Programming by B. M. Harwani Oxford