



# 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
ETC 605	Operating System	4	-	--	4	-	--	4
		Examination Scheme						
		ISE		MSE		ESE		
		10		30		100 (60% Weightage)		

<b>Pre-requisite Course Codes</b>	Basic concepts of computer systems	
After successful completion of the course, student will be able to		
<b>Course Outcomes</b>	CO1	Comprehend and describe the role of an operating system, its functions and issues.
	CO2	Compare between different algorithms used for management and scheduling of processes, Memory and input-output operation.
	CO3	Appreciate, compare and contrast the various features of typical operating systems through case study approach.

Module No.	Unit No.	Topics	Ref.	Hrs.
<b>1</b>	<b>Fundamental of Operating System(OS)</b>		1,3,6	06
	1.1	Definition, objectives, functions, evolution, services, types, and different views of OS		
	1.2	Operating System as a resource manager, system calls, and shell		
	1.3	Monolithic systems, layered systems, client server model, monolithic kernel and microkernel		
<b>2</b>	<b>Process Management and Memory Management</b>		1,3,6	10
	2.1	Process, process creation, process control block, process states, process state transition diagram		
	2.2	Scheduling queues and schedulers, preemptive and non- preemptive scheduling algorithms, types of threads, multithreading models		
	2.3	Race condition, critical section, mutual exclusion, semaphores, monitors		
	2.4	Multiprogramming with fixed and variable partitions, memory allocation strategies		
	2.5	Logical and physical address space, paging and segmentation		
	2.6	Concept, performance of demand paging, page replacement algorithms.		
	2.7	Deadlock Problem, deadlock characterization, deadlock prevention and deadlock avoidance deadlock detection and recovery		
<b>3</b>	<b>File Management and Input Output Management</b>		1,3,6	10
	3.1	File Naming, File Structure, File Types, File Access, File		



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		Attributes, File Operations, Memory Mapped Files, Implementing Files, contiguous allocation, linked list allocation, indexed allocations, Inode		
	3.2	Single level directory system, Two level directory system, Hierarchical Directory System		
	3.3	Principles of Input/output H/W: I/O Devices, Device Controllers, Direct Memory Access.		
	3.4	Principles of Input/output S/W: Goals Of I/O S/W, Interrupt Handler, Device Driver, Device Independent I/O Software		
	3.5	Disks : RAID levels, Disks Arm Scheduling Algorithms		
	3.6	Management of free blocks.		06
<b>4</b>	<b>Unix Operating System</b>		2,7	
	4.1	History of UNIX, UNIX Goals, Unix Shell, interfaces to Unix, UNIX utility programs		
	4.2	Traditional UNIX Kernel, Modern UNIX Systems		
	4.3	Unix process management: Concept, Scheduling in Unix		
	4.4	Unix Memory management: Paging, Page replacement strategies		
	4.5	Unix file management: I-node, File allocation, I/O management		
	4.6	Unix Security measures		
<b>5</b>	<b>Linux Operating System</b>		2,7	10
	5.1	History, Linux Processes and Thread management		
	5.2	Scheduling in Linux, Linux System calls		
	5.3	Memory management: Virtual memory, Buddy Algorithm, Page replacement policy		
	5.4	Linux File System		
	5.5	I/O management: Disk Scheduling		
	5.6	Advantages of Linux and Unix over Windows		
<b>6</b>	<b>Real Time Operating System(RTOS)</b>		1,4	10
	6.1	Introduction, Characteristics of real-time operating systems		
	6.2	Real Time task Scheduling, Modeling Timing constraints, Table-driven scheduling		
	6.3	Cyclic schedulers		
	6.4	Earliest Deadline First (EDF) scheduling		
	6.5	Rate Monotonic Algorithm( RMA)		
			<b>Total</b>	<b>52</b>

## References

1. Tanenbaum, "Modern Operating Systems", III<sup>rd</sup> Edition, PHI
2. Silberschatz A., Galvin P., and Gagne G, "Operating Systems Concepts", VIII<sup>th</sup> Edition Wiley.
3. William Stallings, "Operating System-Internal & Design Principles", VI<sup>th</sup> Edition, , Pearson
4. Rajib Mall, "Real-Time Systems: Theory and Practice," Pearson, 2008.
5. Maurice J. Bach, "The Design of Unix Operating System", Prentice Hall
6. Achyut S. Godbole, "Operating Systems", 2<sup>nd</sup> edition, Tata McGraw Hill
7. Richard Blum and Christine Bresnahan, "Linux Command Line & Shell Scripting", 2<sup>nd</sup> edition, Wiley.