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
CE31	Advanced Data Structures	3	--	--	3	--	--	3
		Examination Scheme						
		Theory Marks						
		ISE		MSE		ESE		
		10		30		100(60% Weightage)		

Pre-requisite Course Codes		ES4 (Programming Methodology and Data Structures)
At the end of successful completion the course, students will be able to		
Course Outcomes	CO1	Apply various operations like traversing, retrieving, storing data using linear and non-linear data structures.
	CO2	Demonstrate and apply concepts of Trees and Graphs to a given problem.
	CO3	Compare various Heap Structure
	CO4	Summarize hashing and collision resolution techniques

Module No.	Unit No.	Topics	Ref.	Hrs.
1		**Linear and Non-linear Data Structures** Introduction to Data Structures (Stack, Queue and Singly Linked List), Circular Linked List, Doubly Linked List, Application of Linked List.	1,2	05
2	2.1	**Trees** Binary Tree Terminology, Binary Search Tree and its operations, Binary Tree Traversal, Expression Tree	1,2	04
	2.2	AVL Trees- Properties of AVL trees, Rotations, Insertion, and Deletion	1,2	03
	2.3	B-Trees- Definition of B-trees, Basic operation of B-Trees, Deleting a key from B-Trees	1,2	04
	2.4	Introduction to B+ Trees	1,2	03
	2.4	Introduction to Multidimensional Trees, Segment trees, k-d trees, Point Quad trees	3	05
3	3.1	**Heap Structure** Introduction to Heap Structures, Min Heap, Max Heap, Construction of Heap	2	04

	3.2	Fibonacci heaps- Structure of Fibonacci heaps, Mergeable heap, operations, Decreasing a key and deleting a node	2	06
4		**Hashing** Introduction to Hash Table, Hash functions, Collision Resolution Technique	1,2	04
5		**Graph** Introduction To Graph, Representation of Graph- Adjacency Matrix, Adjacency List, Graph Traversal Technique	1,2	04
			Total	**42**

References:

[1] Thomas H.Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, "Introduction to Algorithms", MIT Press, Massachusetts, 2009.

[2] Horowitz E, Sahni S andS.Rajasekaran, "Fundamentals of Computer Algorithms", Galgotia Publications, New Delhi, 2010

[3] Subrahmanian V S, "Principles of Multimedia Database Systems", Morgan Kaufman, USA, 2001.