

SCSA1304	ADVANCED DATA STRUCTURES	L	T	P	Credits	Total Marks
		3	*	0	3	100

**COURSE OBJECTIVES**

- To acquire knowledge of organizing the data in non linear fashion.
- To get the idea of balancing the height of trees to optimize the structure and search time.
- To learn the process of establishing the network with various nodes with minimum cost and finding the shortest path.
- To understand the method of designing the table data structure and its applications.

**UNIT 1 BASIC TREE CONCEPTS****9 Hrs.**

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Implementation using Array and Linked list - Binary tree ADT representations, recursive and non recursive traversals - Binary Search Tree - Insertion and Deletion.

**UNIT 2 ADVANCED TREE CONCEPTS****9 Hrs.**

Threaded Binary Trees, AVL Tree, B-tree Insertion and deletion, Splay trees - Heap trees - Heapify Procedure, Tries.

**UNIT 3 GRAPH CONCEPTS****9 Hrs.**

Terminology, Representation using Array and Linked List - Types of graphs - Graph traversals - BFS and DFS - Applications.

**UNIT 4 ADVANCED GRAPH CONCEPTS****9 Hrs.**

Minimum Spanning Tree - Kruskal's, Prim's and Sollin's Algorithm - Shortest path using Dijkstra's, Bellman Ford and Floyd Warshall Algorithm.

**UNIT 5 TABLES AND SETS****9 Hrs.**

Rectangular tables - Jagged tables - Inverted tables - Symbol tables - Static tree tables - Dynamic tree tables - Hash tables. Sets: Representation - Operations on sets - Applications.

**Max. 45 Hrs.****COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - Design and implement the various non-linear data structures and perform the intended operations.
- CO2 - Understand the strength of balancing the height of the trees.
- CO3 - Analyze the time complexity of various non linear data structures.
- CO4 - Apply the algorithms to find the shortest path & to connect the nodes with minimum cost.
- CO5 - Design the table and applying the table for many applications.
- CO6 - Compare and identify the usage of different data structures.

**TEXT / REFERENCE BOOKS**

1. Ellis Horowitz and Sartaj Sahni "Fundamentals of Data Structures" Galgotia Book Source, Pvt. Ltd., 2004.
2. M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2<sup>nd</sup> Edition, Pearson Education, 2005.
3. Jean Paul Tremblay and Paul G. Sorenson, "An Introduction to Data Structures with Applications", Tata McGraw-Hill, 2<sup>nd</sup> edition, 2001.
4. Aaron M Tanenbaum, Moshe J Augenstein and Yedidyah Langsam, "Data Structures using C and C++", Pearson Education, 2004.
5. V. Aho, J.E. Hopcroft, and J.D. Ullman, "Data Structures and Algorithms", Pearson Education, 1<sup>st</sup> Edition Reprint 2003.
6. R. F. Gilberg, B. A. Forouzan, "Data Structures", 2<sup>nd</sup> Edition, Thomson India Edition, 2005.

**END SEMESTER EXAMINATION QUESTION PAPER PATTERN****Max. Marks: 100****Exam Duration: 3 Hrs.****PART A :** 10 Questions of 2 marks each-No choice**20 Marks****PART B :** 2 Questions from each unit with internal choice, each carrying 16 marks**80 Marks**