

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: *In this course student will become familiar with Algorithm analysis: Trees, Graphs, searching and sorting and files.*

PRE-REQUISITES:

- C Programming
- Basic Concepts in Data Structure
- Prelims of Trees and Graphs Functionality of Group Theory

UNIT – I

Fundamentals of algorithm analysis Big 'O' notations, Time and space complexity of algorithms, linked lists: singly and doubly linked lists, stacks, queues, double stack, multistacks and multiqueues, dequeues, polynomial arithmetic, infix, postfix and prefix arithmetic expression conversion and evaluations. **[No. of Hrs: 08]**

UNIT – II

Trees: Binary trees: Definition, Binary Search Tree basic operations, Tree Traversals (recursive and stack based non-recursive), Heaps and priority queues, Threaded binary tree, AVL Trees B-Tree: need, properties, creation, uses. B+ tree, B* tree. **[No. of Hrs: 10]**

UNIT – III

Graphs: Representation (Matrix and Linked), Traversals, Connected components, Spanning trees, Shortest path and Transitive closure, Topological sort, Activity network, Critical path, Path enumeration. Dijkstra's Algorithm, Floyd Warshall's Algorithm, Coloring of Graphs, Spanning Tree, Minimum Spanning Tree Algorithms (Kruskal's Algorithm, Prim's Algorithm)

Searching & Sorting: Binary search, Hash function, Hash table, Search tree. Internal sort: Radixsort, Insertion sort, Selection sort, Shell sort, Quick sort, Merge sort, Heap sort.

[No. of Hrs: 16]

UNIT – IV

Files: Sequential file organization, creating updating retrieving from sequential files advantages and disadvantages of sequential file organization. Data representation and density, parity and error control techniques, devices and channels, double buffering and block buffering, handling sequential files in C language, seeking, positioning, reading and writing binary files in C. External Sorting and merging files k way and polyphase merge **[No. of Hrs: 08]**

TEXT BOOKS:

1. E. Horowitz and S. Sahani, "Fundamentals of Data Structures in C", 2nd Edition, Universities Press, 2008.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition Addison-Wesley, 1997.

REFERENCES:

1. Schaum's Outline Series, "Data Structure", TMH, Special Indian Ed., Seventeenth Reprint, 2009.
2. Y. Langsam et. al., "Data Structures using C and C++", PHI, 1999.
3. N. Dale and S.C. Lilly, D.C. Heath and Co., "Data Structures", 1995.
4. R. S. Salaria, Khanna, "Data Structure & Algorithms", Book Publishing Co. (P) Ltd., 2002.
5. Richard F. Gilberg and Behrouz A. Forouzan, "Data Structure A Pseudocode Approach with C", Cengage Learning, 2nd Ed., 2005.
6. Mary E. S. Loomes, "Data Management and File Structure", PHI, 2nd Ed., 1989.