CORE COURSE-V–DATA STRUCTURES AND COMPUTER ALGORITHMS

Unit I

Introduction to data structure: The need for data Structure-Definitions-Data Structures-Arrays: Introduction, range of an array-one dimensional array-two dimensional array- special types of matrices-linked lists: Introduction - benefits and limitations of linked list-Types- singly linked lists-circular linked lists-doubly linked lists.

Unit II

Stack: Introduction- ADT stack - implementation of stack- application of stack - **Queue:** Introduction - implementation of basic operations on array based and linked list based queue - circular Queues.

Unit III

Trees: Introduction–binary Trees-representation of binary trees-Binary tree Traversals - Recursive procedures of traversal methods-Expression Trees-Threaded Trees-Application of Trees.

Unit IV

Algorithms: Introduction: What is an Algorithm? – Algorithm Specification – Performance Analysis – Divide and Conquer: General method – Binary Search – Finding the maximum and minimum – Merge Sort – Quick Sort – Selection –Strassen's Matrix Multiplication.

Unit V

The Greedy Method: General Method – Knapsack problem – Job Sequencing with deadlines – Optimal Storage on tapes – Optimal merge patterns

Minimum cost spanning trees: Prim's Algorithm – Kruskal Algorithm – Dynamic Problem: All pairs of shortest path – single source shortest path-Travelling salesman problem.

Graph: Graph terminology-connecteed graph-graph traversal techniques-

Text Books:

1. Data Structures, A. Chitra, P. T. Rajan, Vijay Nicol Imprints Pvt Ltd,
    2006, McGrawHillEducation of India Pvt Ltd.
    > UNIT I – Chapter 1, 3 (Except Multi-dimensional Arrays) and 4
    > (Except Simple Algorithms on linked lists, Circular doubly linked lists,
    > multiple linked lists, applications, polynomial representation,
    > polynomial addition, representation of polynomials)
    > UNIT II – Chapters 5, 6 (Except Tower of Hanoi, Dequeue)
    > UNIT III – Chapters (Except Priority Queues)
2. Fundamentals ofComputer Algorithms, Ellis Horrowitz, SaratajSahni,
    Galgottia Publications Pvt Ltd, New Delhi
    > UNIT IV – Chapter 1 (Except 1.4), Chapter 3 (Except 3.2, 3.9)
    > UNIT V – Chapter 4 (Except 4.2, 4.6.3)

Books for Reference:

1. Data Structure and Algorithm Analysis in C – Mark Allen Weiss – Second
   Edition, Addison Wesley publishing company, 1997.
2. C and C++ Programming concepts and Data Structures, P.S.Subramanyam,
   BS Publications, 2013.
3. Data Structures and Algorithms, Alfred V.Aho, John E.Hopcraft and
   Jeffrey D.Ullman, Pearson Education, Fourteenth Impression, 2013.