ITOL1 DATA STRUCTURES AND ALGORITHMS L T P C Int Ext

COURSE OBJECTIVES:

At the end of the course, the student will understand

1. To design and implementation of various basic and advanced data structures.
2. To introduce various techniques for representation of the data in the real world.
3. Acquaintance of algorithm design strategies
4. Expertise with a variety of significant algorithms

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Select and Implement Appropriate Linear data structures as applied to specified problem definition.
2. Implement Non-Linear data structures and Develop solutions for complex problem using Divide and Conquer.
3. Develop solutions for complex problems using Greedy and Dynamic Programming.
4. Design and Improve all possible solutions for a problem using Backtracking and Branch and Bound.

UNIT I *Text Book - 1* [CO:1] **(14)**

Analysis of an Algorithm, Asymptotic Notations, Singly Linked lists - Representation in Memory, Abstract Data Types (ADTs) - singly linked lists, doubly - linked lists and circularly linked lists.Stack ADT and its operations using array and linked list, Queue ADT and its operations using array and linked list.

UNIT II *Text Book - 1* [CO:2] **(12)**

Basic Tree Terminologies, Different types of trees: Binary Tree, Binary Search Tree, tree traversals, Graph representation and traversals.Divide and Conquer - Control Abstraction, Merge sort, Quick sort, Binary Search.

UNIT III *Text Book - 2* [CO:3] **(12)**

Greedy Method - Control Abstraction, Knapsack Problem, Minimum Cost Spanning Trees, Single Source Shortest Paths.Dynamic Programming - General Method, Multi-stage Graph, All Pairs Shortest Paths, String Editing, Single Source Shortest Paths (General Weights).

UNIT IV *Text Book - 2* [CO:4] **(14)**

Backtracking - General Method, 8-Queens Problem, and Graph Coloring.Branch and Bound - General Method, Travelling Sales Person Problem, Knapsack problem.

LEARNING RESOURCES:

TEXT BOOK(s):

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education,1997.
2. E. Horowitz, S. Sahni and S.Rajsekaran, "Fundamentals of Computer Algorithms", Galgotia Publication.

REFERENCE BOOK(s):

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", Second Edition, Mc Graw Hill, 2002.
2. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson ducation,1983.

3. Stephen G. Kochan, "Programming in C", 3rd edition, Pearson Education.
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, University Press, 2008
5. Reema Thareja, "Data Structures Using C", Second Edition , Oxford University Press, 2011