

## **BHARATHIAR UNIVERSITY: COIMBATORE- 46**

### **M.Sc. Computer Science (Colleges)**

**The revised syllabi for the following paper furnished below be followed for the candidates admitted during 2017-18 and onwards and there is no change in the existing scheme of examinations and syllabi of remaining papers .**

### **Paper I : ANALYSIS & DESIGN OF ALGORITHMS**

Subject Description:

This course presents an introduction to the algorithms, their analysis and design and various methods like divide and conquer method, Dynamic programming, backtracking.

Goals:

To enable the students to learn the Elementary Data Structures and algorithms.

Objectives:

On successful completion of the course the students should have

- Understood the various design and analysis of the algorithms.

Contents:

**Unit I** :Introduction: - Algorithm Definition and Specification – Space complexity-Time Complexity-Asymptotic Notations - Elementary Data Structure: Stacks and Queues – Binary Tree - Binary Search Tree - Heap - Heapsort- Graph.

**Unit II** : Basic Traversal And Search Techniques: Techniques for Binary Trees-Techniques for Graphs -Divide and Conquer: - General Method – Binary Search – Merge Sort – Quick Sort.

**Unit III** : – The Greedy Method: - General Method – Knapsack Problem – Minimum Cost Spanning Tree – Single Source Shortest Path.

**Unit IV**: Dynamic Programming - General Method – Multistage Graphs – All Pair Shortest Path – Optimal Binary Search Trees – 0/1 Knapsacks – Traveling Salesman Problem – Flow Shop Scheduling.

**Unit V** :Backtracking: - General Method – 8-Queens Problem – Sum Of Subsets – Graph Coloring – Hamiltonian Cycles – Branch And Bound: - The Method – Traveling Salesperson.

#### **Reference Books :**

1. Ellis Horowitz,“Computer Algorithms”, Galgotia Publications.
2. Alfred V.Aho,John E.Hopcroft,Jeffrey D.Ullman, "Data Structures and Algorithms".
3. Goodrich, “Data Structures & Algorithms in Java”, Wiley 3rd edition.
4. Skiena, ”The Algorithm Design Manual”, Second Edition, Springer , 2008
5. AnanyLevith, ”Introduction to the Design and Analysis of algorithm”, Pearson Education Asia, 2003.
6. Robert sedgewick,Phillipe Flajolet, ”An Introduction to the Analysis of Algorithms”, Addison-Wesley Publishing Company,1996.