**H.N.G. University, Patan**
**M.Sc.(C.A. & I.T.) SEMESTER - VIII**
**803 : Advance Algorithms**

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**Unit : 1** **[25%]**

**Linked Storage Algorithms**

**Linked List Algorithms:** Single, Double, Circular and Sorted Linked list.

**Unit : 2** **[25%]**

**Tree & Graph Algorithms**

**Tree Algorithms:** Types of Tree, Traversing Binary Tree, BST with Header Node, Threaded BST

**Graph Algorithms:** Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Algorithm for Kruskal's and Prim's for finding Minimum cost Spanning Trees.

**Unit : 3** **[25%]**

**Divide and Conquer approach, Dynamic Programming and Greedy algorithms:**

**Divide and Conquer Approach:** Merge Sort, Quick sort, Medians and Order statistics, Strassen's algorithm for Matrix Multiplications

**Dynamic Programming:** Elements of Dynamic Programming, Matrix Chain Multiplication, Longest common subsequence and optimal binary search trees problems.

**Greedy Algorithms:** Elements of Greedy strategy, An activity selection problem, Huffman Codes, A task scheduling problem.

**Unit : 4** **[25%]**

**String matching and NP-Complete Problem**

**String matching:** The naïve String Matching algorithm, The Rabin-Karp Algorithm, String Matching with finite automata, The Knuth-Morris Pratt algorithm.

**NP-Complete Problem:** Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP-Complete problems.

**Text Books :**


1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.
2. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis Of Computer Algorithms", Pearson Education Asia, 2003.


**Reference Books :**


1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt. Ltd., 2001
2. An Introduction to Data Structures with Application By Tremblay & Sorenson McGraw-Hill 1984