



**Paper Code : DAA:604**  
**Paper Name : DESIGN AND ANALYSIS OF ALGORITHMS**

Teaching Hours (Per Week)		Examination Scheme		
TH. (hours)	Pr. (hours)	Internal	External	Total
		Th. (marks)	Th. (marks)	100 (marks)
4		30	70	

**Lectures = 68 Hours**

“In order to design good algorithm, we must first agree the criteria for measuring algorithms. The emphasis in this course will be on design of efficient algorithm, hence we will measure algorithms in terms of the amount of the computational resources that algorithm requires.”

**Detailed Syllabus**

**UNIT I**

**Introduction**

**10 Hours**

What is an Algorithm?, Fundamentals of Algorithmic Problem Solving, Important Problem Types, Fundamental Data Structures.

**Fundamentals of the Analysis of Algorithm Efficiency**

Analysis Framework, Asymptotic Notations and Basic Efficiency Classes.

**UNIT II**

**Brute Force and Exhaustive Search**

**24 Hours**

Selection Sort and Bubble Sort, Sequential Search and Brute-Force String Matching, Exhaustive Search, Depth First Search, Breadth First Search.

**Divide and Conquer**

Mergesort, Quicksort, Binary Search, Binary tree traversals and related properties.

**Decrease and Conquer**

Insertion Sort, , Topological Sorting.

**Transform and Conquer**

Balanced Search Trees, Heaps and Heapsort.

**UNIT III**

**Dynamic Programming**

**8 Hours**

The Knapsack Problem and Memory Functions, Optimal Binary search tree.

**UNIT IV**



**Greedy Technique**

**6 Hours**

Prim's Algorithm, Kruskal's Algorithm.

**UNIT V**

**20 Hours**

**Limitations of Algorithm Power**

Lower-Bound Arguments, Decision Trees, P, NP and NP-Complete Problems.

**Coping with the Limitation of Algorithm Power**

Backtracking (definition only), Branch-and-Bound : Knapsack Problem, Traveling Salesman Problem

**RECOMMENDED BOOKS**

**Main Book:**

**Introduction to The Design & Analysis of Algorithms**, Anany Levitin, 2<sup>nd</sup> Edition, Pearson Education, 2007.

**Reference Book:**

1. **Introduction to Algorithms**, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, 2<sup>nd</sup> Edition, PHI, 2006.
2. **Computer Algorithms** by Horowitz E., Sahni S., Rajasekaran S., Galgotia Publications, 2001.
3. **Introduction to the Design and Analysis of Algorithms A Strategic Approach**, R.C.T. Lee, S.S. Tseng, R.C. Chang & Y.T.Tsai, TMH, 2005.