

Lesson Plan Of Mrinal Kanti Bhowmik

Name of the Subject: Design & Analysis of Algorithms

Subject Code: CSE 901C TH

Topics	Contact Hours	Contact Occurred On	Remarks
Introduction: What is Algorithm? Algorithm and its specification. Time Complexity-I: Asymptotic Notation, Standard Notation and Common Functions, Asymptotic Analysis (Best, Worst, Average Case).	2		
Time Complexity-II: Different cases of Time Complexity of Binary Search and Linear Search, Bubble Sort, Quick Sort, Merge Sort, Tournament Sort, Bucket Sort or Radix Sort, Insertion Sort, Selection Sort.	4		
Greedy Algorithm: Activity Selection Problem, Elements of the Greedy Policy, Hoffman Coding, Task Scheduling Problem, Coin Changing Problem/Algorithm, Prim's Algorithm And Kruskal's Algorithm And Comparisons. Knapsack Problem. Scheduling with Minimizing Time in the System.	6		
Shortest Path Algorithm: Dijkstra Algorithm, Divide And Conquer Method: Multiplying large integers. Strassen Matrix Multiplication.	6		
Dynamic Programming: Elements of Dynamic Programming, Making Change, Knapsack Problem, Shortest Path (Floyd Algorithm), Matrix Chained Multiplication, Assembly Line Scheduling.	6		
Exploring Graphs: Introduction, Traversing Trees: Pre order, Post order Numbering. DFS, BFS, Acyclic Graphs. Backtracking: Knapsack Problem, Eight Queen's Problem Branch and Bound: Assignment Problem.	4		
Graph Algorithms: Single Source Shortest Path: Bellman Ford Algorithm, Dijkstra Algorithm. All Pairs Shortest Path: Short Path of Floyd Warshall Algorithm, Johnson's Algorithm.	4		
Computational Complexity: Introduction to NP completeness, The Classes P and NP, Polynomial Reduction, NP Cook's Therom Complete Problems NP-completeness; Redurdancy. Approximation algorithms; Randomized algorithms; Linear programming;	4		
Special topics: Geometric algorithms (range searching, convex hulls, segment intersections, closest pairs), Numerical algorithms (integer, matrix and polynomial multiplication, FFT, extended Euclid's algorithm, modular exponentiation, primality testing, cryptographic computations),	4		
Grand Total	40		

Consulted/ Prescribed Books:

1. Introduction to Algorithms: T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein (Prentice Hall of India(PHI) Private Limited, New Delhi)
2. Fundamentals of Algorithmics: G. Brassard and P. Bratley (The MIT Press; 3rd edition)
3. Algorithm Design: Foundations, Analysis and Internet Examples: R. Tamassia and M.T Goodrich (Wiley India Private Limited, New Delhi)
4. Algorithm Design: J. Kleinberg and E. Tardos (Pearson Education)
5. Fundamentals of Computer Algorithms: E. Horowitz and S. Sahani (Galgotia Publications, New Delhi)
6. Design and Analysis of Algorithms: S. Sridhar (Oxford University Press, New Delhi)
7. Electronic materials from internet.