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Design and Analysis of Algorithms

SEM -5 ACADEMIC YEAR 2024-25

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Sr. No	Lecture No	Unit No	Name OF Topic
		1	**Introduction:**
1	1	1	Characteristics of algorithm. Analysis of algorithm
2	2	1	Asymptotic analysis of complexity bounds– best, average and worst-case behavior
3	3	1	Asymptotic analysis of complexity bounds– best, average and worst-case behavior
4	4	1	Performance measurements of Algorithm
5	5	1	Time and space trade-offs
6	6	1	Analysis of recursive algorithms through recurrence relations: Substitution method
7	7	1	Recursion tree method
8	8	1	Recursion tree method
9	9	1	Masters' theorem
		2	**Fundamental Algorithmic Strategies:**
10	10	2	Brute-Force
11	11	2	Greedy
12	12	2	Greedy
13	13	2	Greedy
14	14	2	Dynamic Programming
15	15	2	Dynamic Programming
16	16	2	Dynamic Programming
17	17	2	Branch- and-Bound
18	18	2	Branch- and-Bound
19	19	2	Branch- and-Bound
20	20	2	Backtracking methodologies for the design of algorithms
21	21	2	Illustrations of these techniques for Problem-Solving

22	22	2	Bin Packing
23	23	2	Knap Sack TSP
24	24	2	Heuristics – characteristics and their application domains
		3	**Graph and Tree Algorithms:**
25	25	3	Traversal algorithms: Depth First Search (DFS)
26	26	3	Traversal algorithms: Depth First Search (DFS)
27	27	3	Breadth First Search (BFS)
28	28	3	Breadth First Search (BFS)
29	29	3	Shortest path algorithms
30	30	3	Shortest path algorithms
31	31	3	Transitive closure
32	32	3	Minimum Spanning Tree
33	33	3	Minimum Spanning Tree
34	34	3	Topological sorting
35	35	3	Topological sorting
36	36	3	Network Flow Algorithm.
37	37		
		4	**Tractable and Intractable Problems**
38	38	4	Computability of Algorithms
39	39	4	Computability classes – P, NP
40	40	4	NP-complete and NP-hard
41	41	4	Cook's theorem
42	42	4	Standard NP-complete problems
43	43	4	Reduction techniques
		5	**Advanced Topics**
44	44	5	Approximation algorithms
45	45	5	Randomized algorithms
46	46	5	Class of problems beyond NP – P SPACE