



Indraprastha College for Women University of Delhi

Work Plan for ODD SEMESTER – 2026

Course Name:	B.A.(Prog)
Paper Title:	Design and Analysis of Algorithms
Unique Paper Code:	2342574702
Semester:	VII
Faculty:	Dr. Harendra Pratap Singh
Year:	2026-2027

Work Plan			
Unit No.	Learning Objective	Lecture No.	Topics to be Covered
I	Searching, Sorting, Selection	1	Linear search
		2	Binary Search
		3	Insertion Sort
		4	Selection Sort
		5	Bubble sort
		6	Heap Sort
		7	Linear Time Sorting
		8	Running time analysis and correctness
II	Graphs	9	Review of graph traversals
		10	Graph connectivity
		11	Testing bipartiteness, Directed Acyclic Graphs
		12	Topological Ordering
		13	Minimum Spanning Trees
III	Divide and conquer	14	Introduction to divide and conquer techniques
		15	Introduction to divide and conquer techniques
		16	Merge Sort
		17	Merge Sort
		18	Quick Sort
		19	Randomized Quick Sort
		20	Maximum-subarray problem
		21	Strassen's Algorithm for matrix multiplication

IV	Greedy Algorithms	22	Introduction to Greedy Algorithm design approach
		23	Application to minimum spanning trees
		24	Fractional knapsack problem
		25	Fractional knapsack problem with correctness
		26	Fractional knapsack problem and analysis of time complexity
V	Dynamic Programming	27	Introduction to Dynamic Programming approach
		28	Application to subset sum
		29	Integer knapsack problem
		30	Integer knapsack problem with correctness
		31	Integer knapsack problem and analysis of time complexity
VI	Hash Tables	32	Hash Functions
		33	Hash Functions
		34	Collision resolution schemes
		35	Collision resolution schemes

Unit	Contents/Syllabus
I	Searching, Sorting, Selection: Linear search, Binary Search, Insertion Sort, Selection Sort, Bubble sort, Heap Sort, Linear Time Sorting, Running time analysis and correctness
II	Graphs: Review of graph traversals, Graph connectivity, Testing bipartiteness, Directed Acyclic Graphs and Topological Ordering, Minimum Spanning Trees.
III	Divide and conquer: Introduction to divide and conquer techniques, Merge Sort, Quick Sort, Randomized Quick Sort, Maximum-subarray problem, Strassen's Algorithm for matrix multiplication
IV	Greedy Algorithms: Introduction to Greedy Algorithm design approach, Application to minimum spanning trees, Fractional knapsack problem, and analysis of time complexity
V	Dynamic Programming: Introduction to Dynamic Programming approach, Application to subset sum, Integer knapsack problem, and analysis of time complexity
VI	Hash Tables: Hash Functions, Collision resolution schemes.
S. No.	Name of Authors/Books/Publishers
1.	Corman, T.H., Leiserson, C.E., Rivest, R.L., Stein C. <i>Introduction to Algorithms</i> , 4 th edition, Prentice Hall of India, 2022

2.	Kleinberg, J., Tardos E. <i>Algorithm Design</i> , 1 st edition, Pearson, 2013
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	Paper Components		
Credits	Lecture (L)	Tutorial (T)	Practical (P)
4	3	0	1
Assessment Scheme			
S.No.	Component	Marking Scheme	Total Marks
1	Internal Assessment		30
	• Assignment	12	
	• Class Test	12	
	• Attendance	6	
2.	Continuous Assessment (Tutorial)	NA	NA
	• Activity 1	NA	
	• Activity 2	NA	
	• Attendance	NA	
3.	Practical		40
	• Continuous Assessment	10	
	• End Term Written/Practical Exam	20	
	• Viva	10	
4.	End Semester Examination		90