Indraprastha College for Women
University of Delhi

Work Plan for ODD SEMESTER – 2025

Course Name:	BA(Prog.)
Paper Title:	Design and Analysis of Algorithms
Unique Paper Code:	Not received yet
Semester:	III
Faculty(s):	Dr. Manisha Bansal
Year:	2025

	Work Plan			
Week No.	Unit No.	Learning Objective	Reference No.	Topics to be Covered
1 Aug - 2Aug	Unit 1	Insertion Sort, Selection Sort, Bubble Sort		Searching, Sorting, Selection
4 Aug - 9Aug	Unit 1	Insertion Sort, Selection Sort, Bubble Sort		Searching, Sorting, Selection
11Aug - 16Aug	Unit 1	Linear Search, Binary Search, Heapsort		Searching, Sorting, Selection
18Aug - 23Aug	Unit 1	Linear Time Sorting, running time analysis and correctness		Searching, Sorting, Selection
25Aug - 30Aug	Unit 3	Introduction to divide and conquer technique, Merge Sort		Divide and Conquer
1Sep - 6Sep	Unit 3	Quick Sort, Randomised quicksort		Divide and Conquer
8Sep - 13Sep	Unit 3	Maximum-subarray problem, Strassen's algorithm for matrix multiplication.		Divide and Conquer
15Sep - 20Sep	Unit 4	Introduction to the Greedy algorithm design approach, application to minimum spanning trees		Greedy algorithms

22Sep - 27Sep	Unit 4	minimum spanning trees, fractional knapsack problem, and analysis of time complexity.		Greedy algorithms
29Sep - 4Oct	Unit 4	fractional knapsack problem, and analysis of time complexity.		Greedy algorithms
6Oct - 11Oct	Unit 5	Introduction to the Dynamic Programming approach, application to subset sum		Dynamic Programming
13Oct - 18Oct	Unit 5	integer knapsack problems, and analysis of time complexity.		Dynamic Programming
20Oct - 25Oct	Mid Semester Break			
27Oct - 1Nov	Unit 2	Review of graph traversals, graph connectivity,		Graphs
3Nov - 8Nov	Unit 2	testing bipartiteness		Graphs
10Nov - 15Nov	Unit 2	Directed Acyclic Graphs and Topological Ordering, Minimum Spanning Trees.		Graphs
17Nov - 22Nov	Unit 6	Hash Functions		Hash Tables
24Nov - 26Nov	Unit 6	Collision resolution schemes.		Hash Tables

Unit	Contents/Syllabus
I	**Searching, Sorting, Selection:** Linear Search, Binary Search, Insertion Sort, Selection Sort, Bubble Sort, Heapsort, 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 technique, Merge Sort, Quick Sort, Randomised quicksort, Maximum-subarray problem, Strassen's algorithm for matrix multiplication.
IV	Greedy algorithms: Introduction to the Greedy algorithm design approach, application to minimum spanning trees, fractional knapsack problem, and analysis of time complexity.
V	Dynamic Programming: Introduction to the Dynamic Programming approach, application to subset sum, integer knapsack problems, and analysis of time complexity.
VI	Hash Tables Hash Functions, Collision resolution schemes.

S. No.	**Name of Authors/Books/Publishers**
1.	Cormen, T.H., Leiserson, C.E., Rivest, R. L., Stein C. Introduction to Algorithms, 4th edition, Prentice Hall of India, 2022.
2.	Kleinberg, J., Tardos, E. Algorithm Design, 1st edition, Pearson, 2013.
3.	Basse, S., Gelder, A. V., Computer Algorithms: Introduction to Design and Analysis, 3rd edition, Pearson, 1999.
4.	

	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/Quiz/Project/ Presentation	12	
	• Class Test	12	
	• Attendance	6	
2.	Continuous Assessment (**Tutorial)**		NA
	• Activity 1		
	• Activity 2		
	• Attendance		
3.	Practical		40
	• Continuous Assessment	10	
	• End Term Written/Practical Exam	20	
	• Viva	10	
4.	End Semester Examination		90