



Indraprastha College for Women

University of Delhi

Work Plan for ODD SEMESTER – 2026

Course Name:	B.Sc. (Hons.) Computer Science
Paper Title:	Data Structures
Unique Paper Code:	2342012301
Semester:	III
Faculty(s):	Dr. Shailender Singh
Year:	JULY 2026

Work Plan			
Unit No.	Learning Objective	Lecture No.	Topics to be Covered
I	Growth of Functions, Recurrence Relations	1	Functions used in analysis
		2	Asymptotic notations
		3-4	Asymptotic analysis
		5-7	Solving recurrences using recursion trees
		8-9	Master Theorem
II	Arrays, Linked Lists, Stacks, Queues	10	Arrays: array operations, applications,
		11	two- dimensional arrays, dynamic allocation of arrays;
		12-14	Linked Lists: singly linked lists,
		15-16	Doubly linked lists,
		17-18	circularly linked lists,
		19-20	Stacks: stack as an ADT, implementing stacks using arrays,
		21	implementing stacks using linked lists,
		22	applications of stacks;
		23	Queues: queue as an ADT, implementing queues using arrays,
		24	implementing queues using linked lists,
		25	Time complexity analysis.

III	Recursion	26-27	Recursive functions,
		28	linear recursion,
		29-30	binary recursion.
IV	Trees, Binary Trees	31	Trees: definition and properties,
		32-33	tree traversal algorithms and their time complexity analysis;
		34	binary trees: definition and properties,
		35-36	traversal of binary trees and their time complexity analysis.
V	Binary Search Trees, Balanced Search Trees	37	Binary Search Trees: insert,
		38	Binary Search Trees: delete,
		39	Search operations, time complexity analysis of these operations;
		40-41	Balanced Search Trees: insert,
		42	Balanced Search Trees: search operations,
		43	time complexity analysis of these operations. Time complexity analysis.
VI	Binary Heap	44	Binary Heaps: heaps,
		45	heap operations.

Unit	Contents/Syllabus
I	Growth of Functions, Recurrence Relations: Functions used in analysis, asymptotic notations, asymptotic analysis, solving recurrences using recursion trees, Master Theorem.
II	Arrays, Linked Lists, Stacks, Queues: Arrays: array operations, applications, two-dimensional arrays, dynamic allocation of arrays; Linked Lists: singly linked lists, doubly linked lists, circularly linked lists, Stacks: stack as an ADT, implementing stacks using arrays, implementing stacks using linked lists, applications of stacks; Queues: queue as an ADT, implementing queues using arrays, implementing queues using linked lists,. Time complexity analysis.
III	Recursion: Recursive functions, linear recursion, binary recursion.
IV	Trees, Binary Trees: Trees: definition and properties, tree traversal algorithms and their time complexity analysis; binary trees: definition and properties, traversal of binary trees and their time complexity analysis.
V	Binary Search Trees, Balanced Search Trees: Binary Search Trees: insert, delete, search operations, time complexity analysis of these operations; Balanced Search Trees: insert, search operations, time complexity analysis of these operations. Time complexity analysis.

VI	Binary Heap: Binary Heaps: heaps, heap operations.
S. No.	Name of Authors/Books/Publishers
1.	Goodrich, M.T., Tamassia, R., & Mount, D., Data Structures and Algorithms Analysis in C++, 2nd edition, Wiley, 2011.
2.	Cormen, T.H., Leiserson, C.E., Rivest, R. L., Stein C. Introduction to Algorithms, 4th edition, Prentice Hall of India, 2022.
3.	Sahni, S. Data Structures, Algorithms and applications in C++, 2nd edition, Universities Press, 2011.
4.	Langsam Y., Augenstein, M. J., & Tanenbaum, A. M. Data Structures Using C and C++, Pearson, 2009.

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 - Assignment/Quiz/Project/Presentation - Class Test - Attendance	Yes	30
		12	
		12	
		6	
2.	Continuous Assessment (Tutorial) - Activity 1 - Activity 2 - Attendance	NA	NA
3.	Practical - Continuous Assessment - End Term Written/Practical Exam - Viva	Yes	40
		10	
		20	
		10	
4.	End Semester Examination		90