Curriculum Plan

Paper Name: **Data Structures**
Class Type: B.A with Computer Applications
Semester: II
Teacher Name: Ms. Neha Singh

S.N.	Schedule (Approximate)	Topic
1.	January	**Unit 1:** **Growth of Functions, Recurrence Relations:** Functions used in analysis, asymptotic notations, asymptotic analysis, solving recurrences using recursion tree, Master Theorem.
2.	February ***Assignment(Presentations)*** ***Test (Unit 1 & 2)***	**Unit 2:** **Arrays:** array operations, applications, sorting, two-dimensional arrays, dynamic allocation of arrays **Linked Lists:** Linked Lists: singly linked lists, doubly linked lists, circularly linked lists, time complexity analysis of operations **Stacks:** stack as an ADT, implementing stacks using arrays, implementing stacks using linked lists, applications of stacks; time complexity analysis of operations
3.	March ***Assignment(Presentations)*** ***Tests (Unit 2 & 3)***	**Unit 2:** **Queues:** queue as an ADT, implementing queues using arrays, implementing queues using linked lists **Deques:** double-ended queue as an ADT, time complexity analysis of operations. **Unit 3:** **Recursion:** Recursive functions, linear recursion, binary recursion. **Unit 4:** **Trees:** definition and properties
4.	April ***Assignment(Presentations)***	**Unit 4:** **Binary trees**: definition and properties, traversal of binary trees and their time complexity analysis. **Unit 5:** **Binary Search Trees:** insert, delete (by copying), search operations, time complexity analysis of these operations; **Balanced Search Trees**: motivation and introduction.

	Tests (Unit 4 & 5)	**Unit 6** **Binary Heaps:** motivation and introduction, application of heaps
5.	May ***Mock Practical*** ***Viva*** ***Mock Exam***	**Unit 6** **Priority Queues**: introduction only **REVISION**

Essential/recommended readings

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. Drozdek, A., *Data Structures and Algorithms in C++*, 4th edition, Cengage Learning, 2012.

Additional References

(i) Sahni, S., *Data Structures, Algorithms and applications in C++*, 2nd edition, Universities Press, 2011.
(ii) Langsam Y., Augenstein, M. J., & Tanenbaum, A. M. *Data Structures Using C and C++*, Pearson, 2009.