

Curriculum Plan

Paper Name: Data Structures
Class Type: BSc Prog Physical Science
Semester: II
Teacher Name: Ms. Neha Singh

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

5.	May	Unit 5 <u>Binary Heaps:</u> motivation and introduction, heapsort, building heaps REVISION Mock Practical/ Viva/ Mock Exam
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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.

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