Data Structures

UNITS	COURSE CONTENT	CONTACT HOURS
1	**Overview and Arrays:** Introduction to data structures, Data abstraction, Mathematical preliminaries, Arrays, Representation, Searching (linear, binary), Sorting (bubble, insertion, selection)	5L
2	**Linked Lists:** Singly, Doubly, Circular linked lists, Operations (insert, delete, traverse), Applications	3L
3	**Stacks and Queues:** Stack implementation, Recursion, Application (expression evaluation, conversion), Queue types (simple, circular, double-ended, priority), Operations and applications	5L
4	**Trees:** Binary tree, AVL tree, B-tree, M-way search trees, Representation & traversal techniques, Heap tree and applications, Search trees	7L
5	**Graphs:** Graph representations (adjacency matrix/list), BFS/DFS, Shortest path algorithms, Applications	7L
6	**Hashing and Memory:** Hash tables, Techniques (open addressing, chaining), Implementation, Static/dynamic memory allocation	3L
7	**Advanced Applications and Complexity:** Performance analysis (Big-O), Divide and conquer, Recurrence relations, Abstract Data Types (ADT), Libraries for algorithms/data structures	