

DSA Using Python			
S No	Topic	Sub-Topics	Duration
1	Basics of Python programming	Keywords, list,tuple, dictionaries,Functions, Object-Oriented Programming (OOP) Basics	3
2	Introduction to Data Structures	Overview, Importance, Types (Linear, Non-Linear), Memory Concepts	3
	Hands-on	Simple Programs to Understand Memory Allocation and Types	
3	Arrays	1D, 2D Arrays, Multi-Dimensional Arrays, Dynamic Arrays (Lists in Python)	3
	Hands-on	Array Operations: Insertion, Deletion, Traversal, Searching, Sorting	
4	Linked Lists	Introduction, Types (Singly, Doubly, Circular), Operations	4
	Hands-on	Implementing Singly Linked List (Insert, Delete, Reverse, Search)	
5	Doubly & Circular Linked Lists	Concepts, Differences, Use Cases	3
	Hands-on	Implementing Doubly & Circular Linked Lists	
6	Stacks	LIFO, Operations (Push, Pop, Peek), Applications (Expression Evaluation)	3
	Hands-on	Implementing Stack Using Arrays & Linked Lists	
7	Queues	FIFO, Types (Simple, Circular, Priority), Operations	3
	Hands-on	Implementing Queue Using Arrays & Linked Lists	
8	Advanced Queues	Deque, Priority Queue	3
	Hands-on	Implementing Deque and Priority Queue	
9	Recursion in Data Structures	Introduction to Recursion, Applications in Data Structures	3
	Hands-on	Recursive Algorithms (Factorial, Fibonacci, Tree Traversals)	
10	Trees	Types (Binary Tree, BST, AVL), Tree Traversals (Pre, In, Post)	4
	Hands-on	Implementing Binary Search Tree, Traversal Algorithms	
11	Binary Search Trees (BST)	Concept, Insertion, Deletion, Balancing (AVL Trees)	3
	Hands-on	Implementing BST Operations, AVL Tree Rotation	
12	Graphs	Types (Directed, Undirected), Graph Representation (Adjacency Matrix/List)	4
	Hands-on	Implementing Graphs (DFS, BFS Traversal)	
13	Hashing	Concept, Hash Functions, Collision Handling Techniques	4
	Hands-on	Implementing Hash Tables with Collision Handling	
14	Sorting Algorithms	Bubble, Selection, Insertion, Merge, Quick Sort	4
	Hands-on	Implementing Various Sorting Techniques, Analyzing Time Complexity	
15	Searching Algorithms	Linear Search, Binary Search	5
	Hands-on	Implementing Search Algorithms, Time Complexity Analysis	
16	Heaps	Min Heap, Max Heap, Heap Operations (Insertion, Deletion)	4
	Hands-on	Implementing Min Heap and Max Heap, Heap Sort	
17	Dynamic Programming (DP)	Introduction, Approach (Memoization, Tabulation), Classic DP Problems (Knapsack, Longest Common Subsequence)	5
	Hands-on	Solving Dynamic Programming Problems, Analyzing Space-Time Trade-offs	
18	Greedy Algorithms	Concept, Greedy vs. DP, Problems (Activity Selection, Huffman Coding)	4
	Hands-on	Implementing Greedy Solutions, Analyzing Optimality	
19	Graph Algorithms	Shortest Path Algorithms (Dijkstra, Bellman-Ford), Minimum Spanning Tree (Kruskal, Prim)	5
	Hands-on	Implementing Graph Algorithms, Analyzing Time Complexity	
		<b>No. of Hours</b>	<b>70</b>