

Data Structures and its Application – UE23CS252A (4-0-2-5-5)

of Sessions: 126

Class #	Unit # ChapterTitle/ReferenceLiterature	Topics to be Covered	% of Portion covered	
			% of Syllabus	Cumulative %
1	Unit 1: Linked List and Stack T1/R1	Course evaluation policy discussion, Introduction to Data Structures.	25	25
2,3		Review of C, Pointers, Structures, Recursion		
4		Static and Dynamic Memory Allocation		
5		Abstract Data Type (ADT), List as an ADT, List as a data structure		
6		List Implementation using Array.		
7,8,9		LAB on C Fundamentals: Arrays, Structures, Strings, Pointers		
10		Singly Linked List (SLL) insert operations: beginning, end, display		
11		SLL delete operations: beginning, end, at a specified position, destroy list operation		
12		SLL : insert & delete at a specified position		
13		SLL Operations : other operations like search operation and concatenation.		
14,15		Doubly Linked List (DLL) insert operations: beginning, end, at a specified position, destroy list operation		
16,17,18		LAB on C Fundamentals: Structures, Pointers,		

		Dynamic Memory Management		
19,20		DLL delete operations: beginning, end, at a specified position, search operation		
21,22		Circular Singly Linked List		
23,24		Circular Doubly Linked List		
25,26,27		LAB on SLL		
28,29		Sparse matrix and its representation using Multi list,		
30,31		Case Study – Skip List		
32		Basic structure of a stack, stack using arrays		
33		Stack using linked list, Applications of stack: Function execution, Nested functions		
34,35,36		LAB on DLL		
37		Applications of stack: Conversion of an expression from Infix to postfix / prefix		
38		Applications of stack: Evaluation of a postfix expression using stack		
39		Applications of stack: Parenthesis matching using stack		
40	Unit 2 – Queue & Binary Trees T1/R1	Basics of Queue Data Structure, Linear Queue using Array.	25	50
41		Queue using Linked List		
42		Circular queue using array		
43,44,45		LAB on Stack and its Applications		
46		Circular queue using Linked List		
47		Priority queue using array		
48		Priority queue using linked		

		list		
49,50		Double ended queue (Deque) using array and linked list		
51		Applications of Queue: Case Study – Josephus problem, CPU scheduling		
52,53,54		LAB / Case Study Conduction		
55		Revision		
56,57		Case Study1		
58		Binary Tree : definition, properties		
59		Binary Tree traversal: inorder, preorder ,post order		
60		n-ary tree, Forest, conversion of an n-ary tree and Forest to Binary Tree		
61,62,63	Unit 3-Application of Trees, Basics of Graphs TI/RI	LAB on Queue and its Applications	25	75
64		BST using arrays		
65		BST using Linked approach		
66		Other tree operations-finding the height, depth, count no of nodes, leaf nodes		
67,68		Node deletion operation on a Binary Search Tree		
69		Binary Search Tree Traversals using iteration.		
70,71,72		LAB on Binary Tree and its Applications		
73,74		Expression Tree		
75,76		Threaded Binary Tree		
77		Heap Tree and its properties		
78		Heap using Array - Bottom up Heap construction		
79,80,81		LAB on Heap Tree		
82		Heap using Array – Top down Heap Construction		

83,84		Priority Queue using min and max heap		
85		Revision		
86,87		Case Study2		
88,89,90		LAB / Case Study Conduction		
91,92		Balanced Tree : Definition, AVL Tree, Rotation in AVL Tree		
93,94		Splay Tree		
95		Graphs: Introduction, properties.		
96		Graphs : Types of Graphs, Applications and Representation		
97,98,99		LAB on Graph and its Applications		
100		Graphs using adjacency matrix and Adjacency List		
101		Graph Traversal Techniques – DFS & BFS with examples		
102		Depth First Search (DFS) traversal of a graph		
103		Breadth first search (BFS) traversal of a graph		
104		Representation of computer network topology		
105		Revision		
106,107,108		LAB on Graph and its Applications		
109	Unit 4: Applications of Graph, Hashing, Trie ,Suffix Trees T1/R1	Application of BFS and DFS: Connectivity of graph	25	100
110		Application of BFS and DFS: finding path in a network		
111		Hashing: Simple mapping, hash function, hash table		
112		Collision handling using separate Chaining.		
113,114		Collision handling using		

		linear and quadratic probing.		
115,116,117		LAB on Hashing		
118		Collision handling using double hashing and rehashing.		
119		Introduction to Trie trees, properties, Application.		
120,121		Trie trees: Insert & Search, Delete		
122		Application of Trie : Display the words in a trie in lexicographic order		
123		Application of Trie : Word Prediction, Auto Complete Feature		
124		Suffix Tree : Introduction, Properties, Construction.		
125,126		Revision		

Tool/ Languages: C Programming Language

Text Book:

1. “Data Structures using C / C++” ,Langsum Yedidyah, Moshe J Augenstein, Aaron M Tenenbaum Pearson Education Inc, 2nd edition, 2015.

Reference Book:

1. “Data Structures and Program Design in C”, Robert Kruse, Bruce Leung, C.L Tondo, Shashi Mogalla, Pearson, 2nd Edition, 2019.

Evaluation Policy

	Conducted	Scaled to
ISA -1 (Unit 1 & Unit 2)	40	20
ISA -2 (Unit 3 & Unit 4)	40	20
Experiential Learning component	10	10
Lab (Total 10 Labs)	10	20
Hackathon	10	
ESA	100	50
Total		120(scaled to 100)