

DATA STRUCTURES

Course Code	20SO8452	Year	II	Semester	II
Course Category	Skill Oriented Course	Branch	EEE	Course Type	SOC
Credits	2	L-T-P	1-0-2	Prerequisites	C
Continuous Internal Evaluation:	0	Semester End Evaluation:	50	Total Marks:	50

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Apply Structured Programming constructs for solving problems. (L3)
CO2	Implement programs as an individual on different IDEs/ online platforms.
CO3	Develop an effective report based on various programs implemented.
CO4	Analyze outputs using given constraints/test cases. (L4)

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3: High, 2: Medium, 1: Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												2	
CO2					3				3				2	
CO3										3			2	
CO4		3											2	

Syllabus		
Unit No	Contents	Mapped CO
I	<p>Sorting and Searching: Searching; Linear and Binary, Sorting; Bubble, Insertion, Selection, Merge, Quick, Radix</p> <p>Exercise 1 Write the programs for the following searching techniques: Linear and Binary.</p> <p>Exercise 2 Write the programs for the following sorting techniques: Bubble, Insertion, Quick, and Merge</p>	CO1,CO2, CO3,CO4
II	<p>STACKS AND QUEUES: Stacks, queues, infix to postfix , evaluating postfix expression. ,</p> <p>Exercise 3 a) Implementation of stack operations using arrays. b) Implementation of queue operations using arrays.</p> <p>Exercise 4 a) Railroad cars numbered are as 0,1,2,---,n-1. Each car is brought into the stack and removed at any time. For instance, if n=3, we could</p>	CO1,CO2, CO3,CO4

	<p>move 0, move 1, move 2 and then take the cars out, producing 2,1,0. Implement application for the given problem.</p> <p>b) Consider a payment counter at which the customer pays for the items purchased. Every time a customer finished paying for their items, he/she leaves the queue from the front. Every time another customer enters the line to wait, they join the end of the line. Implement the application for this problem.</p> <p>Exercise 4-</p> <p>a) Implementation of infix to postfix conversion</p> <p>b) Implementation of evaluating postfix expression</p>	
III	<p>Linked list: Single linked lists, circularly linked lists, doubly linked lists, Polynomials Representation, adding polynomials, linked stacks and queues.</p> <p>Exercise 5 Implementation of singly linked list</p> <p>Exercise 6 Implementation of doubly linked list</p> <p>Exercise 7</p> <p>a) Implement Exercise 4(a) using linked lists.</p> <p>b) Implement Exercise 4(b) using linked lists.</p> <p>Exercise 8 A polynomial has the main fields as coefficient, exponent in linked list it will have one more field called link to point to next term in the polynomial. If there are n terms in the polynomial then n such nodes has to be created.</p>	CO1,CO2, CO3,CO4
IV	<p>Trees: Introduction Terminology, representation of trees, Properties of binary trees, binary tree representation, binary tree traversals In order, preorder, post order, Binary search trees Definition</p> <p>Exercise 9 Implementation of Binary Search Tree operations</p>	CO1,CO2, CO3,CO4
V	<p>Graphs: Definition, graph representation, elementary graph operations BFS, DFS</p> <p>Exercise 10 Implementation of Graph traversals</p> <p>I) BFS</p> <p>II) DFS</p>	CO1,CO2, CO3,CO4

Learning Resources
Text Books
<ol style="list-style-type: none"> 1. Data Structures and Algorithm Analysis in C – 2nd Edition, Mark Allen Weiss, Pearson 2. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, CareerMonk Publications.

References

1. Introduction to ALGORITHMS – 3rd edition, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, PHI
2. Fundamental of Data Structures in C – 2nd Edition, Horowitz, Sahani, Anderson-Freed, University Press.
3. Classic Data Structures – 2nd Edition, Debasis Samanta, PHI.

E-Resources and other Digital Material

1. <http://cse.iitkgp.ac.in/pds/>
2. <http://cmpe.emu.edu.tr/bayram/courses/231/LectureNotesSlides/IQBAL/Lecture%20Notes>
3. <https://www.geeksforgeeks.org/data-structures/>
4. <https://www.programiz.com/dsa>
5. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
6. <https://www.youtube.com/watch?v=zWg7U0OEAOE&list=PLBF3763AF2E1C572F>
7. https://www.youtube.com/watch?v=S47aSEqm_0I&list=PLgj_V-ZKxRKrxgFyOutPJpoLFBaQMOpK-