

Course Code	Course name	L	T	P	C
	Data Structures and Algorithms Lab	0	0	2	1
Total Units to be Covered:		Total Contact Hours:			
Prerequisite(s):	Programming in C Lab	Syllabus version: 1.0			

Course Objectives

1. Students learn to analyze problems and design algorithms to solve them.
2. Develop students' ability to implement different data structures, common sorting, and searching algorithms using C programming language.
3. Provide students with practical exposure to the applications of data structures.

Course Outcomes

On completion of this course, the students will be able to

- CO1.** Implement linear data structures while ensuring proper memory management and error handling.
- CO2.** Design and develop code to demonstrate the use of non-linear data structures.
- CO3.** Illustrate expertise in understanding and implementing sorting and searching techniques.
- CO4.** Applying the appropriate data structure to solve real-world problems efficiently.

CO-PO Mapping

Program Outcomes Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	1	2	2	1								1	2	1	
CO 2	1	2	2	1								1	2	1	
CO 3	1	2	2	1								1	2	1	
CO 4	1	2	2	1								1	2	1	
Average	1	2	2	1								1	2	1	

1 – Weakly Mapped (Low)

2 – Moderately Mapped (Medium)

3 – Strongly Mapped (High)

“_” means there is no correlation

List of Experiments

Experiment 1: Basic Data Structure

To demonstrate the use of array, structure, and union along with dynamic memory allocation.

Experiment 2: Link List Data Structure and its Applications

To experiment with the concept of pointers, structure, and dynamic memory allocation to realize linked lists, their types, and application.

Experiment 3: Stack Data Structure

To use arrays and linked lists to implement Stack and its applications.

Experiment 4: Queue Data Structure

To demonstrate the use of arrays and linked lists to implement different variants of Queue and its applications.

Experiment 5: Trees

To demonstrate the creation of a binary tree and working with tree traversal.

Experiment 6: Heaps

To create a heap data structure and implement its operations, and its applications.

Experiment 7: Hash Tables

To implement a hash table using various collision resolution techniques, and its applications.

Experiment 8: Graphs

To demonstrate the creation of graphs and working with graph traversal algorithms.

Experiment 9: Sorting algorithms

To implement common sorting algorithms.

Experiment 10: Searching algorithms

To implement various search algorithms on data structures.

Total Lab hours 15

Textbooks

1. S. Lipschutz, "Data Structures with C", Schaum's Outline Series, McGraw-Hill Education (India) Pvt. Limited, 2017.

2. Y. P. Kanetkar, "Data structures through C", 4rd Edition, New Delhi: BPB, 2022.

Reference Books

1. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, "Data Structures and Algorithms", New Delhi: Pearson Education, 2003.

2. E. Horowitz, and S. Sahni, "Fundamentals of Data Structures in C", 2nd Edition, Hyderabad: University Press, 2008.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme: Continuous Assessment

Components	Quiz & Viva	Performance & Lab Report
Weightage (%)	50	50