

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology				Branch/Spec.	Computer Science & Engineering (CSE/BDA/CS/AI&ML)			
Semester	III				Version	1.1.1.1			
Effective from Academic Year			2026-27		Effective for the batch Admitted in			June 2025	
Subject code	2CSE302		Subject Name		Data Structures				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	2	0	5	Theory	40	60	100
Hours	3	0	4	0	7	Practical	60	40	100
Pre-requisites:									
C Programming									
Learning Outcome:									
After completion of the course, student will be able to:									
<ul style="list-style-type: none"> • Learn different types of Linear data structures • Understand different types of Non Linear data structures • Apply appropriate data structure for solving typical computing problems • Apply sorting and searching algorithms on small and large data sets 									
Theory syllabus									
Unit	Content								Hrs.
1	LINEAR DATA STRUCTURES Array: Operations, RMO and CMO representation, Stack: Concepts and representation, Operations, Applications. Polish Expression, Reverse Polish Expression And Their Compilation, Recursion, Tower of Hanoi, Queue, Operations, Types viz. Applications of queue. Linked List: Concept and Representation, Operations, Types of Linked lists								15
2	NONLINEAR DATA STRUCTURES Tree: Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees- Some balanced tree mechanism, e.g. AVL trees, 2-3 trees								10
3	GRAPH Basic Concept of Graph Theory and its Properties, Matrix Representation Of Graphs, Elementary Graph operations, Breadth First Search, Depth First Search, Spanning Trees, Minimum spanning tree- Prims and Kruskal Algorithm								6
4	SORTING & SEARCHING Performance Analysis and Management - Time and space analysis of algorithms – Average, best and worst case analysis. Sorting – Bubble Sort, Selection Sort, Quick Sort, Merge Sort, Insertion sort, Heap Sort. Searching – Sequential Search and Binary Search								8
5	HASHING : Hashing function, Collision Resolution Techniques.								6
Self-Study									
Conversion of General Trees To Binary Trees, Heap Sort									
Practical content									

Practicals will be based on topics such as arrays, strings, stacks, queues, linked lists, graphs, trees, sorting and searching.	
Mooc Course	
Course Name: Programming, data structures and algorithms using Python	
Link: https://www.mygreatlearning.com/academy/learn-for-free/courses/data-structures-in-c	
Text Books	
1	Fundamentals of Data Structures in C++ By Horowitz, Sartaj Sahani
2	Data Structure Using C by ReemaThareja, Oxford Higher Education
Reference Books	
1	Data Structures using C & C++ -By Ten Baum Publisher – Prentice-Hall International
2	Fundamentals of Computer Algorithms by Horowitz, Sahni,Galgotia Pub
3	Data Structures: A Pseudo-code approach with C -By Gilberg & Forouzan Publisher- Thomson Learning
4	An Introduction to Data Structures with Applications. by Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill

Course Outcomes:												
COs	Description											
CO1	Learn different types of Linear data structures											
CO2	Understand different types of Non Linear data structures											
CO3	Apply appropriate data structure for solving typical computing problems											
CO4	Apply sorting and searching algorithms on small and large data sets.											
Mapping of CO and PO:												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	0	1	2	0	0	0	0	3	0	0	1
CO2	2	1	1	2	1	0	0	0	0	0	2	1
CO3	2	1	2	2	0	1	0	0	2	0	0	1
CO4	2	1	1	3	1	0	0	0	0	0	1	1