

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Diploma Engineering				Branch	COMPUTER ENGINEERING			
Semester	III				Version	1.0.0.0			
Effective from Academic Year	2018-19				Effective for the batch Admitted in	June 2018			
Subject code	1CE2303		Subject Name		DATA STRUCTURE				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:
Basic knowledge of computer and c language.

Course Learning Outcomes:
The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes:
T1.To understand the fundamental of data structures and algorithms and summarize their typical uses, strengths, and weaknesses
T2.To apply and use of basic concepts about stacks, queues,lists,trees and graphs
T3.To implement of Linked list to demonstrate how data are stored.
T4.To develop and apply different searching and sorting techniques
The practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate course learning outcomes.

Course Content				
Name of UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
UNIT – 1 Basic Concepts of Data Structures	1.1. Primitive and Non-Primitive Data Structure, 1.2. Linear and Non-Linear Data Structure, Introduction to Algorithms, 1.3. Key features of an algorithm, Time and Space efficiency of the Algorithm. 1.4. Array: Overview of various array operations; String Manipulation – String Length, 1.5. String copy, String Compare, String Concatenation, string find	1a.List the types of data structure 1b.Comprehend the linear and nonlinear data structure 1c.Analyze the time complexity and space complexity 1d.List the different operation on array 1e.Develop algorithms to implement various operations on string	15	10
UNIT – 2 Stack and Queues	2.1. Array Representation and Implementation of Stack, Operations on Stacks: Push & Pop, Linked Representation of Stack,	2a.Comprehend linear and nonlinear data structures and develop algorithms to push an element into stack, pop an element from the stack.	15	12

	<p>2.2. Application of Stack: Conversion of Infix to Prefix and Post fix Expressions,</p> <p>2.3. Evaluation of Post fix Expression using Stack,</p> <p>2.4. Recursion: Recursive Definition and Processes, Recursion in C, Example of Recursion, Tower of Hanoi Problem.</p> <p>2.5. Queues: Array and Linked Representation and Implementation of Queues, Operations on Queue: Create, Add, Delete, Full and Empty; Circular Queues, D-queues and Priority Queues.</p>	<p>2b.Implement the prefix and postfix expression for stack</p> <p>2c.Build a program using recursion and tower of Hanoi problem</p> <p>2d.Comprehend Queue with various operations like insert delete and Differentiate circular and simple queue</p>		
UNIT – 3 Linked List	<p>3.1. Definition, Representation of linked lists in Memory, Memory allocation; Garbage Collection. Linked list operations: Traversing, Searching, Insertion, and Deletion.</p> <p>3.2. Doubly Linked lists, Circular linked lists, and header linked lists.</p> <p>3.3. Applications of Linked lists</p>	<p>3a.Define concept of various linked list and its operations and develop various algorithms on it</p> <p>3b.state application of linked list</p>	15	13
UNIT – 4 Sorting and Searching	<p>4.1. Sorting: Bubble Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort, and Radix Sort.</p> <p>4.2. Searching : Sequential Search, Binary Search,</p>	<p>4a.analyse data sorting, differentiate and develop sorting and searching techniques</p>	15	10

List of Practical		
No.	Unit	Name of Practical
1	1	Implement various string algorithms
2	2	Implement push and pop algorithms of stack using array
3	2	Implement recursive functions
4	2	Implement insert, delete algorithms of queue using array
5	2	Implement insert, delete algorithms of circular queue
6	3	Implement simple structure programs using pointers
7	3	Implement insertion of node in the beginning of the list and at the end of list in singly linked list
8	3	Implement insertion of node in sorted linked list
9	3	Implement insertion of node at any position in linked list
10	3	Implement searching of a node, delete a node and counting no of node algorithms in singly linked list
11	3	Implement insertion of node in the beginning and at the end of doubly linked list
12	3	Implement insertion of node at any position in doubly linked list
13	3	Implement searching of a node, delete a node and counting no of node algorithms in doubly linked list

14	4	Implement of sorting algorithms
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List of Instruments / Equipment / Trainer Board	
1	Hardware: Computer System with minimum PIV processor (or equivalent) and minimum 1 GB MB RAM.
2	Software: C compiler

List of Reference Books			
No	Title of Reference Books	Authors	Publication
1	Data and File Structures using C	Thareja, Reema	Oxford University Press New Delhi 2011
2	Data Structures using C	ISRD Group	McGraw Hill, New Delhi, 2013
3	Data Structures	Chitra, A Rajan, P T	Tata McGraw Hill, New delhi, 2009

Link of Learning Web Resource	
1	https://www.coursera.org/specializations/data-structures-algorithms
2	https://www.programiz.com/dsa