

GLS UNIVERSITY
Bachelor of Computer Applications (BCA)
(Core Course)
Semester-III
210301306 PRACTICAL ON DS

1. Course Objective:

- To gain the knowledge of various advanced data structure topics practically.
- To develop skills for effective use of the link-list and structures in programming.
- To develop skills for effective data sorting and searching.

2. Course Duration:

The course will have sessions which are divided into five modules. Each module consists of nine sessions of 60 minutes each and carries a weightage of 20%.

3. Course Contents:

Module No.	Modules/Sub-Modules	No. of Sessions	Marks Weightage
I	Introduction to Data Structure	09	20%
	<ul style="list-style-type: none"> • Write a program that will display array in reverse order. • Write a program that will display sparse matrix. • Write a program that will display diagonal matrix. Note: Practical related to various types of arrays		
II	Stack and Queue	09	20%
	<ul style="list-style-type: none"> • Write a program to perform the following operations on a stack. PUSH POP PEEP 		
	<ul style="list-style-type: none"> • Write a program to convert an expression in to Infix. 		
	<ul style="list-style-type: none"> • Write a program to convert an expression in to Postfix. 		
	<ul style="list-style-type: none"> • Write a program to convert an expression in to Prefix. 		
	<ul style="list-style-type: none"> • Write a program to convert an infix arithmetic expression into postfix notation. 		
	<ul style="list-style-type: none"> • Write a program to perform the following operation on a simple queue Insert an element Remove an element 		
	<ul style="list-style-type: none"> • Write a program to perform the following operation on a circular queue. Insert an element Remove an element 		
	<ul style="list-style-type: none"> • Write a program to perform the following operations on a priority queue. Insert an element 		

	<p>Remove an element</p> <ul style="list-style-type: none"> • Write a Program to implement Double ended queue (Input Restricted/Output restricted) 		
III	<p>Linked List</p> <ul style="list-style-type: none"> • Write a program to create a singly linked list in LIFO fashion. • Write a program to create a singly linked list in FIFO fashion. • Write a program to create a sorted singly linked list. • Write program perform the following operations on a singly linked list. <ul style="list-style-type: none"> Insert an element Delete an element Find the sum of elements of the list Count number of the nodes in the linked list Search a given elements in the linked list. Reverse the linked list. • Write a program to create a sorted doubly linked list. • Write a program to create a doubly linked list in LIFO fashion. • Write a program to create a doubly linked list in FIFO fashion. • Write a program perform the following operations on a doubly linked List. <ul style="list-style-type: none"> Insert an element Delete an element Find the sum of elements of the list Count number of the nodes in the linked list Search a given elements in the linked list. Reverse the linked list. 	09	20%
IV	<p>Tree and Graph</p> <ul style="list-style-type: none"> • Write a program to create a binary search tree and print its elements in inorder. • Write a program to create a binary search tree and print its elements in postorder • Write a program to delete an element from a binary search tree. • Write a program to make another copy of a given binary search tree. • Write a program that will implement Breadth First Search. • Write a program that will implement Depth First Search. 	09	20%
V	<p>Sorting and Searching</p> <ul style="list-style-type: none"> • Write program of quick sort. 	09	20%

	• Write program of Selection sort.		
	• Write program of Merge sort.		
	• Write program of Bubble sort.		
	• Write program to search an element in a given list using linear search.		
	• Write program to search an element in a given list using Binary search		

4. Teaching Methods:

The following pedagogical tools will be used to teach this course:

1. Lectures and Discussions
2. Practical demos
3. Assignments and Presentations

5. Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Quizzes	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination	50% (External Assessment)

6. Basic Text Books:

Sr. No	Author/s	Name of the book	Publisher	Edition
T1	Varsha H. Patil	Data Structures using C++	Oxford	Latest

7. Reference Books:

Sr. No	Author/s	Name of the book	Publisher	Edition
R1	-	Data Structures through C++	Mc Graw Hill	Latest

8. List of Journals / Periodicals / Magazines / Newspapers etc.:

Sr. No	Link
1	E-book data structure using C++ by Yashwant Kanetkar
2	http://nptel.ac.in/courses/106102064/1
3	http://nptel.ac.in/courses/106102064/2
4	http://nptel.ac.in/courses/106102064/3
5	http://nptel.ac.in/courses/106102064/4

9. Session Plan:

Session No.	Topics / Chapters
1-9	Practical based on matrix and array.
10-15	Practical based on stack operation.
16-18	Practical based on singly link list with operation.

19-23	Practical based on doubly link list with operation.
24-30	Practical based on binary tree and order.
31-35	Practical based on binary tree operation.
36-40	Practical based on BSF and DSF
41-45	Practical based on sorting.

10. Learning Outcome:

Upon the completion of this course, students will be able to:

- Articulate the principles of data structure problem solving and programming.
- Develop programs data structure using C++ programming language.
- Implement programming fundamentals, including link list and sorting.
- Program with basic data structures using array, functions.
- Understand the use of dynamic memory allocation