

DATA STRUCTURES LABORATORY

II Semester: CSE / ECE / EEE / IT													
Course Code	Category	Hours / Week			Credits	Maximum Marks							
ACS102	Foundation	L	T	P	C	CIA	SEE	Total					
		-	-	3	2	30	70	100					
Contact Classes: Nil		Tutorial Classes: Nil		Practical Classes: 36		Total Classes: 36							
I. COURSE OVERVIEW:													
<p>A data structure is a particular way of organizing data in a computer so that it can be used effectively. It covers the design and analysis of fundamental data structures and engages learners to use data structures as tools to algorithmically design efficient computer programs that will cope with the complexity of actual applications. A Data Structure is a particular way of storing and organizing data in a computer so that it can be stored, retrieved, or updated efficiently. Data structures are generally based on the ability of a computer to fetch and store data at any place in its memory, specified by an address. This course is essential for image viewer software, in this images are linked with each other so, images use a linked list to view the previous and the next images using the previous and next buttons. Web pages can be accessed using the previous and the next URL links which are linked using linked list. The music players also use the same technique to switch between music. To keep the track of turns in a multi player game, a circular linked list is used.</p>													
II. OBJECTIVES:													
The course should enable the students to:													
<p>I. Implement linear and non linear data structures. II. Analyze various algorithms based on their time complexity. III. Choose appropriate data structure and algorithm design method for a specific application. IV. Identify suitable data structure to solve various computing problems.</p>													
III. COURSE OUTCOMES:													
After successful completion of the course, students should be able to:													
CO 1	Identify	appropriate	searching	technique	for	efficient	retrieval	of data stored	Apply				
								location.					
CO 2	Choose	sorting	technique	to	represent	data	in	specified	format	to	optimize	data	Apply
								searching.					
CO 3	Make	use	of	stacks	and	queues	representation,	operations	and	their	applications	to	Understand
								organize	specified	data			
CO 4	utilize	linked	lists	to	implement	and	perform	operations	for	for	organizing	specified	Apply
								data					
CO 5	Construct	tree	to	perform	different	traversal	techniques						Apply
CO 6	Select	Appropriate	graph	traversal	techniques	to	visit	the	vertices	of	a	graph	Remember
IV. SYLLABUS:													
LIST OF EXPERIMENTS													
Week-1	SEARCHING TECHNIQUES												
Write C programs for implementing the following searching techniques.													
a. Linear search.													
b. Binary search.													
c. Fibonacci search.													
Week-2	SORTING TECHNIQUES												

Write C programs for implementing the following sorting techniques to arrange a list of integers in ascending order. a. Bubble sort. b. Insertion sort. c. Selection sort.	
Week-3	SORTING TECHNIQUES
Write C programs for implementing the following sorting techniques to arrange a list of integers in ascending order. a. Quick sort. b. Merge sort.	
Week-4	IMPLEMENTATION OF STACK AND QUEUE
Write C programs to a. Design and implement Stack and its operations using Arrays. b. Design and implement Queue and its operations using Arrays	
Week-5	APPLICATIONS OF STACK
Write C programs for the following: a. Uses Stack operations to convert infix expression into postfix expression. b. Uses Stack operations for evaluating the postfix expression.	
Week-6	IMPLEMENTATION OF SINGLE LINKED LIST
Write C programs for the following: a. Uses functions to perform the following operations on single linked list. (i) Creation (ii) insertion (iii) deletion (iv) traversal b. To store a polynomial expression in memory using linked list.	
Week-7	IMPLEMENTATION OF CIRCULAR SINGLE LINKED LIST
Write C programs for the following: Uses functions to perform the following operations on Circular linked list. (i) Creation (ii) insertion (iii) deletion (iv) traversal	
Week-8	IMPLEMENTATION OF DOUBLE LINKED LIST
Write C programs for the following: Uses functions to perform the following operations on double linked list. (i) Creation (ii) insertion (iii) deletion (iv) traversal in both ways.	
Week-9	IMPLEMENTATION OF STACK USING LINKED LIST
Write C programs to implement stack using linked list.	
Week-10	IMPLEMENTATION OF QUEUE USING LINKED LIST
Write C programs to implement queue using linked list.	
Week-11	GRAPH TRAVERSAL TECHNIQUES
Write C programs to implement the following graph traversal algorithms: a. Depth first search. b. Breadth first search.	
Week-12	IMPLEMENTATION OF BINARY SEARCH TREE
Write a C program that uses functions to perform the following: a. Create a binary search tree.	

- b. Traverse the above binary search tree recursively in pre-order, post-order and in-order.
- c. Count the number of nodes in the binary search tree.

Reference Books:

1. Kernighan Brian W, Dennis M. Ritchie, “The C Programming Language”, Prentice Hall of India, Re-Print, 2008.
2. Balagurusamy E, “Programming in ANSI C”, Tata Mc Graw Hill, 6th Edition, 2008.
3. Gottfried Byron, “Schaum's Outline of Programming with C”, Tata Mc Graw Hill, 1st Edition, 2010.
4. Lipschutz Seymour, “ Data Structures Schaum's Outlines Series”, Tata Mc Graw Hill, 3rd Edition, 2014.
5. Horowitz Ellis, Satraj Sahni, Susan Anderson, Freed, “Fundamentals of Data Structures in C”, W. H. Freeman Company, 2nd Edition, 2011.

Web References:

1. http://www.tutorialspoint.com/data_structures_algorithms
2. <http://www.geeksforgeeks.org/data-structures/>
3. <http://www.studytonight.com/data-structures/>
4. <http://www.coursera.org/specializations/data-structures-algorithms>

Course Home Page: