

DATA STRUCTURES LABORATORY

III Semester: ME / CSE / IT / ECE / CE IV Semester AE / EEE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACSB05	Core	L	T	P	C	CIA	SEE	Total
		-	-	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36			Total Classes: 36			
<p>OBJECTIVES:</p> <p>The course should enable the students to:</p> <ol style="list-style-type: none"> Understand various data representation techniques in the real world. Implement linear and non-linear data structures. Analyze various algorithms based on their time and space complexity. Develop real-time applications using suitable data structure. Identify suitable data structure to solve various computing problems. <p>COURSE OUTCOMES:</p> <p>The student will have the ability to:</p> <p>CO 1: Understand the concept of data structures, python and apply algorithm for solving problems like Sorting, searching, insertion and deletion of data.</p> <p>CO 2: Understand linear data structures for processing of ordered or unordered data.</p> <p>CO 3: Explore various operations on dynamic data structures like single linked list, circular linked list and doubly linked list.</p> <p>CO 4: Explore the concept of non linear data structures such as trees and graphs.</p> <p>CO 5: Understand the binary search trees, hash function, and concepts of collision and its resolution methods.</p> <p>COURSE LEARNING OUTCOMES:</p> <ol style="list-style-type: none"> Understand the basic concepts of python. Explore an algorithm to find the location of an element in a given list. Choose a suitable algorithm to organize the data in ascending or descending order. Implementation of stack and queues using lists. Understand application of stacks in arithmetic expression conversion and evaluation. Understand working and implementation of single linked list. Understand the basic operations like insertion and deletion operations associated with double linked list. Understand working and implementation of stack and queue using linked list Understand working and implementation of stack and queue using linked list Understand the concept of non-linear data structures viz. trees and graphs. Understand graphs and graph traversal techniques like Depth first search and Breadth first search. Understand the operations of binary search tree like tree traversals and counting the number of nodes in the binary search tree. 								

LIST OF EXPERIMENTS

Week -1	BASICS OF PYTHON
Write Python programs for the following: To find the biggest of given n numbers using control statements and lists To print the Fibonacci series using functions To find GCD of two numbers	
Week -2	SEARCHING TECHNIQUES
Write Python programs for implementing the following searching techniques to arrange a list of integers in ascending order. a. Linear search b. Binary search	
Week -3	SORTING TECHNIQUES
Write Python 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 -4	IMPLEMENTATION OF STACK AND QUEUE
Write Python programs to for the following: a. Design and implement Stack and its operations using List. b. Design and implement Queue and its operations using List.	
Week -5	APPLICATIONS OF STACK
Write Python 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 Python programs for the following operations on Single Linked List. (i) Creation (ii) insertion (iii) deletion (iv) traversal	
Week -7	IMPLEMENTATION OF CIRCULAR SINGLE LINKED LIST
Write Python programs for the following operations on Circular Linked List. (i) Creation (ii) insertion (iii) deletion (iv) traversal	
Week -8	IMPLEMENTATION OF DOUBLE LINKED LIST
Write Python programs for 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 a Python program to implement Stack using linked list.	

Week -10	IMPLEMENTATION OF QUEUE USING LINKED LIST
Write a Python program to implement Linear Queue using linked list.	
Week -11	GRAPH TRAVERSAL TECHNIQUES
Write Python 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 Python program 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.	
LIST OF REFERENCE BOOKS:	
<ol style="list-style-type: none"> 1. Rance D. Necaise, "Data Structures and Algorithms using Python", Wiley, John Wiley & Sons, INC., 2011. 2. Benjamin Baka, David Julian, "Python Data Structures and Algorithms", Packt Publishing Ltd., 2017. 	
WEB REFERENCES:	
<ol style="list-style-type: none"> 1. https://docs.python.org/3/tutorial/datastructures.html 2. http://interactivepython.org/runestone/static/pythonds/index.html 3. http://www.tutorialspoint.com/data_structures_algorithms 4. http://www.geeksforgeeks.org/data-structures/ 5. http://www.studytonight.com/data-structures/ 6. http://www.coursera.org/specializations/data-structures-algorithms 7. http://cse01-iiith.vlabs.ac.in/ 	