

Program : Diploma in Computer Engineering / Computer Hardware Engineering / Robotic Process Automation	
Course Code : 4138	Course Title: Data Structures Lab
Semester : 4 / 5 / 4	Credits: 1.5
Course Category: Program Core	
Periods per week: 3 (L:0 T:0 P:3)	Periods per semester: 45

Course Objectives:

- Provide hands-on experience on developing elementary data structures.
- Understand the applications of data structures in developing efficient algorithms.

Course Prerequisites:

Topic	Course code	Course name	Semester
Functions and Arrays		Problem Solving and Programming	II
Recursion, Structures and Pointers		Programming in C	III

Course Outcomes:

On completion of the course, the student will be able to:

CO _n	Description	Duration (Hours)	Cognitive Level
CO1	Construct Stack and Queue using array and apply it to solve problems using C.	11	Applying
CO2	Implement Linked List operations.	9	Applying
CO3	Develop programs to implement Binary Search Tree and perform the basic operations.	8	Applying
CO4	Apply Traversal Algorithms on Graphs.	14	Applying
	Lab Exam	3	

CO – PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3			3			
CO2	3			3			
CO3	3			3			
CO4	3	3	3	3		3	

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	Construct Stack and Queue using array and apply it to solve problems using C.		
M1.01	Implement Stack using array.	3	Applying
M1.02	Develop simple applications using stack	2	Applying
M1.03	Implement infix to postfix conversion and evaluation of a postfix expression	3	Applying
M1.04	Implement Queue using array.	3	Applying
CO2	Implement Linked List operations.		
M2.01	Implement Linked List operations - insertion, deletion, searching, etc	5	Applying
M2.02	Construct Stack using Linked List.	2	Applying
M2.03	Construct Queue using Linked List.	2	Applying
	Lab Exam – I	1.5	
CO3	Develop programs to implement Binary Search Tree and perform the basic operations.		
M3.01	Create a Binary Search Tree using Linked List.	2	Applying
M3.02	Develop programs to perform the various traversals in a Binary Search Tree.	2	Applying
M3.03	Develop programs to perform deletion of a node in a Binary Search Tree.	4	Applying

CO4	Apply Traversal Algorithms on Graphs		
M4.01	Implement the Depth first search Traversal and Breadth first search Traversal.	4	Applying
M4.04	Open Ended Experiments**	10	Applying
	Lab Exam – II	1.5	

**** - Suggested Open Ended Experiments**

(Not for End Semester Examination but compulsory to be included in Continuous Internal Evaluation. Students can do open ended experiments as a group of 2-3. There is no duplication in experiments between groups)

- Split a queue to more than one queue depending on a criteria say for example split data in odd positions and even positions to two queues.
- Perform polynomial addition using a suitable data structure

Text /Reference:

T/R	Book Title/Author
T1	Samanta Debasis, Classic Data Structures , Prentice Hall of India, 2 nd ed., 2009
T2	Reema Thareja, Data Structures Using C , Oxford University Press India.
R1	Lipschutz S, Theory and Problems of Data Structures with Applications , Tata McGrawHill, 1995
R2	Richard F. Gilberg, Behrouz A. Forouzan, Data Structures: A Pseudocode approach with C , 2 nd ed., Cengage Learning, India, 2005
R3	E.Balagurusamy, Programming in ANSI C, Tata Mc-Graw Hill, 3 rd ed.

OnlineResources:

SL.N o	Website Link
1	https://www.tutorialspoint.com/data_structures_algorithms/index.htm
2	https://www.programiz.com/dsa
3	https://www.programmingsimplified.com/c/data-structures
4	https://www.sanfoundry.com