

DEPARTMENT OF INFORMATION TECHNOLOGY				CLASS: II B.Sc. Information Technology				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours/week	CIA	Ext	Total
III	Major Core Practical-3	20U3FMP3	Data Structures and Algorithms Lab	2	3	40	60	100

Nature of Course			
Knowledge and skill			Employability oriented
Skill oriented	✓		Entrepreneurship oriented

Course Objectives

1. To develop skills to design and analyze simple linear and non linear data structures.
2. To Strengthen the ability to identify and apply the suitable data structure for the given real-world problem.
3. To Gain knowledge in practical applications of data structures.
4. To develop the skill of applying algorithm of sorting and searching.
5. To apply a greedy technique to solve a specific problem.

UNIT	CONTENT	Hrs	K-Level	CLO
I	Stacks and Queues : 1. Write a C++ program to check the balancing of parentheses in a given expression. 2. Write a C++ program to evaluate postfix expression. 3. Write a C++ program to implement Circular Queue. 4. Write a C++ program to implement Singly Linked List. 5. Write a C++ program to implement Doubly Linked List. 6. Write a C++ program to implement Stack using linked list.	15	Up to K2	1
II	7. Write a C++ program to construct an Expression Tree and perform Tree Traversals. 8. Write a C++ program to construct a Binary Search Tree and print it.	12	Up to K3	2
III	9. Write a C++ program to implement BFS on graph. 10. Write a C++ program to implement DFS on graph.	6	Up to K3	3
IV	11. Write a C++ program to check whether the given number is present or not using binary search techniques. 12. Write a C++ program to implement Selection Sort Algorithm. 13. Write a C++ program to implement Merge Sort Algorithm. 14. Write a C++ program to find the minimum and maximum number of given array.	9	Up to K4	4
V	15. Write a C++ Program to Solve Knapsack Problem.	3	Up to K2	5

Books for Study

1. “Fundamentals of Data structures in C++” by Ellis Horowitz, Sartaj Sahni & Dinesh Mehta — 2nd Edition - Universities Press 2007.
2. “Fundamentals Of Computer Algorithms” by Ellis Horowitz , Sartaj Sahni & Sanguthevar Rajasekaran - 2nd Edition- Universities Press 2007.

Books for Reference

1. “Data structures using C “ by Yedidyah langsam, Moshe J.Augenstein and Aaron M. Tenenbaum - PHI.
2. “Data Structures” by Seymour Lipschutz - TataMcGrawhill – Year 2006.
3. “An Introduction to Data structure with Application” by Jean Paul Tremblay and Paul G Sorenson – THM, II Edition – 1991.

Web Resources

1. <https://www.tutorialspoint.com/cplusplus-program-to-implement-stack-using-linked-list>
2. <https://www.w3resource.com/cpp-exercises/sorting-and-searching/index.php>
3. <https://www.tutorialspoint.com/cplusplus-program-to-solve-knapsack-problem-using-dynamic-programming>

Rationale for Nature of the course

- Helps the students in developing logic and structured programs and to storing and organizing data in a particular way in a computer.

Activities on Skill Development

- Analyze the applicability of algorithms in various fields.
- Compare the efficacy of various data structure.

Pedagogy: Projector, Demonstration and Practical Session.

Course Designer(s) Name

1. Mrs.R. LakshaPriya
2. Mr.M. Ashok Kumar

Lesson Plan

Unit	Topics	Hrs	Mode
I	Write a C++ program to check the balancing of parentheses in a given expression.	3	Demo & Practical Session
	Write a C++ program to evaluate postfix expression.	3	
	Write a C++ program to implement Circular Queue.	3	
	Write a C++ program to implement Singly Linked List.	3	
	Write a C++ program to implement Doubly Linked List.	3	
	Write a C++ program to implement Stack using linked list.	3	
II	Write a C++ program to construct an Expression Tree and perform Tree Traversals.	3	Demo & Practical Session
	Write a C++ program to construct a Binary Search Tree and print it	3	
III	Write a C++ program to implement BFS on graph.	3	Demo & Practical Session
	Write a C++ program to implement DFS on graph.	3	
IV	Write a C++ program to check whether the given number is present or not using binary search techniques.	3	Demo & Practical Session
	Write a C++ program to implement Selection Sort Algorithm.	3	
	Write a C++ program to implement Merge Sort Algorithm.	2	
	Write a C++ program to find the minimum and maximum number of given array.	1	
V	Write a C++ Program to Solve Knapsack Problem.	3	Demo & Practical Session

Course Learning outcomes

On the successful completion of the course, students will be able to

CLOs	Course Learning Outcomes	K - Levels
CLO 1	Implement and Analyze the performance of stack, queue, single and double linked list	Up to K2
CLO 2	Understand the concept of tree and its operation.	Up to K3
CLO 3	Gain knowledge to differentiate various operations on graphs.	Up to K3
CLO 4	Build and compare various sorting techniques.	Up to K4
CLO 5	Ability to identify the appropriate data structure for given problem.	Up to K2

Mapping of CLOs with PSOs

CLOs/PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO 1	3	3	2	2	2	1
CLO 2	3	3	3	2	2	3
CLO 3	3	3	2	1	2	3
CLO 4	3	3	3	3	2	2
CLO 5	3	3	3	2	2	1

(3 – Advanced Application, 2 – Intermediate Level , 1- Basic Level)

Mapping of CLOs with POs

CLOs/POs	PO1	PO2	PO3	PO4	PO5
CLO 1	3	2	3	3	2
CLO 2	3	3	3	2	2
CLO 3	3	2	2	1	3
CLO 4	3	3	1	3	3
CLO 5	3	2	1	3	3

(3 – Advanced Application, 2 – Intermediate Level , 1- Basic Level)