



THIRUVALLUVAR UNIVERSITY

SERKKADU, VELLORE-632115

B. Sc. Computer Science

SYLLABUS

FROM THE ACADEMIC YEAR

2023 - 2024

Semester-II

Part	List of Courses	Credit	No. of Hours
Part-1	Language – Tamil	3	6
Part-2	English	3	6
Part-3	Core Courses & Elective Courses including laboratory [in Total]		
	CC3 – Data Structures and Algorithm	5	5
	CC4 - Practical: Data Structures and Algorithm Lab	5	5
	Elective Courses(EC2):(Choose one from the following list)		
	i) Numerical Methods-II	3	4
ii) Discrete Mathematics – II			
Part-4	Skill Enhancement Course -SEC-2 Office Automation	2	2
	Skill Enhancement Course -SEC-3 (Discipline / Subject Specific) PHP Programming	2	2
		23	30

Semester II

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Data Structure and Algorithms	Core	5	-	-	-	4	5	25	75	100
Learning Objectives											
LO1	To understand the concepts of ADTs										
LO2	To learn linear data structures-lists, stacks, queues										
LO3	To learn Tree structures and application of trees										
LO4	To learn graph structures and application of graphs										
LO5	To understand various sorting and searching										
UNIT	Contents										No. of Hours
I	Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation: singly linked lists-circular linked lists-doubly-linked lists - operations- Insertion-Deletion -Applications of lists-Polynomial Addition										15
II	Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix to postfix expression-Queue ADT-Operations- Circular Queue- applications of queues.										15
III	Tree ADT-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT- insertion and deletion operations binary-tree traversals										15
IV	Definition- Representation of Graph-Types of graph-Breadth first traversal – Depth first traversal										15
V	Searching-Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Hashing-Hash functions-Separate chaining-Open Addressing-Rehashing Extendible Hashing										15
	Total										75
Course Outcomes							Programme Outcome				
CO	On completion of this course, students will										
CO1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation						PO1, PO6				
CO2	Understand basic data structures such as arrays, linked lists, stacks and queues						PO2				
CO3	Describe the hash function and concepts of collision and its resolution methods						PO2, PO4				
CO4	Solve problem involving graphs, trees and heaps						PO4, PO6				

CO5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	PO5, PO6
Text Book		
1	1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, Pearson Education 2014, 4th Edition.	
2	ReemaThareja, “Data Structures Using C”, Oxford Universities Press 2014, 2nd Edition	
Reference Books		
1.	Thomas H.Cormen,ChalesE.Leiserson,RonaldL.Rivest, Clifford Stein, “Introduction to Algorithms”, McGraw Hill 2009, 3rd Edition.	
2.	Aho, Hopcroft and Ullman, “Data Structures and Algorithms”, Pearson Education 2003	
3.	P.Rizwan Ahmed, C++ and Data Structure, Margham Publications, 2014	
Web Resources		
1.	https://www.programiz.com/dsa	
2.	https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/	

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	3	3
CO 3	3	3	3	2	3	2
CO 4	3	2	3	2	3	3
CO 5	3	3	3	3	3	3
Weightage of course contributed to each PSO	15	14	13	13	15	14

S-Strong-3 M-Medium-2 L-Low-1

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Data Structure and Algorithms Lab [Note: Practicals offered through C++]	Core	-	-	4	-	4	4	25	75	100
Learning Objectives											
LO1	To understand the concepts of ADTs										
LO2	To learn linear data structures-lists, stacks, queues										
LO3	To learn Tree structures and application of trees										
LO4	To learn graph structures and application of graphs										
LO5	To understand various sorting and searching										
Sl. No	Contents										No. of Hours
1.	Write a program to implement the List ADT using arrays and linked lists.										60
2.	Write a program to implement the Stack ADT using arrays and linked lists										
3.	Write a program to implement the Queue ADT using arrays and linked list.										
4.	Write a program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT).										
5.	Write a program to perform the following operations: <ul style="list-style-type: none"> • Insert an element into a Doubly Linked List. • Delete an element from a Doubly Linked List. • Search for a key element in a Doubly Linked List. 										
6.	Write a program to perform the following operations: <ul style="list-style-type: none"> • Insert an element into a binary search tree. • Delete an element from a binary search tree. • Inorder, preorder and postorder Traversals of a binary search tree. 										

7.	Write a programs for the implementation of BFS and DFS for a given graph.	
8	Write a programs for implementing the following searching methods: <ul style="list-style-type: none"> • Linear search • Binary search. 	
9.	Write a programs for implementing the following sorting methods: <ul style="list-style-type: none"> • Bubble sort • Selection sort • Insertion sort 	
Total		60
Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation	PO1,PO4,PO5
2	Understand basic data structures such as arrays, linked lists, stacks and queues	PO1, PO4,PO6
3	Describe the hash function and concepts of collision and its resolution methods	PO1,PO3,PO6
4	Solve problem involving graphs, trees and heaps	PO3,PO4
5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	PO1,PO5,PO6
Text Book		
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2.	https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/	

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3

CO 3	3	3	3	3	2	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	15

S-Strong-3 M-Medium-2 L-Low-1