

Programme : Diploma in Computer Engineering										
Course Code: CO19204				Course Title: Data Structures						
Compulsory / Optional:										
Teaching Scheme and Credits				Examination Scheme						
TH	PR	TU	Total	TH (2 Hrs)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
3	2		5	50	25	25	25*		25	150

Abbreviations: TH- Theory; PR-Practical; TU-Tutorial; TS1 and TS2- Term Tests; OR-Oral Exam; TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal assessment
 Note: For Minimum passing marks under various heads, refer, examination rule AR26.

Rationale: The study of Data Structure is essential part of Computer Science. Data structure is a logical and mathematical model for storing and organizing data in a particular way in a computer. The study of data structure helps the students in developing logic and structured programs

Course Outcomes: Student will be able to

CO1	Demonstrate different data structure.
CO2	Use Stack and recursion concept.
CO3	Implement the Queue concept .
CO4	Use Linked List ,Tree and Graph Concept
CO5	Implement different Searching and Sorting Techniques.

Course Content Details:

Unit No	Topics / Sub-topics
1	Introduction to Data Structures: 1.1 Need of data structures. 1.2 Definition of Data structure and Abstract data type. 1.3 Classification of Data structures: Linear, non-linear, homogeneous, non-homogeneous, static & dynamic. Course Outcome: CO1 Teaching Hours :6 hrs Marks: 10(R- 02, U-4, A-)
2	Linked List 2.1 Introduction and Terminologies : Node, Next Address and Pointer, Null pointer, Empty list 2.2 Types of Linked List: Single Linked List, Doubly Linked List , Circular Linked List Doubly Circular Linked List 2.3 Operations on Single Linked List: Searching, Insertion - (At Front ,In between and At End), Deletion - (From Front ,In between, From End) Course Outcome:CO4 Teaching Hours :10 Marks: 12 (R- 02 , U- 04 , A- 06)

3	<p>Stacks</p> <p>3.1 Definition & examples of Stack, Stack as an abstract data type implementations using arrays and dynamic memory allocation</p> <p>3.2 Operations on Stack PUSH POP Top Of The Stack</p> <p>3.3 Overflow & Underflow of Stack</p> <p>3.4 Applications of Stack</p> <p>3.5 Polish Notation</p> <p>3.6 Reversing a List</p> <p>3.7 Recursion</p> <p>Course Outcome: CO2 Teaching Hours : 08 Marks: 06 (R- 02 , U- 04 , A-)</p>
4	<p>Queue</p> <p>4.1 Definition & examples of Queue Queue as an abstract data type implementations using arrays and dynamic memory allocation</p> <p>4.2 Operations on Queue</p> <p>4.3 Types of Queue Priority queue Circular queue</p> <p>4.4 Application Of Queue</p> <p>4.5 Job Scheduling</p> <p>4.6 Task Scheduling</p> <p>Course Outcome: CO3 Teaching Hours : 08 Marks: 06 (R- 02 , U- 02 , A- 02)</p>
5	<p>Trees and Graphs</p> <p>5.1 Introduction and Terminologies : Sub-tree, root ,leaf , left, non-leaf, right, parent, child, ancestor, descendant, brother, level, depth, height.</p> <p>5.2 Types of Tree General Tree Binary Tree Binary Search Tree</p> <p>5.3 Representation of Tree</p> <p>5.4 Operations on Trees Insertion Deletion Searching - Depth-first search and Breadth-first search</p> <p>5.5 Traversing - Pre-order, In-order ,Post-order</p> <p>5.6 Introduction to GRAPHS Terminologies: graph, node (Vertices), arcs (edge), directed graph, in-degree, out-degree, adjacent, successor, predecessor, relation, weight, path, length.</p>

	Course Outcome: CO4 Teaching Hours : 10 Marks: 10 (R- 02 , U- 02 , A- 06)
6	Searching and Sorting 6.1 Searching Linear Search, Binary Search , Hash Search. 6.2 Sorting Bubble Sort Insertion Sort Selection Sort Merge Sort Quick Sort Course Outcome: CO5 Teaching Hours :08 Marks: 10 (R- 02 , U- 02 , A- 06)

Suggested Specifications Table (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Introduction to Data Structures	4	02	04		6
2	Linked List	10	02	04	06	12
3	Stack	08	02	04		06
4	Queue	08	02	02	02	06
5	Trees and Graphs	10	02	02	06	10
6	Searching and Sorting	08	02	02	06	10
Total		48	12	18	20	50

List of experiments: Total 10 experiments(or turns) out of 15 experiments(or turns)

Sr. No.	Unit No	COs	Title of the Experiments	Hours
1	1	CO1	Write a program for insertion and deletion of an element in an Array at given position.	02

2	2	CO2	Write a program to implement following operations on Singly Linked List a)Create b)Insertion c)Deletion	02												
3	3	CO3	Write a program to implement following operations on Doubly Linked List a)Create b)Insertion c)Deletion	02												
4	4	CO4	<div>In a “Suryan” Shopy multiple Items are available for selling , the store wants to automate the billing system so that the customer gets printed bill .Each Item has unique Id, name and its rate associated with it. Write a menu driven program which will ask the customer to select the Items and quantity of the Items and will generate bill in following format.</div> <table><tr><td>Sr.no</td><td>Items</td><td>Rate</td><td>Quantity</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>Grand Total</td><td colspan="3"></td></tr></table>	Sr.no	Items	Rate	Quantity					Grand Total				02
Sr.no	Items	Rate	Quantity													
Grand Total																
5	5	CO5	Write a program to implement the PUSH and POP operation of Stack	02												
6	6	CO6	Write a program to implement the do and undo activity using Stack	02												
7	1	CO1	Write a program to implement Infix Prefix and Postfix Operation	02												
8	2	CO2	Write a program to implement different operations on Queue.	02												
9	3	CO3	Write a program to implement the concept of Doubly ended Queue.	02												
10	4	CO4	Write a program to implement Ticket Reservation of system which is based on following priorities VIP=5,Senior =4,Handicap=3,Ladies=2,General =1	02												
11	5	CO5	Write a program to insert and delete nodes in a Tree.	02												
12	6	CO6	Write a program to implement Inorder Preorder and Post order of Tree nodes	02												
13	5	CO1	Write a program to implement DFS and BFS.	04												
14	6	CO2	Write a program to implement Linear and Binary Search Techniques.	02												
15	5	CO3	Write a program to implement a)Quick sort b)Bubble sort c)Insertion d)Selection	02												
Total				32												

References/ Books:

Sr. No.	Name of Book	Author	Publisher
1	Data Structure	Schaum's Series	Tata McGraw Hill
2	An Introduction to Data Structures with applications	Tremblay and Srenson	Tata McGraw Hill
3	Data Structure through 'C'	Ajit Abyankar	Tata McGraw Hill

CO VsPO and CO Vs PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	3	3	2	3	3	2	3	3
CO2	2	2	3	3	1	3	2	2	3	2
CO3	2	3	3	2	2	2	2	2	2	2
CO4	2	3	2	3	2	3	3	2	3	3
CO5	1	2	3	3	2	3	3	2	3	3

Industry Consultation Committee:

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