MARIS STELLA COLLEGE (AUTONOMOUS),VIJAYAWADA-8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Computer Science   Semester: II
Course Title: Data Structures using C   Course Code: 22CSCCDS23
No. of Hours: 60   LTP: 400   Credits: 3

Objectives

- To familiarize the fundamentals of data structures.
- To impart knowledge of complexity of basic operations like insert, delete, search on these data structures.
- To build the ability to choose a data structure to suitably model any data used in computer applications.

Course Outcomes

CO1: Identify data structures to represent data items in the real world.
CO2: Analyse the working principles and applications of data structures.
CO3: Develop programs by applying various operations on data structures.
CO4: Apply various sorting, searching and hashing techniques.

UNIT–I   (12 Hrs.)

Introduction to Data Structures: Introduction to the Theory of Data Structures, Data Representation, Advantages of Data Structures, Operations of Data Structures, Abstract Data Types, Classification of Data Types: Primitive Data Types, Non - Primitive Data Types.
Principles of Programming and Analysis of Algorithms: Algorithms, Characteristics of an algorithm, Factors of an algorithm, Complexity, Algorithm Analysis, Approaches of algorithm - programming exercises.

UNIT–II   (12 Hrs.)

Arrays: Introduction to Linear and Non- Linear Data Structures, One-Dimensional Arrays, Array Operations, Two- Dimensional arrays- programming exercises.
Linked Lists: Introduction to Lists and Linked Lists, Dynamic Memory Allocation, Basic Linked List Operations, Doubly Linked List, Circular Linked List - programming exercises.

UNIT–III **(12 Hrs.)**

Stacks: Introduction to Stacks, Representation of Stacks through Arrays, Representation of Stacks through Linked Lists, Applications of Stacks - programming exercises.

Queues: Introduction, Representation of Queues, Circular Queues, Double Ended Queues- Deques, Priority Queues, Application of Queues - programming exercises.

UNIT–IV **(12 Hrs.)**

Binary Trees: Introduction to Non- Linear Data Structures, Introduction Binary Trees, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees, Representation of Binary Trees, Operations on a Binary Search Tree, Binary Tree Traversal, Applications of Binary Tree, Heap - programming exercises.

UNIT– V **(12 Hrs.)**

Sorting and Searching: Sorting – An Introduction, Bubble Sort, Insertion Sort, Merge Sort, Searching – An Introduction, Linear or Sequential Search, Binary Search - programming exercises.

Graphs: Introduction to Graphs, Terms Associated with Graphs, Sequential Representation of Graphs, Linked Representation of Graphs, Traversal of Graphs : DFS & BFS, Spanning Trees, Application of Graphs - programming exercises.

Co-Curricular Activities
- Assignments on problem solving
- Student presentations and seminars
- Online quizzes

Prescribed Books
1. "Data Structures using C", ISRD group Second Edition, TMH
2. "Data Structures through C", Yashavant Kanetkar, BPB Publications
3. "Data Structures Using C" Balagurusamy E. TMH

Reference Book
1. E Balagurusamy – Programming in ANSIC – Tata McGraw-Hill publications.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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Blueprint

Subject: Computer Science   **Semester: II**

Course Title: Data Structures using C   **Course Code: 22CSCCDS23**

Time: 3 Hrs.   **Max. Marks: 100**

SECTION – A

Answer **ALL** questions   **20 x 1 = 20M**

Q. No.	UNIT	Marks Weightage	RBT LEVEL
1	I	1	
2	I	1	
3	II	1	
4	II	1	
5	III	1	
6	III	1	**No. of questions to be set**
7	IV	1	RBT1 – 10
8	IV	1	RBT2 – 10
9	V	1	
10	V	1	
11	I	1	
12	I	1	
13	II	1	
14	II	1	
15	III	1	
16	III	1	
17	IV	1	
18	IV	1	
19	V	1	
20	V	1	

SECTION – B

Answer any **FOUR** questions   **4 x 8 = 32M**

Q. No.	UNIT	Marks Weightage	RBT LEVEL
21	I	8	**No. of questions to be set**
22	II	8	RBT1 – 3
23	III	8	RBT2 – 3
24	IV	8	
25	V	8	
26	I / II / III / IV / V	8	

SECTION – C

Answer any **FOUR** questions   **4 x 12 = 48M**

Q. No.	UNIT	Marks Weightage	RBT LEVEL
27	I	12	**No. of questions to be set**
28	II	12	RBT1 – 3
29	III	12	RBT2 – 3
30	IV	12	
31	V	12	
32	I / II / III / IV / V	12	

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SECTION – A

Answer **ALL** questions   20 x 1 = 20 M

1. _____ is a storage that is used to store and organize data.
    A. Data
    B. Information
    C. Raw facts and figures
    D. Data structure

2. Accessing each record exactly once so that the certain elements in the records may be processed is called _____.
    A. Inserting
    B. Deleting
    C. Searching
    D. Traversing

3. The memory location of the first element of the array starts with and index value____.
    A. 0
    B. 1
    C. 0 and 1
    D. 0 or 1

4. Single linked list or one way consists of Nodes, thus Node is partitioned in to two parts, they are ____ and ___.
    A. Order and preference
    B. Information and Address of the next node
    C. Data and Invalid operator
    D. Stack and Queue

5. In the representation of the Stack in memory, if TOP=3 and MAX STK=8, ____ are the free rooms left in the stack.
    A. 3
    B. 8
    C. 5
    D. 0

6. A Circular queue or a ring buffer is a linear queue based on _____
    A. LIFO

   B. FIFO

   C. LILO

   D. FILO

7. To represent a binary tree of depth 'n' using array representation, in single dimensional array with a maximum size of _____.

   A. 2n - 1

   B. 2n + 1

   C. n + 2

   D. n - 2

8. A _____ is a hierarchical data structure that naturally hierarchically stores the information.

   A. Node

   B. Tree

   C. Root

   D. Child

9. Acronym of BFS is _____.

   A. Breadth First Search

   B. Breadth Forth Search

   C. Binary First Search

   D. Binary Search Tree

10. In _____ searching, the element to be found in searching the elements to be found is searched sequentially in the list.

   A. Linear and Binary

   B. Binary search

   C. Heap

   D. Linear search or sequential search

11. The process of finding the location of an element within the data structure is called _____.

12. _____ is a step-by-step procedure, which defines a set of instructions to be executed in a certain order to get the desired output.

13. _____ is a linear data structure that collects elements of the same data type and stores them in contiguous and adjacent memory locations.

14. _____ is a type of linked list in which a node contains a pointer to the previous as well as the next node in the sequence.

15. Backtracking is an application for _____.

16. _____ queue determines the order in which elements are served.

17. A _____ is a tree-type non-linear data structure with a maximum of

two children for each parent.
18. _____ is a special tree-based data structure in which the tree is a complete binary tree.
19. _____ is a sorting technique based on divide and conquer technique.
20. _____ data structure is a collection of nodes that have data and are connected to other nodes.

SECTION – B

Answer any **FOUR** questions　　　　　　　　　　　**4 x 8 = 32 M**

21. Explain the concept of data structure and its operations with example.
22. Define an Algorithm. Explain the characteristics of an algorithm.
23. What is an Array? Write a program for addition of two matrices using two-dimensional array in C.
24. Explain about Queue and its representation with example using C.
25. What is a Binary tree? Demonstrate the types of trees with example.
26. Write a program for merge sort with example using C.

SECTION – C

Answer any **FOUR** questions　　　　　　　　　　　**4 x 12 = 48 M**

27. Explain the concept of data types and its types.
28. Explain about single linked list and its operations with example using C.
29. Explain about Stack and its representation through arrays with example using C.
30. Demonstrate the operations on Binary Tree with examples.
31. Explain in detail about Binary search with example using C.
32. Discuss the terms associated with graphs. Explain about DFS with example using C.