

**B.C.A**  
**SEMESTER – III**

**Paper No-303: Data Structures Using C:****Credit: 03**

Total: **100 Marks**  
Semester End Examination: **70 Marks**  
Continuous Internal Evaluation: **30 Marks**

| Unit          | Detailed Syllabus  | Teaching Hours | Marks/Weight |
|---------------|--|----------------|--------------|
| <b>Unit-1</b> | <p><b><u>Introduction &amp; Concepts of Data Structure:</u></b></p> <p>1.1 Definition, Data Types(Primitive, Non- Primitive), Type of Data Structures (Linear, Non-Linear, Static, Dynamic)</p> <p>1.2 Logical and Control Structures of data</p> <p>1.3 1.3Time and space efficiency of Algorithms</p> <p>1.4 Applications, Aims &amp; Goals of Data Structure</p> <p>1.5 Storage Representation of data in 1, 2, and Multidimensional Array and Sparse Matrix</p>  | 09             | 14           |
| <b>Unit-2</b> | <p><b><u>Searching, Sorting and Merging Techniques:</u></b></p> <p>2.1 Sequential search, Binary Search</p> <p>2.2 Bubble, Selection sorts</p> <p>2.3 Insertion , Shell, Quick sorts</p> <p>2.4 Merge sort</p> <p>2.5 Applications, merits &amp; demerits of all above techniques</p>  | 09             | 14           |
| <b>Unit-3</b> | <p><b><u>Linear Data Structure(Stack &amp; Queue):</u></b></p> <p>3.1 Stack: -Basic Operations using array and linked list (Push, Pop, Peep, Display)</p> <ul style="list-style-type: none"> <li>♣ Applications of Stack</li> </ul> <p>3.2 Polish Notations:</p> <ul style="list-style-type: none"> <li>♣ Conversion of expression (Infix, Postfix, Prefix)</li> <li>♣ Evaluate Postfix Expressions (using Hand, Stack) Method.</li> </ul> <p>3.3 Queue, Circular Queue:</p> <ul style="list-style-type: none"> <li>♣ Basic Operations using array and linked list (Insert, Delete, Update, Search, Sort, Display)</li> </ul> <p>3.4 Concept of Priority Queue and Double Ended Queue:</p> <p>3.5 Applications of all above Queues</p>   | 09             | 14           |
| <b>Unit-4</b> | <p><b><u>Non-Linear Data Structure1(Tree):</u></b></p> <p>4.1 Introduction of Tree:</p> <ul style="list-style-type: none"> <li>♣ Definitions, Basic Tree Terminology,</li> <li>♣ Different graphical representations techniques</li> </ul> <p>4.2 Binary Tree, Full, Complete, in-complete, balance, imbalance</p> <ul style="list-style-type: none"> <li>♣ Memory Representations of Binary Tree(Array &amp; Linked) and its merits &amp; demerits of representations</li> <li>♣ Basic Operations on Binary Tree using linked list (Create, Insert, Display, Search, Update)</li> </ul> <p>4.3 Binary Tree Traversal algorithms : In order, pre- order, post order</p> <p>4.4 Binary Search Tree, Properties of BST,</p> <ul style="list-style-type: none"> <li>♣ Basic Operations on BST using liked list (Insert, Display, Search, Update)</li> </ul> <p>4.5 Applications, Merits &amp; Demerits of all above trees</p> | 09             | 14           |

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| <b>Unit-5</b> | <b><u>Non-Linear Data Structure2(Graph):</u></b><br>5.1 Introduction of Graph, Properties of graph & Terminology<br>5.2 Adjacency & Incidence Matrices Representation of Graph.<br>5.3 Graph Traversal Techniques(DFS & DFS)<br>5.4 Applications of Graph | 09 | 14 |
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**Break up of Continuous Internal Evaluation:**

- 1) Test: 10 Marks
- 2) Assignment: 10 Marks
- 3) Presentation: 10 Marks

**Total Marks: 30 Marks**

**Reference / Text-Books / Additional Reading:**

- [1] Data & File Structure: Tremblay & Sourenson
- [2] Expert in Data Structure with C: R. B. Patel (Second or above editions)
- [3] Data & File Structure: A. A. Puntambekar