

# Syllabus

B.Sc. (CS) 3<sup>rd</sup> Semester

Paper-CS08 : Data Structures

## Unit – I

**Basic Concepts :** Introduction to Complexity, Data Structure and Data Structure operations. Applications of Data Structure. Basic data Structures: **Arrays:** Introduction, Types of Array, Memory representation, Applications and operations. **Stacks:** Introduction, memory representation, Applications and operations.

## Unit – II

**Linked List :** Operations : - traversing, searching, inserting, deleting, operations on header linked list, circular linked list, doubly linked list, memory representation, Applications, polynomial manipulation; **Queue:** Introduction, Types, Memory Representation and Applications.

## Unit – III

**Trees -** Definition and Basic concepts, Representation in Contiguous Storage, Binary Tree, Binary Tree Traversal, Binary Search tree; **Graphs:** Introduction, Memory Representation, Graph Traversal (DFS and BFS)

## Unit – IV

**Searching :** Binary and Linear Search; **Sorting:** Bubble sort, Insertion sort, Selection sort, Merge Sort, Quick sort. Shell sort, Heap Sort. Comparison of various Searching and Sorting algorithms.

**Paper – PCS04 : Practical Based on Paper CS08 – Implement Data Structures**

# Syllabus

BCA 3<sup>rd</sup> Semester

Data Structures

BCA – 16 – 305

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Time Duration: 3 Hrs.

External Marks: 65

Internal Marks: 10

Number of Lectures : 60

**Objective:** To teach the students various data structures and the basic operations performed using them. At the end of course the student will have complete knowledge of data structures, thus will be able to use them for solving real world problems.

**Note :**

- (i) The Question Paper will consist of Four Units.
- (ii) Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- (iii) The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- (iv) All questions carry equal marks unless specified.

## UNIT – I

**Basic Concepts :** Introduction to Complexity, Data Structure and Data Structure operations. Applications of Data Structure.

**Arrays:** Introduction, Types of Array, Memory representation, Applications and operations.

**Stacks:** Introduction, memory representation, Applications and operations.

## UNIT – II

**Linked List :** Operations :- traversing, searching, inserting, deleting, operations on header linked list, circular linked list, doubly linked list, memory representation, Applications, polynomial manipulation.

**Queue:** Introduction, Types, Memory Representation and Applications.

## UNIT – III

**Trees -** Definition and Basic concepts, Representation in Contiguous Storage, Binary Tree, Binary Tree Traversal, Searching, Inserting and deletion in binary trees, Binary Search tree.

**Graphs:** Introduction, Memory Representation, Graph Traversal (DFS and BFS)

## UNIT – IV

**Searching :** Binary and Linear Search;

**Sorting:** Bubble sort, Insertion sort, Selection sort, Merge Sort, Quick sort.

Comparison of various Searching and Sorting algorithms.