UNIVERSITY OF MADRAS

BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)

SYLLABUS WITH EFFECT FROM 2020-2021

BCA-DSC05

CORE-V: DATA STRUCTURES

II YEAR / III SEM

OBJECTIVES:

- To understand the concepts of ADTs
- To learn linear data structures-lists, stacks, queues
- To apply Tree and Graph structures
- To understand sorting, searching and hashing

OUTCOMES:

- Implement abstract data types for linear data structures.
- Apply the different linear and non linear data structures to problem solutions.
- Critically analyze the various sorting algorithms.

UNIT - I

Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation-singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations-Insertion-Deletion-Merge-Traversal.

UNIT - II

Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix to postfix expression-Queue ADT-Operations-Circular Queue- Priority Queue- deQueue-applications of queues.

UNIT - III

Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT- Threaded Binary Trees-AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.

UNIT - IV

Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.

UNIT - V

Searching- Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort-Hashing-Hash functions-Separate chaining- Open Addressing-Rehashing-Extendible Hashing.

TEXT BOOKS:

1. Mark Allen Weiss, "*Data Structures and Algorithm Analysis in C++",* Pearson Education 2014, 4th Edition.
2. Reema Thareja, "*Data Structures Using C",* Oxford Universities Press 2014, 2nd Edition.

REFERENCES:

1. Thomas H.Cormen,Chales E.Leiserson,Ronald L.Rivest, Clifford Stein, "*Introduction to Algorithms*", McGraw Hill 2009, 3rd Edition.
2. Aho, Hopcroft and Ullman, "*Data Structures and Algorithms*", Pearson Education 2003.

WEB REFERENCES:

- NPTEL & MOOC courses titled Data Structures
- https://nptel.ac.in/courses/106106127/