BC102 --- DATA STRUCTURES

Course Description and Objective*:*
The main objective of this course is to provide an introduction to basic data structures and manipulation by using C programming language. It enables the students to understand Abstract Data Types. It also enables the students to understand the behavior of data structures (lists, stacks, queues, trees (binary trees and tree traversals, height-balanced trees), graphs, hash tables). It improves his ability to analyze a problem and determine the appropriate data structure for the problem.

Course Outcome:
Having successfully completed this course, the student will be able to:

- Apply C programming techniques such as pointers, dynamic memory allocation, structures to developing solutions for particular problems.
- Design and implement abstract data types such as linked list, stack, queue and tree in C programming language using static or dynamic implementations.
- Evaluate and choose appropriate abstract data types to solve particular problems.

UNIT – I Introduction, Arrays and Linked Lists
Concept of Data Structures, Implementation of Data Structures Arrays: One-dimensional array, multidimensional arrays, pointer Arrays, linked lists: Types of linked list, applications of linked lists.

UNIT – II Stacks and Queues
Stack:- Introduction to stack, Representation of a stack, operations on stack, applications of stacks; Queue: Representation of Queues, Operations on Queue, various Queue structures, Applications of Queues.

UNIT-III Trees
Trees:- Definition and concepts of trees, Representation of Binary tree, types of Binary trees, Tree Traversals operations of Binary search tree, Introduction to AVL trees.

UNIT-IV Graphs
Graph Terminologies, Representation of Graphs, operations on graphs, Graph traversals, Applications of Graphs, minimum spanning trees.

UNIT-V Sorting and Searching
Sorting Techniques; Insertion sort, selection sort, merge sort, heap sort, searching Techniques : linear search, binary search and hashing.

Text Books:
1. Debasis Samanta, “Classic Data Structures”, PHI Learning Private Limited, 2nd edition, 2011.
2. E. Horowiz & S. Sahani, “Fundamentals of Data Structures”, Galgotia Book Source Pvt. Limited, 3rd edition, 2003.

Reference Books:
1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Second Edition, Pearson Education.
2. Sartaj Sahni, Data Structures, Algorithms and Applications in C++ , Universities Press, Second Edition, 2005
3. Jean Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications,Tata Mc-Graw Hill, Second Edition, 26th Reprint 2004