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Future Vision

By K B Hemanth Raj

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6th Semester Open Electives Syllabus for the Courses Offered by EC/TC

Board:

DATA STRUCTURE USING C++
B.E VI Semester (Open Elective)
[As per Choice Based Credit System (CBCS) Scheme]

Course Code	17EC661	CIE Marks	40
Number of Lecture Hours/Week	03	SEE Marks	60
Total Number of Lecture Hours	40 (08 Hrs per Module)	Exam Hours	03

CREDITS – 03

Course objectives: This course will enable students to

- Explain fundamentals of data structures and their applications essential for programming/problem solving
- Analyze Linear Data Structures: Stack, Queues, Lists
- Analyze Non Linear Data Structures: Trees
- Assess appropriate data structure during program development/Problem Solving

Module -1

INTRODUCTION: Functions and parameters, Dynamic memory allocation, Recursion.
LINEAR LISTS: Data objects and structures, Linear list data structures, Array Representation, Vector Representation, Singly Linked lists and chains. **L1, L2**

Module -2

ARRAYS AND MATRICES: Arrays, Matrices, Special matrices, Sparse matrices.

STACKS: The abstract data types, Array Representation, Linked Representation, Applications-Paranthesis Matching & Towers of Hanoi. **L1, L2, L3**

Module -3

QUEUES: The abstract data types, Array Representation, Linked Representation, Applications-Railroad car arrangement.

HASHING: Dictionaries, Linear representation, Hash table representation. **L1, L2, L3**

Module -4

BINARY AND OTHER TREES: Trees, Binary trees, Properties and representation of binary trees, Common binary tree operations, Binary tree traversal the ADT binary tree, ADT binary tree and the class linked binary tree. **L1, L2, L3**

Module -5

Priority Queues: Linear lists, Heaps, Applications-Heap Sorting.

Search Trees: Binary search trees operations and implementation, Binary Search trees with duplicates. **L1, L2, L3**

Course outcomes: After studying this course, students will be able to:

- Acquire knowledge of Dynamic memory allocation, Various types of data structures, operations and algorithms and Sparse matrices and Hashing
- Understand non Linear data structures trees and their applications
- Design appropriate data structures for solving computing problems
- Analyze the operations of Linear Data structures: Stack, Queue and Linked List and their applications

Text Book:

Data structures, Algorithms, and applications in C++, Sartaj Sahni, Universities Press, 2nd Edition, 2005.

Reference Books:

1. **Data structures, Algorithms, and applications in C++**, Sartaj Sahni, Mc. Graw Hill, 2000.
2. **Object Oriented Programming with C++**, E.Balaguruswamy, TMH, 6th Edition, 2013.
3. **Programming in C++**, E.Balaguruswamy. TMH, 4th, 2010.