

## **EC6301 OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES**

### DETAILED SYLLBUS

#### **OBJECTIVES:**

- To comprehend the fundamentals of object-oriented programming, particularly in C++.
- To use object-oriented programming to implement data structures.
- To introduce linear, non-linear data structures and their applications.

#### **UNIT I DATA ABSTRACTION & OVERLOADING**

Overview of C++ – Structures – Class Scope and Accessing Class Members – Reference Variables – Initialization – Constructors – Destructors – Member Functions and Classes – Friend Function – Dynamic Memory Allocation – Static Class Members – Container Classes and Integrators – Proxy Classes – Overloading: Function overloading and Operator Overloading.

#### **UNIT II INHERITANCE & POLYMORPHISM**

Base Classes and Derived Classes – Protected Members – Casting Class pointers and Member Functions – Overriding – Public, Protected and Private Inheritance – Constructors and Destructors in derived Classes – Implicit Derived – Class Object To Base – Class Object Conversion – Composition Vs. Inheritance – Virtual functions – This Pointer – Abstract Base Classes and Concrete Classes – Virtual Destructors – Dynamic Binding.

#### **UNIT III LINEAR DATA STRUCTURES**

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation — singly linked lists –Polynomial Manipulation - Stack ADT – Queue ADT - Evaluating arithmetic expressions

#### **UNIT IV NON-LINEAR DATA STRUCTURES**

Trees – Binary Trees – Binary tree representation and traversals – Application of trees: Set representation and Union-Find operations – Graph and its representations – Graph Traversals – Representation of Graphs – Breadth-first search – Depth-first search - Connected components.

#### **UNIT V SORTING and SEARCHING**

Sorting algorithms: Insertion sort - Quick sort - Merge sort - Searching: Linear search –Binary Search

#### **TEXT BOOKS:**

1. Deitel and Deitel, "C++, How to Program", Fifth Edition, Pearson Education, 2005.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Third Edition, Addison Wesley, 2007.

**REFERENCES:**

1. Bhushan Trivedi, "Programming with ANSI C++, A Step-By-Step approach", Oxford University Press, 2010.
2. Goodrich, Michael T., Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", 7th Edition, Wiley. 2004.
3. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Second Edition, Mc Graw Hill, 2002.
4. Bjarne Stroustrup, "The C++ Programming Language", 3rd Edition, Pearson Education, 2007.
5. Ellis Horowitz, Sartaj Sahni and Dinesh Mehta, "Fundamentals of Data Structures in C++", Galgotia Publications, 2007.