

2.5.6.Detailed Syllabus

(i) Object Oriented Concepts

Object Oriented Programming- a new paradigm, Abstraction, forms of Abstraction, OOP concepts- Classes, Objects, Polymorphism, Data Encapsulation, Data Hiding, Inheritance,

(ii) Basics of C++, Classes and Objects

Features of C++, Tokens, keywords, Data types, Operators, Manipulators, Console input , output, Control statements (conditional and loops), Functions, Classes, Instantiation, Destructor, constructor, Polymorphism - Operator Overloading, Function Overloading ,Inheritance-Single , Multiple, Multilevel, Pointers

(iii) Analysis of Algorithm

Introduction to algorithm design and Data structures, Comparison of Algorithms, Complexity in terms of space and time, Calculation of O- notation. Abstract Data type and its implementation with a Rational number example

(iv) Searching and Sorting

Searching- Linear and Binary Search, Sorting- Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Comparison of various searching and sorting techniques in terms of time complexity

(v) Elementary Data Structures: Arrays, Linked Lists

Representation of arrays-single and multidimensional, Address calculation using row major ordering, Various operations on arrays, Linked Lists-Singly Linked List, Double linked List, Circular Linked List- traversing, deleting, inserting, searching, counting, reversing, printing of nodes.

(vi) Stacks and Queues

Stack ADT, Implementation of stack using array and linked list, Application of Stack- Evaluation of postfix/prefix expression, Queue ADT, Implementation of queue using Array and Linked List

(vii) Trees

Definition and notations, Binary Search Trees Implementation. Traversals using stacks and recursion - In-order, post-order, pre-order techniques, Threaded binary tree, B-trees with implementation of 2-3 trees.

(viii) Graphs

Definition and notations, Components of Graphs, Types of Graphs, Graph Implementation using Adjacency Matrix and Adjacency List algorithms and programs, Graph Traversal Methods : Depth First Search and Breadth First Search.