

# C++ Training Syllabus

## Introduction to C++

- Introduction to C++
- Benefits of C++
- Brief Introduction to OOPs
- First C++ program

## C++ Language Features

- How C++ differs from C
- Variable Declaration
- Function Overloading
- Reference Parameters
- Operator overloading
- cin and cout and Formatting
- Constant pointers
- Pointers to constant

## OOPs Concepts

- Overview of OOPs Principles
- Encapsulation
- Inheritance
- Polymorphis
- Classes Objects
- Introduction to classes objects
- Creation destruction of objects
- Data Members
- Member Functions
- this Pointer
- Constructor destructor
- Static class member
- Access modifiers
- Data abstraction (public and private)
- Friend class and functions
- ADT information hiding
- Namespace

## Inheritance

- Introduction and benefits
- Base derived class
- Types of inheritance
- Function overriding
- Destructor overriding
- Virtual base class

## Polymorphism

- Static dynamic bindings
- Dynamic binding through virtual functions
- Virtual function call mechanism using vtable
- Pure virtual functions
- Virtual destructors

## I/O Streams

- Types of Streams
- Basic file i/o
- Text vs Binary Streams
- Overloading operators
- Error handling during file operations

## Exceptions

- Benefits of exception handling
- Types of exception
- Try catch block
- throw statement
- Writing custom Exception class
- Stack unwinding
- Rethrowing an exception
- Catching all exceptions

## Templates

- Necessity of Templates
- Function Templates
- Class Templates

## Searching sorting

- Introduction to searching
- Types of searches
  - Sequential search
  - Binary search
- Introduction to Sorting
- Types of sorting
  - Bubble sort
  - Selection sort
  - Insertion sort
  - Quick sort
  - Merge sort

## Linked list

- Introduction to linked lists
- Types of Linked lists
  - Single list
  - Circular list
  - Double linked list

## Stacks

- Definition
- Array Linked representation
- Applications

## Queues

- Definition
- Array Linked representation
- Applications

## Trees

- Introduction to Trees
- Types of trees
  - Binary tree
  - Avl tree
  - splay trees
  - Red Black trees
  - B tree
  - B+ tree

## Graphs

- Introduction to Graphs
- Representation of Graphs
- Graph search methods
- Applications