

## **CPP**

### **1. Introduction to C++**

- History and evolution of C++.
- Features of C++ (Object-Oriented Programming).
- Structure of a C++ program.

### **2. Basics of C++**

- Data types: int, float, double, char, bool, string
- Variables, constants, and literals.
- Input/Output in C++: cin, cout.
- Keywords: const, bool

### **3. Control Structures**

- Decision-making:
  - if, if-else, switch.
- Loops:
  - for, while, do-while.
- Jump statements:
  - break, continue, goto.
- Keywords: if, else, switch, case, default, for, while, do, break, continue, goto.

### **4. Functions**

- Function declaration, definition, and calling.
- Inline functions.
- Default arguments.
- Keywords: inline, return.

## 5. Object-Oriented Programming (OOP) Concepts

- Classes and objects
- Definition, declaration, and instantiation.
- Access specifiers: private, protected, public.
- Constructors and destructors.
- this pointer.
- Static members and member functions.
- Friend functions and classes.
- Keywords: class, private, protected, public, static, friend.
- Namespaces, scope resolution operator ( :: )

## 6. Inheritance

- Concept of inheritance.
- Types of inheritance:
  - Single, multiple, hierarchical, multilevel, hybrid.
- Virtual base classes.
- Overriding base class methods.
- Keywords: protected, public, private, virtual.

## 7. Polymorphism

- Compile-time polymorphism:
  - Function overloading.
  - Operator overloading.
- Run-time polymorphism:

- Virtual functions.
- Pure virtual functions and abstract classes.
- Keywords: virtual, override.
- V Pointer, V-Table

## **8. Pointers and Dynamic Memory Allocation with CPP**

- new and delete operators.
- Keywords: new, delete.

## **9. Templates**

- Function templates.
- Class templates.
- Keywords: template.
- STL -Standard Template Library

## **10. Exception Handling**

- Basics of exception handling.
- try, catch, throw keywords.
- Standard exception classes.
- User-defined exceptions.
- Keywords: try, catch, throw.

## **11. File Handling in C++**

- Introduction to File Handling
  - File streams (ifstream, ofstream, fstream)
  - File opening modes
- Writing to a File
  - Using ofstream
  - Appending data to a file

- Reading from a File
  - Using ifstream
  - Handling EOF (End of File)
- File Positioning
  - Using seekg(), seekp(), tellg(), tellp()
- Binary File Handling
  - Writing and reading objects to/from binary files