

C++ Full Syllabus and Course Overview

Importance of C++ in Real Life and Industry

C++ is a powerful programming language that is widely used in various domains such as system/software development, game development, and high-performance applications. It combines the features of both high-level and low-level programming languages, providing fine control over system resources and memory. C++ is the backbone of many applications and systems, making it a vital skill for developers aiming to work in industries requiring efficient and robust software solutions.

1. Introduction to C++

- Basics of C++ Programming
- C++ Syntax and Structure
- Data Types and Variables

2. Control Flow

- Conditional Statements (if, switch)
- Loops (for, while, do-while)
- Break and Continue

3. Functions

- Function Declaration and Definition
- Function Overloading
- Default Arguments and Inline Functions

4. Object-Oriented Programming (OOP)

- Classes and Objects
- Inheritance, Encapsulation, and Polymorphism
- Abstract Classes and Interfaces

5. Pointers and Dynamic Memory Management

- Introduction to Pointers
- Dynamic Memory Allocation (new, delete)
- Smart Pointers (unique_ptr, shared_ptr)

6. Data Structures

- Arrays, Linked Lists, Stacks, and Queues
- Introduction to STL (Standard Template Library)
- Vectors and Lists

7. File Handling

- Reading and Writing Files
- Working with Text and Binary Files
- Error Handling in File Operations

8. Templates and Exception Handling

- Function Templates and Class Templates
- Exception Handling (try, catch, throw)
- Standard Exception Classes

9. Advanced Topics

- Multithreading and Concurrency
- Lambda Expressions
- Introduction to Design Patterns

10. Real-World C++ Projects

- Developing Applications using C++
- Case Studies and Portfolio Development