Professional C++

Description

This course will give the student to object-oriented programming concepts of program specification and design, coding and testing using a modern software development environment. Students will also learn how to write programs in an object-oriented high level programming language. Topics covered include fundamentals of algorithms, flowcharts, problem solving, Oops programming concepts, classes and methods, control structures, arrays, and strings. Throughout the session, problem solving skills will be stressed and applied to solving computing problems. Weekly laboratory experiments will provide hands-on experience in topics covered in this course.

Expectations and Goals

The learning goals of this course are:

- To understand how C++ improves C with object-oriented features.
- To learn how to write inline functions for efficiency and performance.
- To learn the syntax and semantics of the C++ programming language.
- To learn how to design C++ classes for code reuse.
- To learn how to implement copy constructors and class member functions.
- To understand the concept of data abstraction and encapsulation.
- To learn how to overload functions and operators in C++.
- To learn how containment and inheritance promote code reuse in C++.
- To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
- To learn how to design and implement generic classes with C++ templates.
- To learn how to use exception handling in C++ programs.

Prerequisites

- Basic Computing and Logical Knowledge.
- Knowledge of C Programming.

Course Schedule

Module	Topic
Module 1	**Introduction** Introduction to C++. Procedural vs. Object Oriented Programming(OOP) Benefits of OOPs Different OOPs Features Basic Components of C++ Compiling and Executing C++ program
Module 2	**Fundamental of C++** Tokens, Keywords, Identifiers and Constants Data Types, Type Compatibility and Variables Operators in C++ Operator precedence Control Statement. Iteration and Loops

Module 3	**Function in C++** Type of Function, Function Prototyping Call by Reference and Call by value Scope and Visibility of variables in Functions Inline Function, Friend Function
Module 4	**Variadic Function in C++** What is Variadic Function Use of Variadic Function Types of Variadic Function A C++ Program to implement a variadic function
Module 5	**Basic Concept in OOPs** Objects and Classes Encapsulation Abstraction This pointer Polymorphism Inheritance Dynamic Binding Message Passing
Module 6	**Object and Classes** Access Specifier Specifying a Class and Create an Object Defining Member Function A C++ program with Class
Module 7	**Constructors and Destructors** Default Constructor, Parameterized Constructor, Copy Constructor, Dynamic Constructor Constructor Overloading How to define a Destructor
Module 8	**Inheritance** Introductions and Benefits Access Specifiers Base and Derived Class Types of Inheritance Function Overriding
Module 9	**Polymorphism** What is Polymorphism Run-time and Compile-time Polymorphism Function Overloading Operator Overloading Virtual Function

Module 10	**Files and Exception Handling** Classes for File Stream Operations Opening and Closing a File File Modes, File Pointers Input-Output Operations Updating a File Types of Error and Exceptions Try-Catch-Throw mechanism
Module 11	**Templates** Template Class Template Function Implementation of Templates using C++
Module 12	**Standard Template Library (STL)**
Module 13	Project work and documentation