Certificate Course on Object Oriented Programming Using C++/ JAVA

(30 Hours ➔ 12 Theory + 18 Practicals)

Objectives: Every student will be able to:
1. Articulate the principles of object-oriented problem solving and programming.
2. Outline the essential features and elements of the C++ programming language.
3. Explain programming fundamentals, including statement and control flow and recursion.
4. Apply the concepts of class, method, constructor, instance, data abstraction, function abstraction, inheritance, overriding, overloading, and polymorphism.

Course Outcome

After competing this course, you will be able to:
1. Describe OOPs concepts
2. Use functions and pointers in your C++ program
3. Understand tokens, expressions, and control structures
4. Explain arrays and strings and create programs using them
5. Describe and use constructors and destructors

Syllabus:

Unit No	Topics
1	**Introduction to OOP :** What is object oriented programming? Why do we need object oriented, Programming characteristics of object-oriented languages, C and C++.
2	**C++ Programming basics :** Output using cout Directives. Input with cin, type bool, the set manipulator, type conversions.
3	**Functions :** Returning values from functions. Reference arguments. Overloaded function. Inline function. Default arguments. Returning by reference.
4	**Object and Classes :** Making sense of core object concepts (Encapsulation, Abstraction, Polymorphism,

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Unit No	Topics
	Classes, Messages Association, Interfaces) Implementation of class in C++, C++ Objects as physical object, C++ object as data types constructor. Object as function arguments. The default copy constructor, returning object from function. Structures and classes. Classes objects and memory static class data. Const and classes
5	**Arrays and string arrays fundamentals:** Arrays as class member data, Arrays of object
6	**Operator overloading :** Overloading unary operations. Overloading binary operators, data conversion, pitfalls of operators overloading and conversion keywords. Explicit and Mutable.
7	**Inheritance :** Concept of inheritance. Derived class and based class. Derived class constructors, member function, inheritance in the English distance class, class hierarchies, inheritance and graphics shapes, public and private inheritance, aggregation: Classes within classes, inheritance and program development
8	**Pointer :** Addresses and pointers. The address of operator and pointer and arrays. Pointer and Faction pointer and C-types string. Memory management -New and Delete, pointers to objects, debugging pointers
9	**Virtual Function :** Virtual Function, friend function, Static function, Assignment and copy initialization, this pointer, dynamic type information
10	**Streams and Files :**

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Unit No	Topics
	Streams classes, Stream Errors, Disk File I/O with streams, file pointers, error handling in file I/O with member function, overloading the extraction and insertion operators, memory as a stream object, command line arguments, and printer output
11	**Templates and Exceptions :** Function templates, Class templates Exceptions

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