

ANNEXURE - II

C++ Complete with C++11 -14-17-20

1. OBJECTIVES

- ❖ To enable the participants to develop good object-oriented design and use modern C++ effectively

2. Duration

- ❖ This is a 6 Days Program

3. Entry Profile

- ❖ Medium degree of proficiency in "C".
- ❖ Medium degree of proficiency in OO concepts

Day 1

Runtime memory layout of a application

- ❖ Code Segment
- ❖ Data Segment
- ❖ Heap
- ❖ Stack

Concepts of Object oriented

- ❖ The Object-oriented approach
- ❖ Abstraction, Encapsulation and Modularity
- ❖ Interface and implementation
- ❖ Fundamentals of Object Oriented Approach
- ❖ Why objects?
- ❖ Classes & Objects – the different perspectives
- ❖ State, Identity and Behavior
- ❖ Abstraction
- ❖ Encapsulation
- ❖ Inheritance & Class Hierarchy
- ❖ Polymorphism: Early v/s late binding
- ❖ Object relationships

Namespace

- ❖ What is a namespace?
- ❖ Using Namespace with Scope resolution
- ❖ Using Namespace with The using directive
- ❖ Using Namespace with The using declaration
- ❖ Namespace Aliases
- ❖ Namespace Composition

- ❖ Resolving Potential Clash

Day 2

Functions

- ❖ Inline function
- ❖ Function prototype
- ❖ Recursive Function
- ❖ Overloading Functions
- ❖ Pass by value v/s Pass by ref
- ❖ Default function Arguments
- ❖ **Variable Parameter List**
- ❖ Temporary objects

Class and Object concepts

- ❖ Classes and Objects
- ❖ Class declaration & object mechanism
- ❖ Objects & references
- ❖ Constructors and Destructors
- ❖ Overloaded constructors
- ❖ Copy constructor
- ❖ Destructors
- ❖ Managing the heap
- ❖ Objects & references
- ❖ Copy constructor
- ❖ Overloading copy constructor

Day 3

Data Members

- ❖ Memento Pattern

Function Pointers

- ❖ Callbacks using Function Pointer
- ❖ Synchronize v/s Asynchronize calls
- ❖ Observer Pattern

Container class

- ❖ Creating Container Class
- ❖ Iterator Pattern
- ❖ Composite Pattern
- ❖ Command Pattern

Object Attributes and Behaviour

- ❖ Static members and objects on the heap
- ❖ Static members of a class
- ❖ Static data members
- ❖ Static member functions
- ❖ Const data members
- ❖ Const member functions

Day 4

Friend Functions

- ❖ Friend and classes
- ❖ Object communication
- ❖ Friend functions
- ❖ Friend classes
- ❖ Const objects and const member functions
- ❖ Object composition & destruction mechanism

Operator Overloading

- ❖ Overloading unary & binary operators
- ❖ Overloading the input/output stream operators
- ❖ Operators that cannot be overloaded
- ❖ Conversion functions
- ❖ Returning objects & assignment operator
- ❖ Copy And Swap Idiom
- ❖ Overloading >> & << operators
- ❖ Cascading operators & returning reference

Day 5

Inference and Closures

- ❖ Type Inference
- ❖ Lambda Expressions

Dynamic Memory Management Techniques for Memory Management

- ❖ Preventing Heap based objects
- ❖ Identifying object is on Heap or Stack

- ❖ Smart pointers

Exception handling

- ❖ multiple catch blocks
- ❖ catch any block
- ❖ set_terminate functions
- ❖ custom exception class

Day 6

- ❖ Inheritance in private, protected & public mode
- ❖ Applying Inheritance, key abstraction and dynamic binding
- ❖ Constructors & destructors in a derived class
- ❖ Multiple inheritance
- ❖ Virtual Base class
- ❖ Invoking base class constructors
- ❖ Why a constructor is not inherited
- ❖ Is-a & Has-a relationship
- ❖ Nested classes & Containership
- ❖ Runtime Polymorphism, Virtual Functions & Dynamic Binding
- ❖ Pointers & Classes
- ❖ Pointers to Class Members

