Course Contents for Object Oriented Programming using C++

## CS Object Oriented Programming

**Credit hours: 4**

**Course objectives:** When students complete this course, they will be able to:

* Understand the basic constructs of a C++ program
* Define a problem and implement its solution using classes and objects
* Effectively use and implement OOP analysis and design
* understand object-oriented programming features in C++
* understand object-oriented concepts and how they are supported by C++
* gain some practical experience of C++
* build good quality software using object-oriented techniques

**Reference material :**

1. Java How to Program, 5/E, (Harvey & Paul), Deitel&Deitel, Prentice Hall.

2. The C++ Programming Language by Bjarne Stroustrup

3. Object-Oriented Software Engineering by Jacobson,Christerson,Jonsson

**Course outline:**

Week 1:

Motivation for Object-Oriented Programming:

Significance of Object Orientation as a Modeling Technique,

Software Reuse, Software Maintenance.

Week 2 :

Class

Types in C++

Abstraction

Defining a new user defined type

Objects and Classes

Accessing member

Access Specifiers

Week 3:

Member functions

Definign member functions

Constructor

Constructor Properties

Default Constructor

Week 4:

Constructor overloading  
 copy constructor

Deep copy

Shallow copy

Week 5:

Destructor

This pointer

Constant member function

This pointer and constant member function

Week 6:

Static variables

Accessing static data member

Static member function

Week 7:

Global variable vs static variable

Arrays of objects

Pointer to objects

Week 8:

Composition

Aggregation

Friend Function

Week 9:

Operator Overloading

Overloading assignment operator

Other Binary Operators

Friend function and operator overloading

Unary operators overloading

Week 10:

Inheritance in C++

Is-A relationship

Overloading VS Overriding

Hierarchy of inheritance

Week 11:

Types of inheritance

Private inheritance

Protected inheritance

Week 12:

Virtual Functions

Static VS dynamic Binding

Week 13:

Abstract classes and concrete classes

Virtual destructors

Virtual functions and pure virtual functions

Virtual functions usage

Week 14:

Dynamic dispatch (Dynamic Binding)

Multiple inheritance

Problem in multiple inheritance

## Lab. manual CS326 - Object Oriented Programming

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| Week # | Topic | Example/question |
| Week 1 | Classes and Objects | Create a class student and show the attributes of student using get , set functions |
| Week2 | Classes and Objects | Create a class employee and accessing the attributes of employees using access apecifier  Create a class in C++ that uses coordinate to model a point  Square class and uses member functions to find  the perimeter and area of the square |
| Week3 | Constructor function in a class | Create a class rational which represents two numeric value by double and initialize them using constructor function.  Create a bit/Byte class to show the constructor concept. |
| Week4 | Constructor Overloading | Using Student class to demonstrate the constructor overloading concept |
| Week5 | Destructor and constant functions | Using Student class to demonstrate the constructor overloading concept |
| Week 6 | Static member | Creata class Count containing static data member and static function |
| Week 7 | Static member | Creata class Count containing static data member and static function |
| Week 8 | Global variable vs static variable  Arrays of objects | Creating Count class to discuss the global and static variables , arrays of object. |
| Week9 | Inheritance | [Create a class shape with variables….and two methods drawShape() and changeShape()….implement ……another class….with variables …and methods … ….. ] |
| Week 10 | Operator overloading |  |
| Week11 |  |  |