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 apecifierCreate a class in C++ that uses coordinate to model a pointSquare class and uses member functions to findthe 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 variableArrays 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 |  |  |