Course Title: Object Oriented Programming
Course No: CSC-202 Full Marks:60+20+20
Credit Hours: 3 Pass Marks: 24+8+8

Nature of Course: Theory (3hrs) + Lab (3hrs)
Course Synopsis: Study of basic programming skills, the concept of object oriented programming and its features, implementing the features.
Goal: to provide the object oriented programming approach to solve the problem.
Course contents:

Unit 1: **11hrs.**

1.1. Introduction to programming concept 4hrs.
- Overview of structural programming approach
- Object oriented approach
- Features of object oriented languages
- Components of object oriented languages.

1.2. Elements of object oriented languages 3hrs
- Introduction to inheritance
- Introduction to polymorphism
- Encapsulation and abstraction.

1.3. C++ basics 4hrs
- Introduction to C++
- Basic program construction; like functions, statements etc.
- Output using cout.
- Directives:
  - Preprocessor directives
  - Header files
  - The using directives etc.
- Comments and syntax
- Integer variable
  - Definition
  - Declaration,
  - Variable names
  - Assignment statements
- Integer constants
- Output variable.
- Input with cin
- Operators
- Library functions etc.

Unit 2: **15 hrs**

2.1.Control structure 3hrs
- Introduction
- Control statements
- The if selection structure
- The if/else selection structure
- The while structure
- The for structure

The do/while structure
The switch structure,
The break and continue statement etc.

2.2. The functions 4hrs
Introduction
Math library functions
Function definition, prototype.
Header files
Storage classes
Scope rules
Recursion
Inline functions
Function overloading
Function templates etc.

2.3. Arrays 2hrs
Introduction
Declaring arrays
Passing arrays to functions
Types of array, etc

2.4. Pointers 6hrs
Introduction
Pointer variable declaration and initialization
Operators in pointers
Calling functions by references
Relationship between array and pointers
Arrays of pointers
Function pointers, etc.

Unit 3: 19hrs

3.1. Class and Objects 4hrs
Introduction Features
of class, Object and its
features Declaration
of class Using class
Accessing member of class
Class scope
Initialization class objects
Constructor
Destructor
Object as function arguments
Overload constructor
Member functions defined outside class
Objects as arguments, etc.

3.2. Operator overloading 6hrs
Introduction
Fundamentals of operator overloading

Restriction on operator overloading
Operator functions as a class members
Overloading stream insertion and stream extraction operators
Overloading unary and binary operators, etc.

3.3. Inheritance 3hrs
Introduction
Types of inheritance
Protected members
Casting base class pointers to derived class pointer
Public, protected and private inheritance
Constructor and destructor in derived classes, etc.

3.4. Virtual functions and polymorphisms 3hrs
Introduction
Type fields and switch statements
Virtual functions
Abstract base classes and concrete classes
Polymorphism and its roles, etc.

3.5. Templates 2hrs
Introduction
Function templates
Overloading templates functions
Class templates
Templates and inheritance, etc.

3.6. Exceptional handling 1hrs
Introduction
Use of exceptional handling
Try, throw and catch statements

Laboratory works:
Suitable examples from each subsection are considered as the laboratory work.

Text books: C++ how to program; Deitel &Deitel, 3rd Edition, PEARSON

Reference: Object Oriented Programming in C++; Robert Lafore, Third Edition, GALGOTIA

Homework

Assignment: Assignment should be given from the above units in throughout the semester.

Computer Usage: No specific
Prerequisite: C
Category content: science aspect: 40%
Design aspect: 60%

Tribhuvan University

Model Question Paper

Level : Bachelor
Program : CSIT
Course: Object Oriented Programming

Year : -
Full Marks: 60
Time : 3 hrs.

Group:-A : Attempt any two question (2X10 = 20)

1. Explain in detail the following principles of object oriented programming
   (i) Data encapsulation and data hiding
   (ii) Inheritance and polymorphism
   (iii) Generic programming.
2. Explain the different types of constructors in C++. With suitable example.
3. Create an abstract base class shape with two members base and height, a member function for initialization and a pure virtual function to compute area ( ). Derive two specific classes Triangle and Rectangle which override the function area ( ). Use these classes in a main function and display the area of a triangle and a rectangle.

Group:-B : Attempt any eight question (8X5 = 40)

4. What is a friend function? What are the merits and demerit of using friend function?
5. What is this pointer? How is it available to member functions of a class?
6. Write a program to perform addition of two complex numbers using operator overloading.
7. In what order are the class constructors called when a derived class object is created? Explain with examples.
8. Write a program in C++ to count the number of words in a line of text.
9. Write a C++ program to multiply matrices using function template.
10. What are the keywords used in C++ for exception handling? Describe their usage with suitable example.
11. Write a program to find the cube of given integer using inline function.
12. Write a program to convert polar coordinates into rectangular coordinates.
13. Explain the different types of class access specifiers.