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<b>OBJECT-ORIENTED PROGRAMMING LAB (R161229)</b>					

**Pre-requisite Course:** Students should have basic understanding of Computers.

**Course Description and Objectives:**

1. To strengthen their problem solving ability by applying the characteristics of an object-oriented approach.
2. To introduce object oriented concepts in C++ and Java.

**Course Outcomes:**

Upon completion of the course, the student will be able to achieve the following outcomes.

CO	Course Outcomes	POs
1	Explain what constitutes an object-oriented approach to programming	4
2	Identify potential benefits of object-oriented programming over other approaches.	3
3	Apply an object-oriented approach to developing applications of varying complexities	2
4	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.	4
5	To strengthen their problem solving ability by applying the characteristics of an object-oriented approach	6
6	To introduce object oriented concepts in C++ and Java	5

**SYLLABUS:**

**Exercise – 1 (Basics)**

Write a Simple Program on printing “Hello World” and “Hello Name” where name is the input from the user

- a) Convert any two programs that are written in C into C++
- b) Write a description of using g++ (150 Words)



**Exercise – 2 (Expressions Control Flow)**

- a) Write a Program that computes the simple interest and compound interest payable on principal amount(inRs.)of loan borrowed by the customer from a bank for a giver period of time (in years) at specific rate of interest. Further determine whether the bank will benefit by charging simple interest or compound interest.
- b) Write a Program to calculate the fare for the passengers traveling in a bus. When a Passenger enters the bus, the conductor asks “What distance will you travel?” On knowing distance from passenger  
(as an approximate integer), the conductor mentions the fare to the passenger according to following criteria.

**Exercise – 3 (Variables, Scope, Allocation)**

- a) Write a program to implement call by value and call by reference using reference variable.
- b) Write a program to illustrate scope resolution, new and delete Operators. (Dyanamic Memory Allocation)
- c) Write a program to illustrate Storage classes
- d) Write a program to illustrate Enumerations

**Exercises –4 (Functions)**

Write a program illustrating Inline Functions

- a) Write a program illustrate function overloading. Write 2 overloading functions for power.
- b) Write a program illustrate the use of default arguments for simple interest function.

**Exercise -5 (Functions –Exercise Continued)**

- a) Write a program to illustrate function overloading. Write 2 overloading functions for adding two numbers
- b) Write a program illustrate function template for power of a number.
- c) Write a program to illustrate function template for swapping of two numbers.

**Exercise -6 (Classes Objects)**

Create a Distance class with:

- feet and inches as data members
- member function to input distance
- member function to output distance
- member function to add two distance objects

- a). Write a main function to create objects of DISTANCE class. Input two distances and output the sum.
- b). Write a C++ Program to illustrate the use of Constructors and Destructors (use the above program.)



- c) Write a program for illustrating function overloading in adding the distance between objects (use the above problem)
- d). Write a C++ program demonstrating a Bank Account with necessary methods and variables

**Exercise – 7 (Access)**

Write a program for illustrating Access Specifiers public, private, protected

- a) Write a program implementing Friend Function
- b) Write a program to illustrate this pointer
- c) Write a Program to illustrate pointer to a class

**Exercise -8 (Operator Overloading)**

- a). Write a program to Overload Unary, and Binary Operators as Member Function, and Non Member Function.
  - i. Unary operator as member function
  - ii. Binary operator as nonmember function
- b). Write a c ++ program to implement the overloading assignment = operator
- c). Write a case study on Overloading Operators and Overloading Functions (150 Words)

**Exercise -9 (Inheritance)**

- a) Write C++ Programs and incorporating various forms of Inheritance

- i) Single Inheritance
- ii) Hierarchical Inheritance
- iii) Multiple Inheritances
- iv) Multi-level inheritance
- v) Hybrid inheritance

- b) Write a program to show Virtual Base Class
- c) Write a case study on using virtual classes (150 Words)

**Exercise-10 (Inheritance –Continued)**

- a) Write a Program in C++ to illustrate the order of execution of constructors and destructors in inheritance
- b) Write a Program to *show how constructors are invoked in derived class*

**Exercise -11 (Polymorphism)**

- a) Write a program to illustrate runtime polymorphism
- b) Write a program to illustrate this pointer
- c) Write a program illustrates pure virtual function and calculate the area of different shapes by using abstract class.
- d) Write a case study on virtual functions (150 Words)

**Exercise -12(Templates)**

- a) Write a C++ Program to illustrate template class
- b) Write a Program to illustrate class templates with multiple parameters



c) Write a Program to illustrate member function templates

**Exercise -13 (Exception Handling)**

a).Write a Program for Exception Handling Divide by zero

b). Write a Program to rethrow an Exception

**Exercise -14 (STL)**

a) Write a Program to implement List and List Operations

b) Write a Program to implement Vector and Vector Operations

**Exercise -15 (STL Continued)**

a) Write a Program to implement Deque and Deque Operations

b) Write a Program to implement Map and Map Operations