Virtual University	**Assignment No. 02 (Graded)** **Semester: Spring 2025** **CS304- Object Oriented Programming**	**Total Marks: 20** **Due Date: 20 June, 2025**

Objective:

The objective of this assignment is to enable students to learn about inheritance, abstract class, concrete classes, and polymorphism.

Learning Outcome:

After completing this assignment, students will be able to implement the following concepts in C++:

- Inheritance
- Polymorphism

Submission Instructions:

- Your assignment should be in .cpp file format (Any other format like scan images, PDF, zip, doc, rar, and bmp, etc. will not be accepted).
- You can use any C++ compiler for implementation. However, the solution file must be in .cpp format.

Rules for Marking:

It should be clear that your assignment will not get any credit if:

- The assignment is submitted after the due date.
- The submitted assignment does not open or execute, or the file is corrupted.
- Your assignment is copied from the internet, handouts, or any other student. (Strict disciplinary action will be taken in this case).

Lectures Covered: This assignment covers lectures 22-30.

Assignment No. 2

Problem Statement:

In this assignment, you will implement the Vehicle Purchase System. In this system, there are two types of Vehicles: Normal Car and Luxury Car. Normal Car and Luxury Car classes are inherited from the Vehicle class in which Vehicle is an abstract class, whereas Normal Car and Luxury Car are the concrete classes. The Vehicles price/rate needs to be calculated for each type of vehicle based on the following requirements.

Vehicle class has the following data members:

- baseRate
- taxRate

Vehicle class has the following member functions:

- getBaseRate()
- calculateTaxes()
- calculateTotalCost()

Normal Car class has the following member functions:

- Parameterized constructor for baseRate.
- Use the same parameterized constructor to assign a 15% tax rate.
- Override the base class functions.

The Luxury Car class has the following data member:

- Eduty

The Luxury Car class has the following member functions:

- Parameterized constructor for baseRate.
- Use the same parameterized constructor to assign a 20% tax rate and 30000/- as excise duty for luxury cars.

- Override the base class functions.

Tax for normal cars will be calculated based on the following formula:

Tax = taxRate * baseRate

Tax for luxury cars will be calculated based on the following formula:

Tax = taxRate * baseRate + Eduty

The total cost for both types of cars will be calculated based on the following formula:

Total cost = Tax + baseRate

In the main() function, create two objects, one object of the normal car and another object of the luxury car class. Use the concept of polymorphism to calculate the costs and taxes of both types of cars and only display their total cost.

Best of luck!

NOTE: Do not put any query on MDB about this assignment. If you have any query then email at cs304@vu.edu.pk. Furthermore, if any student is found cheating by any other student or from online forums then he/she will be awarded ZERO right away and strict disciplinary action will be taken against the student.

Deadline: Your assignment must be uploaded/submitted on or before 20 June 2025.