

Ramaiah Institute of Technology (Autonomous Institute, Affiliated to VTU)

**Department of Computer Science & Engineering**

**Data Visualization with Python Lab(CSL48)**

**USN:**

**Week #: 03**

**Semester:**

**Section:**

**Date:**

**Instructions:**

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* **Implement the following programs using python language.**

**Topic:** **Object-Oriented Programming (OOP)**, covering **Classes, Objects, Inheritance,**

**Polymorphism, Encapsulation, and Abstraction**.

**Programs:**

1. Write a Python class named Car with attributes brand, model, and year. Create an object and display its attributes.
2. Write a Python class Student with attributes name and marks, and a method to display the student details.
3. Write a Python program where Dog and Cat classes inherit from a base class Animal, and implement a method speak().
4. Create a class Vehicle with attributes brand and speed. Derive a class Car that adds the attribute fuel\_type.
5. Write a Python program where different classes (Car, Bike, Truck) have the same method start\_engine(), demonstrating polymorphism.
6. Write a Python program that uses operator overloading to add two Vector objects using the + operator.
7. Write a Python program demonstrating encapsulation using a class BankAccount with private attributes \_\_balance and methods to deposit and withdraw money.
8. Create a class Laptop with private attributes for price and model, and public methods to access and modify them safely.
9. Create an abstract class Shape with an abstract method calculate\_area(), then implement Circle and Square classes.
10. Write a Python program that demonstrates abstraction using an interface (abstract class) for different payment methods like CreditCard, PayPal, and Bitcoin.