204191   Object Oriented Programming

Teaching Scheme: **Examination Scheme:**

Lectures: 2 Hrs/ Week   **Oral :**   50 Marks

Practical : 2 Hr/Week   **Term work :** 25 Marks

Course Objectives:

The objective of this course is to learn object oriented concepts and build object oriented programming application using C++ and Java. Its main objective is to teach the basic concepts and techniques which form the **object oriented programming paradigm**

Having successfully completed this course, the student will be able to:

1. Justify the philosophy of object-oriented design and the concepts of encapsulation, abstraction, inheritance, and polymorphism;

2. Design, implement, test, and debug simple programs in an object-oriented programming language.

3. Describe how the class mechanism supports encapsulation and information hiding.

4. Design, implement, and test the implementation of "is-a" relationships among objects using a class hierarchy and inheritance.

5. Compare and contrast the notions of overloading and overriding methods in an object-oriented language.

Unit I: Object Oriented Programming and Basics of C++   4L

Principles of Object-Oriented Programming, Beginning with C++, Tokens, Expressions and Control Structures, Functions in C++.

Unit II: **Classes and Objects in C++**   4L

Classes and Objects, Constructors and Destructors.

Unit III: Operator Overloading, Inheritance and Polymorphism in C++   **4L**

Operator Overloading and Type Conversions, Inheritance: Extending Classes, Pointers, Virtual Functions and Polymorphism.

Unit IV: Object Oriented Programming and Basics of Java   **3L**

Java Evolution, Overview of Java Language, Constants, Variables, and Data Types, Operators and Expressions, Decision making.

Unit V: Classes and Objects in Java   **4L**

Classes, Objects and Methods, Arrays Strings and Vectors.

Unit VI: Interfaces: Multiple Inheritance in Java   **3L**

Defining interfaces, Extending interfaces, Implementing interfaces, Accessing interface variables.

Text Books:

1. E Balagurusamy, "Object Oriented Programming Using C++ and JAVA", Tata McGraw-Hill

Reference books:

1. Bjarne Stroustrup, "C++ Programming Language", Pearson Education
2. H.M.Dietel and P.J.Dietel, "Java How to Program" Pearson Education/PHI, Sixth Edition
3. Robert Lafore, "Object-Oriented Programming in C++ ",Pearson Education India , (4th Edition)
4. Herbert Schildt , "Java : The Complete Reference" Tata McGraw-Hill (7th Edition)
5. Yeshwant Kanetkar "Let us C++", BPB Publications

List of Practical

1. Write a program in C++ to sort the numbers in an array using separate functions for read, display, sort and swap. The objective of this assignment is to learn the concepts of input, output, functions, call by reference in C++.

2. Write a program in C++ to perform following operations on complex numbers Add, Subtract, Multiply, Divide, Complex conjugate. Design the class for complex number representation and the operations to be performed. The objective of this assignment is to learn the concepts classes and objects

3. Write a program in C++ to implement Stack. Design the class for stack and the operations to be performed on stack. Use Constructors and destructors. The objective of this assignment is to learn the concepts classes and objects, constructors and destructors.

4. Write a program in C++ to perform following operations on complex numbers Add, Subtract, Multiply, Divide. Use operator overloading for these operations. The objective of this assignment is to learn the concepts operator overloading.

5. Write a program in C++ to implement database of persons having different profession e,g. engineer, doctor, student, laborer etc. using the concept of multiple inheritance. The objective of this assignment is to learn the concepts of inheritance.

6. Write a program in Java to implement a Calculator with simple arithmetic operations such as add, subtract, multiply, divide, factorial etc. using switch case and other simple java statements. The objective of this assignment is to learn Constants, Variables, and Data Types, Operators and Expressions, Decision making statements in Java.

7. Write a program in Java with class Rectangle with the data fields width, length, area and colour. The length, width and area are of double type and colour is of string type. The methods are get_length(), get_width(), get_colour() and find_area(). Create two objects of Rectangle and compare their area and colour. If the area and colour both are the same for the objects then display " Matching Rectangles", otherwise display " Non-matching Rectangle".

8. Write Programs in Java to sort i) List of integers ii) List of names. The objective of this assignment is to learn Arrays and Strings in Java

9. Write a Program in Java to add two matrices. The objective of this assignment is to learn Arrays in Java

10. Write a program in Java to create a player class. Inherit the classes Cricket_player, Football_player and Hockey_player from player class. The objective of this assignment is to learn the concepts of inheritance in Java