

4.4 OBJECT ORIENTED PROGRAMMING USING JAVA

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RATIONALE

Object orientation is a new approach to understand the complexities of the real world. In contrast to the earlier approaches like procedural etc, object orientation helps to formulate the problems in a better way giving high reliability, adaptability and extensibility to the applications. The students are already familiar with this concept of programming in C which is the basic for JAVA. This course offers the modern programming language JAVA that shall help the students to implement the various concept of object orientation practically.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

- CO1: Learn the concepts of OOPS using JAVA.
- CO2: Execute the language construct and classes concepts.
- CO3: Describe and implement inheritance and polymorphism.
- CO4: Install Java IDE, Compiler, Java virtual machines
- CO5: Explain and implement the abstract class and interface.
- CO6: Implement the exception handling in live projects

DETAILED CONTENTS

UNIT I

Introduction of Features

Fundamentals of object oriented programming – procedure oriented programming
Vs. object oriented programming (OOP) Object oriented programming concepts – Classes, object, object reference, abstraction, encapsulation, inheritance and polymorphism
Introduction of eclipse (IDE) for developing programs in Java.

UNIT II.

Language Constructs, Classes and objects

Review of constructs of C used in JAVA : variables, types and type declarations, data types, increment and decrement operators, relational and logical operators; if then else clause;

conditional expressions, input using scanner class and output statement, loops, switch case, arrays, methods. Creation, accessing class member.

UNIT III

Inheritance and Polymorphism

Definition of inheritance, protected data, private data, public data, constructor chaining, order of invocation, types of inheritance, single inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance

Method & constructor overloading, method overriding, up-casting and down-casting.

UNIT IV

Abstract class & Interface

Key points of Abstract class & interface, difference between an abstract class & interface, implementation of multiple inheritance through interface.

UNIT V

Exception Handling

Definition of exception handling, implementation of keywords like try, catch, finally, throw & throws. Importance of exception handling in practical implementation of live projects.

PRACTICAL EXERCISES

1. Write a program in JAVA to print “Hello” using classes.
2. Write a program to input using Scanner Class.
3. Write a program to print factorial of a Number.
4. Write a program to create a Class and make objects of that class.
5. Create a class with data members Feet, Inches and add them.
6. Create a class using constructors.
7. Create a class and show the use of Single inheritance.
8. Create a class and show the use of multiple inheritance.
9. Create a class and show the use of Multi-level inheritance.
10. Create a class showing the use of Constructor Overloading.
11. Create a program showing the use of Interfaces.
12. Create a program using Try and Catch Block.

RECOMMENDED BOOKS

1. Object Oriented Programming using JAVA by Sunil Bhutani & Amrendra Shara; Eagle Publishing House, Jalandhar
2. Java Programming by Sachin Malhotra; Oxford University Press, New Delhi
3. Head First Java, O-REILLY, Kathy Sierra & Bert Bates.
4. Object-Oriented programming With Java, C.Thomas Wu.
5. Advance Java Programming by Uttam K. Roy; Oxford University Press, New Delhi
6. e-books/e-tools/relevant software to be used as recommended by AICTE/ HSBTE/ NITTTR.

SUGGESTED WEBSITES

1. <http://swayam.gov.in>

INSTRUCTIONAL STRATEGY

This is a programming skill based subject and topics taught in the class should be practiced in the lab regularly for development of required skills in the students. This subject contains five units of equal weight age with hands on practice for programming skill development.