<table>
<tr><td colspan="6">Devi Ahilya Vishwavidhyalaya, Indore, India
Institute of Engineering & Technology</td><td>II Year B.Tech.
(Computer Science and Engineering)</td></tr>
<tr><td>Course Code & Name</td><td colspan="5">Instructions Hours per Semester and Credits</td></tr>
<tr><td rowspan="2">3RCPC2
OBJECT ORIENTED PROGRAMMING</td><td colspan="2">Classroom Instruction (CI)</td><td>Lab Instruction (LI)</td><td>Term Work (TW) and Self Learning (SL)</td><td>Total no. of Hours Per semester</td><td>Total Credits (Total Hours/30)</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>TW+SL</td><td rowspan="2">120</td><td rowspan="2">4</td></tr>
<tr><td>30</td><td>10</td><td>20</td><td>60</td></tr>
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Course Learning Objectives:

- To impart fundamental knowledge of the Object-Oriented Programming (OOP) paradigm and its role in modern software development.
- To familiarize students with basic programming constructs and language features that support object-oriented program development.
- To develop analytical and programming skills required to design and implement solutions using the object-oriented approach.

Pre-requisites: Basic skills of Programming language.

COURSE CONTENTS

UNIT-I

Introduction to Object Oriented Programming: Object Oriented Concepts, Merits of Object-Oriented Technology. Abstraction, Encapsulation, Information Hiding. Object Model: definition, State, behavior, Identity and messages. Concept of object initialization, constructors, constructor overloading. Access modifiers: Class attributes and methods. Introduction to object model of software development.

UNIT-II

Introduction to Java classes and objects: Java features: Java syntax, data types, data type conversions, control statements, operators and their precedence. Introduction to Class: Instance members and member functions. String Handling, Wrapper classes: Arrays and Vectors.

UNIT-III

Inheritance and Polymorphism: Class relationships: Inheritance and its types, Merits and Demerits, Association, Polymorphism: Dynamic method dispatch, Runtime polymorphism, Abstract classes, Interfaces and Packages, Nested classes.

UNIT-IV

Exception Handling and Multithreading: Exceptions: Need for exceptions, Checked Vs Unchecked exceptions, creating custom exceptions. Multithreading: Introduction, Priorities and scheduling, Inter-thread communication, Thread Synchronization and its life cycle.

UNIT-V

Java I/O, Event Handling and JDBC: Basic concept of streams I/O stream & reader-writer classes. File handling, Designing GUI with Components and Layout Managers, Event Handling, Drawing Objects of Graphics class, MySQL Basics and setup installation, JDBC: Java Database Connectivity, JDBC: Characteristics, Types of JDBC Drivers, JDBC Architectures, Connecting to Database.

CO. No.	CO
CO1	Understand fundamental object-oriented concepts and advantages of object-oriented technology. Illustrate concept of abstraction, encapsulation, and information hiding. Describe the object model including state, behaviour, identity, and message passing.
CO2	Apply Java language features, data types, operators, and control structures to develop simple and structured programs. Evaluate and design Java classes using instance members, methods, arrays, strings, wrapper classes, and vectors to solve programming problems..
CO3	Explain class relationships including inheritance, its types, merits and demerits, and association in object-oriented systems. Analyse and apply polymorphism concepts such as dynamic method dispatch and runtime polymorphism in object-oriented program design.
CO4	Explain the need for exception handling, and differentiate between checked and unchecked exceptions in Java. Explain the fundamentals of multithreading,.
CO5	Explain the basic concepts of Java I/O streams, including byte streams, character streams, and reader–writer classes, for data input and output operations.

BOOKS RECOMMENDED:

[1] Cay S. Horstmann, *Core Java, Volume I – Fundamentals* — 14th Edition, 2025
[2] Herbert Schildt, *The Complete Reference* — 13th Edition, 2024 (for Java SE 21**)**
[3] Scott W Amber, *The Object Primer*, 3/e, Cambridge 2004.
[4] Timothy Budd, *Object Oriented Programming*, 3/e, Pearson Education 2009.
[5] Kathy Sierra, Bert Bates, *Head First Java*, 3/e, Oreilly Publications 2021.

CO-PO-PSO Relationship

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2	PSO 3
3RCPC2.CO1	2	2	4		3							3	2	1
3RCPC2.CO2	3	3	5		3							2	3	1
3RCPC2.CO3	2	4	4		3							3	2	1
3RCPC2.CO4	2	3	3		3							2	3	1
3RCPC2.CO5	2	4	4		3							3	2	1

List of Practical Assignment:

1. Experiments to understand program development environment for Java language.
2. Writing program to learn basic language constructs like identifier, variables, data types and console input/output.
3. Writing program to learn control statements.
4. Writing program to use class and objects to model problem domain entity in program domain.
5. Writing program to use inheritance and polymorphism features.
6. Programs to use exception and handling condition in execution as class and objects.
7. Experiments to learn multi-thread execution.

8. Writing program to code applications needing concurrency and exploring inter-thread communication mechanism.
9. Experiments to understand stream concept and study various stream abstractions and implementation available in the language.
10. Exploring GUI components and understanding GUI objects and their communication-based program to realize object-oriented programming in action.
