<table>
<tr><td colspan="5">Devi Ahilya Vishwavidhyalaya, Indore, India<br>Institute of Engineering & Technology</td><td colspan="2">III Year B.Tech. (Electronics and Telecommunication Engineering)</td></tr>
<tr><td>Course Code & Name</td><td colspan="6">Instructions Hours per Semester and Credits</td></tr>
<tr><td rowspan="2">5RTPC1<br><br>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">90</td><td rowspan="2">3</td></tr>
<tr><td>20</td><td>10</td><td>0</td><td>60</td></tr>
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**Course Learning Objectives:**

- To develop the understanding of object oriented programming concepts.
- To enable developing Java based application programs using iteration statements, conditional statements, strings, arrays and vectors.
- To understand the concept of different types of exceptions, inheritance and developing multi-threaded programs.
- The students will be able to create GUIs based on Java AWT and Java Swing.

**Prerequisites (if any):** basic knowledge of computer programming

## COURSE CONTENTS

**UNIT-I**

**Introduction to Object Oriented Programming:**

Object oriented concepts, Need for object oriented programming, Principles of object oriented programming- Abstraction, Encapsulation, Polymorphism, Inheritance; Procedural language vs OOPs, Salient features of Java, Development of Java programming, Access modifiers, Introduction to object model, concept of object initialization, simple Java program structure,

**UNIT-II**

**Introduction to Java classes and objects**

Java data types, data type conversions and type casting, operators and their precedence, Types of operators, conditional statements- if—else, switch case, ternary operator, Iteration statements- for loop, while expression, do-while, branching mechanism, introduction to classes-class members and member functions, constructors, constructor overloading, String handling, wrapper classes, Arrays and vectors.

**UNIT-III**

**Inheritance and Polymorphism**

Inheritance basics, Types of inheritance, merits and demerits, application of keyword Super, method overriding and overloading, Inhibiting inheritance of class using Final, Dynamic method dispatch, runtime polymorphism, abstract classes, Interfaces, implementing interfaces, Packages in Java, importing packages and classes into programs, user defined packages

**UNIT-IV**

**Exception handling and Multi-threading**

Introduction to exceptions, need for exceptions, exception handling techniques, exception types, Using try-catch, finally, throw and throws keywords, user defined exceptions, Multi-thread programming in Java, Thread class, the Main Thread, creation of new Threads, Thread states, Thread priority, Thread synchronization.

**UNIT-V**

**Java I/O, Event Handling**

Basic I/O classes, byte streams and character streams, class File, reading and writing Bytes, Event handling in Java, Delegation event model, types and sources of Events, Event listeners, Event listener interfaces, creating GUIs in AWT windows, Java Swings, hierarchy of Swing classes, Swing window panes, Swing components and classes, adding components to a container.

**BOOKS RECOMMENDED:**

[1] Anita Seth, B.L.Juneja, Java One Step Ahead, Oxford University press, 2017.
[2] Joyce Farrell, Java Programming, Cengage 2020.
[3] Herbert Schildt, Java The complete reference, McGraw Hill Education private limited, 2013.
[4] Timothy, Budd, Object Oriented Programming, 3/E Pearson Education, 2002.
[5] Cay S.Horstmann, Core Java, vol-1,8/E, Pearson Education, 2008.

**Course Outcomes**

| CO No. | CO |
|---|---|
| CO 1 | To comprehend the drawbacks of procedural language and understanding the need for OOPs, characteristics of OOPs, object instantiation. |
| CO2 | Developing Java based program using conditional statements, iteration statements; developing program using wrapper classes, arrays and vectors. |
| CO3 | Implementing and developing Java based programs using different characteristics of OOPs including inheritance, different types of inheritance, polymorphism, abstraction, interfaces, developing user defined packages. |
| CO4 | Understanding different methods for handling exceptions; implementing multi-thread programming using various techniques. |
| CO5 | Developing graphical user interface using Java AWT and Java Swing. |

## CO-PO-PSO Relationship

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO 1 | PSO 2 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **5RTPC1.CO1** | 3 | | | | | | | | 2 | 2 | | 2 | 3 | 1 |
| **5RTPC1.CO2** | 2 | 2 | 3 | | 3 | | | | 2 | 2 | | 2 | 3 | 1 |
| **5RTPC1.CO3** | 2 | 2 | 3 | | 3 | | | | 2 | 2 | | 2 | 3 | 1 |
| **5RTPC1.CO4** | | 3 | 3 | | 3 | | | | 2 | 2 | | 2 | 1 | 3 |
| **5RTPC1.CO5** | 2 | 2 | 3 | | 3 | | | | 2 | 2 | | 3 | 2 | 3 |