Devi Ahilya University, Indore, India Institute of Engineering & Technology				III Year B.E. (Electronics & Telecommunication Engg.)			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
SUBJECT CODE: ETR5C1/EIR5C1 SUBJECT NAME Object Oriented System	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
	3	1	2	3	1	1	5
Duration of Theory Paper: 3 Hours							

Learning Objective: To learn about object oriented concepts through Java programming.

Prerequisites (if any): basics 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, Multi-threading and Networking
Introduction to exceptions, need for exceptions, exception handling techniques, exception types, Using try-catch, finally, throw and throws keywords, user defined exceptions, Multi-threading in Java, Thread class, the Main Thread, creation of new Threads, Thread states, Thread priority, Networking basics, classes and interfaces for network applications, TCP/IP server socket programming.

UNIT-V

Java I/O, Applets and Event Handling

Basic I/O classes, byte streams and character streams, class File, reading and writing Bytes, Applet basics, Applet architecture, Applet class and methods, Applet life cycle, Adding images to Applet, Interactive Applets with AWT graphical components, Event handling in Java, Delegation event model, types and sources of Events, Event listeners, Event listener interfaces, creating GUIs in AWT windows.

Learning Outcomes:

Upon completing the course, Student would be able to:

- Understand the basic concepts of Java programming
- familiarize with the declaration of classes, arrays, operations with arrays, process of inheritance.
- Learn the implementation of interfaces, importing packages, handling exceptions and creating applets.
- learn how to write, compile and get results of simple application programs in Java

BOOKS RECOMMENDED:

[1] Anita Seth, B.L.Juneja, Java One Step Ahead, Oxford University press, 2017.

[2] Herbert Schildt, Java The complete reference, McGraw Hill Education private limited, 2013.

[3] Timothy, Budd, Object Oriented Programming, 3/E Pearson Education, 2002.

[4] Cay S.Horstmann, Core Java, vol-1,8/E, Pearson Education, 2008.

List of Practical Assignments:

1. Write a program that finds the greatest of 4 integer numbers using ternary operator. The number values are entered by the user of the program.

2. Write a program to find factorial of a given number which is provided by the user.

3. Write a program to convert a decimal integer into binary equivalent number.

4. An audio signal is given as $A_m Sin2\pi(f_m t)$ amplitude modulates a carrier which is given as $A_c sin2\pi(f_c t)$. Write a program to find and display modulation index and percent modulation when $f_m = 1500$ Hz and $f_c = 100$ KHz. Also find and display the frequencies in the spectrum of modulated wave.

5. The numbers in the sequence

   1 1 2 3 5 8 13 21……….are called as Fibonacci numbers. Write a program using do while loop to calculate and print the first m Fibonacci numbers.

6. Write a program to find and display power efficiency of AM modulated signal under the following cases:

   (i) over-modulation   (ii) under- modulation

7. Make a program which uses a for loop to calculate and display squares and cubes of numbers from 1 to 8.

8. Write a program in which a class Circle is defined. Following methods are defined within this class to compute and display circumference and arc length of a circle :

   (i) circumCircle() - to compute the circumference of a circle.

   (ii) arcLenght – to compute the lenght of the arc for a given angle.

   Write a program to compute and display circumference and arc length when the radius is 10 and angle subtended is 37 degrees.

9. Write a program using arrays to find and display the multiplication of two matrices.

10. Write a program that declares an array of the type double and finds out the square root of array elements.

11. Write a program using interfaces to calculate and display the value of bandwidth for AM, SSB and FM modulated signals.

12. Write a program to find and display the power content of carrier, power content of each of the sidebands and total power for AM modulated signal having some percentage modulation (assume μ). Take the user inputs for μ and amplitude of carrier signal.

13. Write a program using inheritance to find and display efficiency of AM system and root mean square (RMS) value of power of AM system.

14. Write a program using method overriding to find and display figure of merit for single tone AM and PM systems.

15. Make an applet program to draw filled hexagon in different colors like orange, red green etc.

16. Write a client side program to send a message to server and server program to reply back using TCP/IP protocol.

17. In a cellular system, a particular geographical area is covered by a number of cells. Each cell is assumed to be having equal size and hexagonal in shape. In each cell, a group of frequency channels are allocated. A group of cells using a different set of frequencies in each cell is called as cluster. Only a selected number of cells can form a cluster and cluster size should be 4, 7, 9, 12 etc. Write a program in which user is prompted to enter number of geographical area, channels available in a cell, radius of given cell in Km, and cluster size. The program calculates and displays the coverage area of each cell, total number of cells in a particular area, number of channels available per cell. Exception is thrown if the user enters either zero or negative value for the geographical area, radius or number of channels.