**Semester: 5** **Year: 2023-24**

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| Department: Artificial Intelligence & Data Science | Course Type: Ability Enhancement Course |
| Course Title: Object Oriented Programming | Course Code: 22ADA582 |
| L-T-P:0-0-2 | Credits:02 |
| Total Contact Hours: 30 hours | Duration of SEE:03 hours |
| SEE Marks: 50 | CIE Marks: 50 |

**Pre-requisites:**

* Students should be familiarized about java installation and setting the java environment
* Usage of IDEs like Eclipse/Netbeans should be introduced.

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**Course Objectives:**

1. To understand the basic concepts of compiler, interpreter and history of Java.

2. To acquire the knowledge on object and classes constructor in Java Programming.

3. To develop programs using inheritance and polymorphism .

4. to apply the concepts of multiprogramming, exception/event handling,

5.To be able to implement using packages and interfaces.

**Course Outcomes:**

Students will be able to:

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| **Cos** | **Course Outcome Description** | **Blooms Level** |
| 1 | Understand the features and object oriented concepts in JAVA programming | L2 |
| 2 | Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP. | L3 |
| 3 | Demonstrate the ability to design and develop java programs, analyze, and interpret object oriented data and document results. | L3 |
| 4 | Apply the concepts of multiprogramming, exception/event handling, abstraction to develop robust programs. | L4 |
| 5 | Develop concepts of importing packages and exception handling mechanisms. | L4 |

**Teaching Methodology:**

* PowerPoint presentations
* Hands-on Sessions

**Assessment Methods:**

* Lab :CIE (Experiments, viva voce 5 marks, Record :25 marks, lab test:20 marks)
* A final Lab examination of 100 Marks will be conducted and will be evaluated for 50 Marks.

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| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| 1 | 3 | 2 | 2 |  |  |  |  |  |  |  | 1 | 2 | 3 | 3 |
| 2 | 3 | 2 | 2 |  |  |  |  |  | 2 | 2 | 1 | 2 | 3 | 3 |
| 3 | 3 | 2 | 2 |  |  |  |  |  | 2 | 2 | 1 | 2 | 3 | 3 |
| 4 | 3 | 2 | 2 |  |  |  |  |  | 2 | 2 | 1 | 2 | 3 | 3 |
| 5 | 3 | 2 | 2 |  |  |  |  |  | 2 | 2 | 1 | 2 | 3 | 3 |

**CO-PO Mapping:**

**COURSE CONTENT**

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| **UNIT – I** |
| An Overview of Java: Object-Oriented Programming, A First Simple Program, A Second Short Program, Two Control Statements, Using Blocks of Code, Lexical Issues, The Java Class Libraries, Data Types, Variables, and Arrays: Java Is a Strongly Typed Language, The Primitive Types, Integers, |
| **UNIT – II** |
| Using Parentheses, Control Statements: Java‟s Selection Statements, Iteration Statements, Jump Statements.Introducing Classes: Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructor. |
| **UNIT – III** |
| The this Keyword, Garbage Collection, The finalize( ) Method, A Stack Class, A Closer Look at Methods and Classes: Overloading Methods,Inheritance: Inheritance, Using super, Creating a Multilevel Hierarchy, When Constructors Are Called, Method Overriding, Dynamic Method Dispatch, |
| **UNIT – IV** |
| Using Abstract Classes, Using final with Inheritance, The Object Class. Packages and Interfaces: Packages, Access Protection, Importing Packages, Interfaces, |
| **UNIT – V** |
| Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java‟s Built-in Exceptions, |

| **Sl. No** | **Program / Exercise** |
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| 1. | Basic programs |
| 2. | Create a Java class called Student with the following details as variables within it.  USN, Name, Branch, Phone  Write a Java program to create n Student objects and print the USN, Name, Branch, and Phone of these objects with suitable headings. |
| 3. | Design a super class called Staff with details as StaffId, Name, Phone, Salary. Extend this class by writing three subclasses namely Teaching (domain, publications), Technical (skills), and Contract (period). Write a Java program to read and display at least 3 staff objects of all three categories. |
| 4. | Write a java program demonstrating Method overloading and Constructor overloading. |
| 5. | Develop a java application to implement currency converter (Dollar to INR, EURO to INR, Yen to INR and vice versa), distance converter (meter to KM, miles to KM and vice versa), time converter (hours to minutes, seconds and vice versa) using packages. |
| 6. | Write a program to generate the resume. Create 2 Java classes Teacher (data: personal information, qualification, experience, achievements) and Student (data: personal information, result, discipline) which implements the java interface Resume with the method biodata(). |
| 7. | Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer for every 1 second; the second thread computes the square of the number and prints; the third thread will print the value of the cube of the number. |
| 8. | Write a program to perform string operations using ArrayList. Write functions for the following a. Append - add at end b. Insert – add at particular index c. Search d. List all strings starting with a given letter. |
| 9. | Write a Java program to read two integers a and b. Compute a/b and print, when b is not zero. Raise an exception when b is equal to zero. |
| 10 | Write a java program that reads a file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes |

TextBook:

1. E Balagurusamy, Programming with Java, Graw Hill, 6th Edition, 2019.

Reference Book:

1. Herbert Schildt, C: Java the Complete Reference, McGraw Hill, 11th Edition, 2020