# 23CS21P2 - OBJECT-ORIENTED PROGRAMMING THROUGH JAVA LAB

(Common to CSE, CSE (DS), CSE (AI&ML), AI&DS, and IT)

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| Course Category: | Professional Core | Credits: | 1.5 |
| Course Type: | Practical | Lecture-Tutorial-Practical: | 0-0-3 |
| Prerequisite: | Basic Programming Skills and Problem Solving Skills | Sessional Evaluation:Univ. Exam Evaluation:Total Marks: | 3070100 |
| Objectives: | * To practice object-oriented programming in the Java programming language
* To implement Classes, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
* To illustrate inheritance, Exception handling mechanism, JDBC connectivity
* To construct Threads, Event Handling, implement packages, Java FX GUI
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| Course Outcomes | Upon successful completion of the course, the students will be able to: |
| CO1 | Demonstrate a solid understanding of Java syntax, including data types, control structures, methods, classes, objects, inheritance, polymorphism, and exception handling. (L2) |
| CO2 | Apply fundamental OOP principles such as encapsulation, inheritance, polymorphism, and abstraction to solve programming problems effectively. (L3) |
| CO3 | Familiar with commonly used Java libraries and APIs, including the Collections Framework, Java I/O, and other utility classes. (L2) |
| CO4 | Develop problem-solving skills and algorithmic thinking, applying OOP concepts to design efficient solutions to various programming challenges. (L3) |
| CO5 | Implement Keyboard and mouse event handling (L4) |
| Course Content | **Sample Experiments****Exercise – 1**1. Write a JAVA program to display default value of all primitive data type of JAVA
2. Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

**Exercise – 2**1. Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
2. Write a JAVA program to sort for an element in a given list of elements using bubble sort
3. Write a JAVA program using StringBuffer to delete, remove character.

**Exercise – 3**1. Write a JAVA program to implement class mechanism. Create a class, methods and invoke them inside main method.
2. Write a Java program that demonstrates the use of access specifiers (public, protected, default, and private).
3. Write a JAVA program implement method overloading.
4. Write a JAVA program to implement constructor.
5. Write a JAVA program to implement constructor overloading.

**Exercise – 4**1. Write a JAVA program to implement Single Inheritance
2. Write a JAVA program to implement multi level Inheritance
3. Write a JAVA program for abstract class to find areas of different shapes

**Exercise – 5**1. Write a JAVA program give example for “super” keyword.
2. Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?
3. Write a JAVA program that implements Runtime polymorphism

**Exercise – 6**1. Write a JAVA program that describes exception handling mechanism
2. Write a JAVA program Illustrating Multiple catch clauses
	* Write a JAVA program for creation of Java Built-in Exceptions
	* Write a JAVA program for creation of User Defined Exception

**Exercise – 7**1. Write a JAVA program that creates threads by extending Thread class. First thread display “Good Morning “every 1 sec, the second thread displays “Hello “every 2 seconds and the third display “Welcome” every 3 seconds, (Repeat the same by implementing Runnable)
2. Write a program illustrating is Alive and join ()
3. Write a Program illustrating Daemon Threads.
4. Write a JAVA program Producer Consumer Problem

**Exercise – 8**1. Write a JAVA program that import and use the user defined packages.
2. Without writing any code, build a GUI that display text in label and image in an ImageView (use JavaFX)
3. Build a Tip Calculator app using several JavaFX components and learn how to respond to user interactions with the GUI
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| Text Books &ReferencesBooks | **TEXT BOOKS:**1. JAVA one step ahead, Anitha Seth, B.L.Juneja, Oxford.
2. Joy with JAVA, Fundamentals of Object Oriented Programming, Debasis Samanta, Monalisa Sarma, Cambridge, 2023.
3. JAVA 9 for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

**REFERENCE BOOKS:**1. The complete Reference Java, 11th edition, Herbert Schildt,TMH
2. Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson
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| E-Resources | 1. <https://nptel.ac.in/courses/106/105/106105191>
2. https://infyspringboard.onwingspan.com/web/en/app/toc/lex\_auth\_012880464547618816347\_shared/overview
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