# 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: | 30  70  100 |
| 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 | |
| Text Books &  References  Books | **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 | |
| E-Resources | 1. <https://nptel.ac.in/courses/106/105/106105191> 2. https://infyspringboard.onwingspan.com/web/en/app/toc/lex\_auth\_012880464547 618816347\_shared/overview | |