UG Programme: B. Tech (Honours) Computer Science and Engineering (Data Science)

Course: OBJECT ORIENTED PROGRAMMING USING JAVA LAB
Regulation: 2021 CBCS

Course Code: **Semester: III**
Credits: 01 **L: T: P: 0:0:2**
CIE: UE: 70:30 **Maximum Marks: 100**
Contact Hours: 15
Prerequisite: PROBLEM SOLVING USING COMPUTATIONAL THINKING, DATA STRUCTURES USING C

Course Objectives:

The objective of the course is

1. Understand Object Oriented Programming concepts.
2. Implement the classes to create the GUI using Java programs and apply your knowledge to create the GUI with applets.
3. Demonstrate Inheritance, polymorphism and Data abstraction with programs
4. Apply the knowledge to connect with Database for Creating tables, querying the database, updating the data etc.

Course Outcomes:
At the end of the course, students will be able to:

Course Outcomes	Description	Bloom's Taxonomy Level
CO1	Employ the programs for basic concepts of Object Oriented Programming.	Apply
CO2	Illustrate the reusability concepts of inheritance through programming.	Apply
CO3	Use exception handling mechanism to show java as a robust language.	Apply
CO4	Demonstrate the ways to resolve the issue of multiple inheritance.	Apply
CO5	Demonstrate the working of Multithreading and Java Swings with real world examples	Apply
CO6	Illustrate the applications of java swings and multithreading for real time projects through presentations	Apply

Course Contents:

List of Experiments:

Lab Exercise 1

a. Demonstrate Constructor Overloading and Method Overloading in JAVA.
b. Implement Inner Classes and demonstrate its access protection.
c. Programs to create constructors and methods with a case study.

Lab Exercise 2

Programs to implement different types of Inheritance. Implement the following:

a. An abstract class "Shape" with the following properties: an instance variable shapeName of type String, an abstract method area (), a toString() method that returns the name of the shape.

b. Create a subclass named "Sphere" which has radius and its area given by the formula 4*PI*r^2.

c. Create a subclass named "Rectangle" which has length and width and its area is length times width.

d. Create a subclass named "Triangle" which has base and height and its area is ½*base*height.

e. Create another class which displays the calculated area.

Lab Exercise 3

Perform the following operations:

a. Check the length and capacity of String and StringBuffer objects

b. Reverse the contents of a string given on console and convert the resultant string in Upper Case.

c. Input a string from the console and append it to above resultant string.

d. Extract the substring from resultant string.

Lab Exercise 4

a. A class "Account" with minimum balance 1000rs, deposit() method to deposit amount, withdraw() method to withdraw amount and also throws LessBalanceException if an account holder tries to withdraw money which makes the balance less than 1000rs.

b. A class "LessBalanceException" which returns the statement that says "withdraw amount (__ rs) is not valid".

c. A class which creates 2 accounts through which both deposit and withdraw operations are performed. Appropriate action has to be taken for LessBalanceException.

Lab Exercise 5

Implement Linear Queue using user defined exception handling (also use 'throw' and ‘throws’ keyword)

Lab Exercise 6

Implement the concept of Producer Consumer using synchronized threads.

Lab Exercise 7

Create the following:

a. Create an Interface for ‘Stack’ operations.
b. A class that implements the Stack interface and create a fixed length stack.
c. A class that implements the Stack interface and create a dynamic length stack.
d. A class that uses the above stacks through interface reference and does the stack operations that demonstrates the runtime binding

Lab Exercise 8

Develop the following:

a. Create a package named "Calculator".
b. Create some classes in the package representing some common operations like addition, subtraction, multiplication and division.
c. Import and compile these classes in other program.

Lab Exercise 9

Create an enumeration DayofWeek with seven values SUNDAY through SATURDAY. Add a method isWorkday() to the DayofWeek class that returns true if the value on which it is called is MONDAY through FRIDAY.

Lab Exercise 10

Using File I/O streams, write a program to demonstrate file operations.

Lab Exercise 11

Write a Swing Application which uses:

i) JTabbed Pane

ii) Each Tab should use JPanel, which includes any one component given

i. below in each Panel

ii. ComboBox / List / Tree / Radiobutton

TEXT BOOKS

1. Fundamentals of computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekaran, 2nd Edition, 2014, Universities Press
2. Introduction to the Design and Analysis of Algorithms, Anany Levitin: 2nd Edition, 2009. Pearson

REFERENCES

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, 3rd Edition, PHI
2. Design and Analysis of Algorithms, S. Sridhar, Oxford (Higher Education)