GLS UNIVERSITY
Bachelor of Computer Applications (BCA)
(Core Course)
Semester-III
210301305 PRACTICAL ON CORE JAVA

1. Course Objective:

- Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Be able to make use of members of classes found in the Java API.
- Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements.
- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.

2. Course Duration:

The course will have sessions which are divided into five modules. Each module consists of nine sessions of 60 minutes each and carries a weightage of 20%.

3. Course Contents:

Module No.	Modules/Sub-Modules	No. of Sessions	Marks Weightage
I	**Introduction to Java**	09	20%
	• Write a program to find SUM and PRODUCT of the Digits of a given number. Take the value of a number using Scanner Class.		
	• Write a Java Program to find the factorial of a given number. Take the value of a number using Scanner Class.		
	• Write a Java program to generate first n prime numbers.		
	• Write a program in Java to find maximum of three numbers using conditional operator.		
	• Write a Java program to convert decimal number into binary number.		
	• Write a Java program to display Floyd's triangle: 1 2 3 4 5 6 7 8 9 10 .....So on.		
	• Write a Java program to find the sum of all integers greater than 100 and less than 200 that are divisible by 7.		
	• Write a Java Program to calculate the simple interest and ask the user to input required values.		
	• Write a Java Program which shows if else and looping		

	concepts.		
	• Write a Java Program to reverse the digits of a number using while loop.		
II	**Java Programming Array and Class**	09	20%
	• Write a Java Program to create an array with 10 values. Sort all the values in ascending order. Take all the values from user using Scanner Class.		
	• Write a Java program to create a function named maximum to find the Maximum value from the array. Note: Pass an array as argument to the Function.		
	• Write a Java program that will create class named college and create object of that class and print the members of class.		
	• Write a Java program to demonstrate use of this Keyword. Check whether this can access the private members of the class or not.		
	• Write a Java Program to find the average and sum of the N numbers using Command line argument.		
	• Write a class called Student, each student has a roll no, name and an array of marks in a number of subjects. Write constructor with first parameter for name of student and any number of Integer parameter for the marks of subjects, also provide a method to get the average of the marks for a student. Use appropriate mechanism to manage a sequence of roll no for the students being created. Write appropriate main method to test the Student class.		
	• Define a class called Product, each product has a name, a product code and manufacturer name. Define variables, methods and constructors, for the Product class. Write a class called TestProduct, with the main method to test the methods and constructors of the Product class.		
	• Define a class called StatisticalData which manages a number of readings of type int. Provide a method to setData available in the form of an array, a method add to individually add data of type int, a method to reset the entire data, and methods to return the following statistics: Mean Median Mode		
	• Write a Java program that will create class room having length and breadth as data members and two methods getdata() and area() as member function. Askuser to input the room dimensions (l x b) and calculatethe area.		
	• Write a Java program that will create class to represent bank account having following data members: Name of the depositor Account number, Type of account, Balance		

	Member functions: To assign initial values using constructor To deposit amount To withdraw amount after checking balance Display name and balance		
	• Write a simple Java application to print a pyramid with 5 lines. The first line has one character, 2nd line has two characters and so on. The character to be used in the pyramid is taken as a command line argument.		
	• Write a Java program to create a class student having roll no and marks of 3 subjects as its data members. Create an array of class objects of minimum 5 objects. Create member functions for the following: Total marks obtained by the students Highest marks in each subject and roll no of student who secured it. Students who obtained highest total marks		
	• Create a class called Word and define a static method displayWordStats() which displays on standard output the word, total no. of characters in the word and the number of vowels in the word.		
III	**Inheritance, Interfaces and Packages**	09	20%
	• Write an application that illustrates how to access a private variable. Class A declares a static variable x. The class B extends A and declares an instance • variable x. display() method in B displays both of these variables.		
	• Write a program in Java to develop overloaded constructor. Also develop the copy constructor to create a new object with the state of the existing object.		
	• Write a program in Java in which a subclass constructor invokes the constructor of the super class and instantiate the values.		
	• Describe abstract class called Shape which has three subclasses say Triangle, Rectangle, Circle. Define one method area() in the abstract class and override this area() in these three subclasses to calculate for specific object i.e. area() of Triangle subclass should calculate area of triangle etc. Same for Rectangle and Circle.		
	• Write a program in Java to demonstrate implementation of multiple inheritance using interfaces.		
	• Write a program in Java to demonstrate use of final class		
	• Consider two types of residency, a Flat or a Villa. All types of residences have an area (square yards) and a rate (per square yard). The property price of a residency is by default calculated as area * rate. In case of Flat, the price get incremented by the maintenance charges, and in case of Villa the price is incremented by		

	furniture charges. Now define the following classes in a common package called “residence”. An abstract class called Residency, with appropriate methods and constructors. • Two sub-classes called Flat and Villa, which inherit from the Residence class and override the appropriate methods, from Residency class.		
	• Write a Java Program to create a simple class to find out the Area and perimeter of rectangle and box using super and this keyword.		
	• Write a Java program to create an interface area having pie as its data members and a method compute(float, float) Create a class rectangle and circle which implements area interface.		
	• Write a Java program to create an interface Sports having sportmarks as data member and a method putweight().Create a class result which implements sports interface having data member total (stores total of 3 subject marks) and percentage (total + sportmarks). Calculate the percentage and grade and display the same.		
	• Write a java program which shows importing of classes from other packages.		
	• Write a java program to create a package that access the member of external class as well as the same class.		
	• Create a package named MyPackage which consists a class named Student which stores information like the roll number, first name, middle name, last name, address and age of the student. The class should also contain appropriate get and set methods.		
	• Write a program to create a class to demonstrate the use of the methods of String class.		
	• Write a Java application to count and display frequency of letters and digits from the String given by user.		
	• Write a Java Program which will read a string and rewrite it in the alphabetical order e.g. The word STRING” should be written a GINRST.		
IV	**Exception Handling & Multi Threading**	09	20%
	• Write a program in Java to develop user defined exception for 'Divide by Zero' error.		
	• Write an small application in Java to develop Banking Application in which user deposits the amount Rs 1000.00 and then start withdrawing of Rs 400.00, Rs • 300.00 and it throws exception "Not Sufficient Fund" when user withdraws Rs. 500 thereafter.		
	• Write a java program to handle the exception using try and multiple catch block.		

	• Write a program to handle the user defined exception using throw keyword.		
	• Write a program which create a class named Triangle which throw an exception if the CartesianPoint instances passed as parameter does not specify an appropriate Triangle i.e. if the three points are in a straight line.		
	• Write a program that executes two threads. One thread displays Thread1" every 2,000 milliseconds, and the other displays "Thread2" every 4,000 milliseconds. Create the threads by extending the Thread class.		
	• Write a program that executes two threads. One thread will print the even numbers and the thread will print odd numbers from 1 to 50.		
	• Write a program to create a thread that implement runnable interface.		
	• Write a java program which create threads using the thread class.		
	• Write a java program which manipulates and shows the priority of threads.		
	• Write a java program to create two threads. One using runnable interface and other by extending thread. First thread will print all odd numbers and second will print all even numbers between 1 to 10.		
	• Write a program to create three threads. Assign priority to thread. Make a class to test them. Also use Sleep method to give pause between them.		
	• Write a java program to create 3 threads using Thread class. Three threads should calculate the sum of 1 to 5, 6 to 10 and 11 to 15 respectively. After all thread finishes main thread should print the sum and average.		
	• Write a java program that creates two threads using Runnable interface. One thread should display "Thread 1" at every 1000 Milliseconds and other should display "Thread 2" at every 3000 milliseconds.		
V	**Applet and JApplet**	09	20%
	• Write a program to draw a line using drawLine() method.		
	• Write a program that does the following task Changes color of background and fore ground. Changes color of font and face of the font. Draw a rectangle and fill color in it.		
	• Write a Java applet that draws a circle centered in the center of the applet and filled with random color. Radius of the circle should be passed as a parameter.		
	• Write a Java applet that draws a circle divided in 6 equal parts.		

	• Write a program to create JApplet with a JButton.when the user clicks the button, display your favorite cricket team in a large font.		
	• Create a JApplet that contains a JLabel and JButton. When user clicks the JButton, change the fonttypeface, style and size on the Jlab el.		
	• Create a JApplet that contains two JTextFileds, a JButtons, three JLabels, when the user types an employee's first and last names in a JTextfield, the employee's job title displays in a second JTextField.		
	• Create a JApplet that initially displays a single JButton. When the user clicks the JButton, display a JLabel that prompts the user to enter an integer, a JTextField into wich the user can type the interger, and a second JButton contain the text"Double me". When the user clicks the second button the integer is doubled and the answer is displayed in the JTextField.		
	• Make a color choice from radio button and change the background color		

4. Teaching Methods:

The following pedagogical tools will be used to teach this course:

1. Lectures and Discussions
2. Practical demos
3. Assignments and Presentations

5. Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Quizzes	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination	50% (External Assessment)

6. Basic Text Books:

Sr. No	Author/s	Name of the book	Publisher	Edition
T1	Sachin Malhotra Saurabh Choudhary	Programming in Java	OXFORD	LATEST

7. Reference Books:

Sr. No	Author/s	Name of the book	Publisher	Edition
R1	Joyce Farrell Ankit Bhavsar	JAVA for Beginners	Cengage Learning	Latest
R2	Dr. G.T.Thampi	Object Oriented Programming in java	Dreamtech	Latest

8. List of Journals / Periodicals / Magazines / Newspapers etc.:

Sr. No	Link
1	www.cs.columbia.edu/~lok/3101/lectures/02-corejava.pdf
2	portal.aauj.edu/e-book/teach_your_self_java_in_21_days.pdf
3	http://www.nptelvideos.com/video.php?id=1472&c=15
4	http://nptel.ac.in/courses/106105084/28
5	http://nptel.ac.in/courses/106105084/29
6	http://nptel.ac.in/courses/106105084/30
7	www.cs.columbia.edu/~lok/3101/lectures/02-corejava.pdf
8	portal.aauj.edu/e_books/teach_your_self_java_in_21_days.pdf

9. Session Plan:

Session No.	Topics / Chapters
1-9	Practical based on basic java programs, loops and conditional statements
10-15	Practical based on classes and objects.
16-18	Practical based Array and command line argument
19-21	Practical based on Inheritance.
22-24	Practical based on interfaces
25-27	Practical based on Packages
28-31	Practical based on Exception Handling.
32-36	Practical based on Multi-Threading
36-40	Practical based on Applets.
41-45	Practical based on JApplet.

10. Learning Outcome:

Upon successful completion of the course, students will be able to:

- Create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism; use data types, arrays and other data collections; implement error-handling techniques using exception handling.
- Apply decision and iteration control structures to implement algorithms.
- Implement interfaces, inheritance, and polymorphism as programming techniques.