GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (SOFTWARE ENGINEERING) (02)

OOP WITH JAVA

SUBJECT CODE: 2720215

SEMESTER: II

Type of course: Regular

Prerequisite:

Basic Programming language concept

Fundamentals of Computer Systems

Rationale:

Java is a simple, portable, distributive, robust, secure, dynamic, architecture neutral, object oriented programming language. It allows the software designed and developed once for an idealized 'virtual machine' and run on various computing platforms. The aim of this course is that student should learn platform independent object oriented programming and java as base language for advanced technology like three tier architecture applications, cloud computing and web development.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	2	5	70	30	20	10	10	10	150

Content:

Srno	Topic	Teaching Hrs	Weightage(%)
1	**Introduction to Java** Overview of Java : Data types : Operators and Control statements.	2	5
2	**Classes and Inheritance:** Methods; contractors; Garbage collection; Access control; Multilevel hierarchy	4	12
3	**Packages and Interfaces :** Access protections : Importing packages; Implementation and applications of Interfaces.	3	7
3	**Exception handling :** Fundamentals : Exception types; try, catch, throw, throws and finally; Nested try statements and propagation of thrown exception	4	12
4	**Multithreaded programming :** Thread model; Thread priorities; Synchronization and inter thread communication	4	12
5	**I/O and Applets :** Streams; File I/O; Applets; Parameter passing to applets	5	14
6	**Event Handling :** Event model; Event Classes; Event listeners interfaces.	4	12
7	**Abstract Window Toolkit :** AWT Classes; Component; Container; Panel; Window;	5	14

	FrameCanvas; Graphics; AWT controls; Layout Managers; Buttons; Check Boxes; Choices; Lists; Scroll Bars; Text fields; Text Areas; Menus; Dialog Boxes; GUI bases programs		
8	**Java Library :** String handling; Exploring java language; java io; java.util	4	12

Reference Books:

1. The Complete Reference, Java 2 (Ninth Edition), Herbert Schild, TMH.
2. Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.
3. Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press.
4. Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD
5. Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, Pearson Education.
6. Java Programming, D. S. Malik, Cengage Learning.
7. Big Java, 3rd Ed., Horstmann, Wiley-India.
8. Head First Java, Katy Sierra & Bert Bates, SPD (O'Reilly).

List of Experiments and Open Ended Problems:

1. Write a program in Java to generate first n prime numbers.
2. Write a program in Java to find second maximum of n numbers without using arrays
3. Write a program in Java to reverse the digits of a number using while loop.
4. Write a program in Java to convert number into words & print it
5. Write programs in Java to use Wrapper class of each primitive data types.
6. Write a static block which will be executed before main( ) method in a class.
7. Write a program in Java to demonstrate use of **this** keyword. Check whether **this** can access the private members of the class or not.
8. 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.
9. Write a program in Java to demonstrate the use of private constructor and also write a method which will count the number of instances created using default constructor only.
10. Write a program in Java to demonstrate the use of **'final'** keyword in the field declaration. How it is accessed using the objects.
11. Develop minimum 4 program based on variation in methods i.e. passing by value, passing by reference, returning values and returning objects from methods.
12. Write a program in Java to demonstrate single inheritance, multilevel inheritance and hierarchical inheritance.
13. Create a class to find out whether the given year is leap year or not. (Use inheritance for this program)
14. Write an application that illustrates how to access a hidden 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.

14. Write a program in Java in which a subclass constructor invokes the constructor of the super class and instantiate the values.
15. Write a program that illustrates interface inheritance. Interface **P12** inherits from both **P1** and **P2**. Each interface declares one constant and
16. Write an application that illustrates method overriding in the same package and different packages. Also demonstrate accessibility rules in package and different packages.
17. Write an application that illustrates method overriding in the same package and different packages. Also demonstrate accessibility rules in inside and outside packages.
18. 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**
19. Write a program in Java to demonstrate implementation of multiple inheritance using interfaces.
20. Write a program in Java to demonstrate use of final class.
21. Write a program in Java to develop user defined exception for 'Divide by Zero' error.
22. Write a program in Java to demonstrate multiple try block and multiple catch exception
23. 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.
24. 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
25. Write a program that executes two threads. One thread will print the even numbers and the another thread will print odd numbers from 1 to 50.
26. Write a program in Java to demonstrate use of synchronization of threads when multiple threads are trying to update common variable.
27. Write a program in Java to create, write, modify, read operations on a Text file.
28. Write a Java Application to create a frame and display a solid square at the mouse pointer when the mouse clicked.
29. Create an application with a Text Field, a Text Area and button show. User has to enter the name of the file in the Text Field. When the button show is pressed, the contents of the file should be displayed in the Text Area.
30. Write a program using Applet (a)to display a message in the Applet (b)for configuring Applets by passing parameters

Major Equipment:

Computers with latest hardware configuration

List of Open Source Software/learning website:

I. Java Development Kit: http://www.oracle.com/technetwork/java/javase/downloads/index.html
II. http://docs.oracle.com/javase/specs/jls/se7/html/index.html
III. http://docs.oracle.com/javase/tutorial/java/index.html

IV. http://www.tutorialspoint.com/java/
V. http://www.learnjavaonline.org/
VI. http://www.c4learn.com/javaprogramming/
VII. http://www.learn-java-tutorial.com/
VIII. http://www.tutorialspoint.com/javaexamples/

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.