

Branch Name:	Computer Engineering / Information Technology/ Information and Communication Technology
Program Code:	ET103/ ET105/ ET107
Course Title:	Object Oriented Programming with Java Practical
Course Code:	2ET1030304P
Pre-requisite Course:	Course on programming for problem solving.

Course Objectives:

1. This course provides the basic concepts and fundamentals knowledge of platform independent object-oriented language.
2. On successful completion of the course, the students will be able to Identify the merits of Java programming over procedure-oriented programming, understand the features of object-oriented programming such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity, apply features of OOP along with exception handling and multithreading programming, design responsive GUI with swings and event handling (event-driven programming).

Teaching and Examination Scheme:

Credit	Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
1	-	-	2	2	-	-	-	-	10	25	10	25	50

Course Contents:

Practical No.	Topics	Total Hours
1	Write a program to enter two numbers and perform mathematical operations on them.	1
2	Write a java program to print all real solutions to the quadratic equation $ax^2+bx+c=0$. Read a, b, c values and use the formula $(-b \pm \sqrt{b^2-4ac})/2a$.	1
3	Write a following programs: a. Interactive program to generate different triangle patterns. b. Program that prints Fibonacci series. c. Program that finds out the sum of digits of a number. d. Program that reverses a number.	2
4	Write a program that calculates percentage marks of the student if marks of N subjects are given.	1
5	Write a program to find length of string and print second half of the string. Also check the string is palindrome or not.	2
6	Write a program to accept a line and check how many consonants and vowels are there in line. Also count the number of words that start with capital letters.	1
7	Write a Java application to create a class "Time" having hour, minute and second as data members and getTime(), showtime() and addtime() as method. Also define the necessary constructors. Create two objects of "Time" and add them and display the result.	1
8	Create a class Room having two data members, length & width. Now write another class RoomArea that creates an instance of this class and displays area of a room.	1
9	Write a java class Temperature contains an instance variable, say, temp, and access methods that operate on it. The access methods would be: setFahrenheit(double), getFahrenheit():double, setCelsius(double), and getCelsius(): double. One way to implement this design is to store the temperature in the Celsius scale and then convert to Fahrenheit in the access methods. The formula for converting Celsius to Fahrenheit is $F = (C * 9/5) + 32$.	1

10	Create a class Figure having one method area (). Create one more class Rectangle which will override area () method of rectangle class. Demonstrate with example.	1
11	Create a class Circle, which contains one protected instance data member, radius, and member functions, area () to compute an area of circle respectively. Derive a class Cylinder from base class Circle, which contains one more protected instance data member, height, and override member function area() to compute an area of cylinder respectively. Cylinder class also add a volume () & surface functions to compute a volume & surface of Cylinder. Add required constructors to initialize data member and getter/setter methods to access data member outside class. Create an object of circle and cylinder class to test member function working properly.	2
12	Create an abstract class "Shape" having two data members, constructors and abstract method disparea (). Derive a class "Rectangle" and "Triangle" from "Shape" class which include appropriate constructors and implement disparea () methods. Create objects of "Rectangle" and "Triangle" classes and call the disparea () methods. NOTE: keep every class definition in separate file named same as a class name within package.same	1
13	Write a program that illustrates interface inheritance. Interface A is extended by A1 and A2. Interface A12 inherits from both P1 and P2. Each interface declares one constant and one method. Class B implements A12. Instantiate B and invoke each of its methods. Each method displays one of the constants	1
14	How do you create an ArrayList? How do you append an object to a list? How do you insert an object at the beginning of a list? How do you find the number of objects in a list? How do you remove a given object from a list? How do you remove the last object from the list? How do you check whether a given object is in a list? How do you retrieve an object at a specified index from a list?	2
15	Write a Program to read a file and print the file with line numbers.	1
16	Write a Program to read a file and check whether the file exists, readable, writable and also print the length.	1
17	Implement TCP Server for transferring files using Socket and ServerSocket.	2
18	Write a try/catch block that throws an Exception if the value of variable X is less than zero. The exception should be an instance of Exception, and when it is caught, the message returned by getMessage () should be "ERROR: Negative value in X coordinate".	1
19	Write a program to create two threads, one thread will print odd numbers and Second thread will print even numbers between 1 to 20 numbers.	1
20	Write an applet that contains three buttons OK, CANCEL and HELP and one text field. If OK is pressed shown on the status bar-"OK is pressed" and the text field should turn red. When CANCEL is pressed -shown on the status bar-"CANCEL is pressed" and text field should turn green. When HELP is pressed- shown on the status bar-"HELP is pressed" and the text field should turn yellow.	2
21	Write a program to create an interface to perform division operations when user enters the two integers. The division of two values must displayed in the third text box when user clicks the CAL button. If num1 & num2 are not integers then the program to throw NumberFormatException, when num1 divide with 0 it has to throw ArithmeticException in exception Message label.	2
22	Write a java applet to create a frame with exit capabilities. Handle events for mouse pressed, released, clicked and dragged by displaying appropriate message describing the event at the coordinates where the event has taken place.	2

Reference Books:

1. The Complete Reference, Java 2, 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, Eighth Edition, Horstmann & Cornell, Pearson Education.
6. Java Programming, D. S. Malik, Cengage Learning.
7. Big Java, 3rd Edition, Horstmann, Wiley-India.
8. Head First Java, Katy Sierra & Bert Bates, SPD (O'Reilly).
9. Java Fundamentals A comprehensive introduction By Herbert Schildt, Dale Skrien, McGrawHill Education.

List of Open-Source Software/learning website:

1. Java Development Kit: <http://www.oracle.com/technetwork/java/javase/downloads/index.html>
2. <http://docs.oracle.com/javase/specs/jls/se7/html/index.html>
3. <http://docs.oracle.com/javase/tutorial/java/index.html>
4. <http://www.javatpoint.com/>
5. <http://www.tutorialspoint.com/java/>
6. <http://www.learnjavaonline.org/>
7. <http://www.c4learn.com/javaprogramming/>
8. <http://www.learn-java-tutorial.com/>

Course Learning Outcomes (CLO):

Course Outcomes	Description	Bloom's Taxonomy Level
COL1	Use the syntax and semantics of java programming language and basic concepts of OOP.	Understanding (1)
COL2	Develop reusable programs using the concepts of inheritance, polymorphism, interfaces, packages, IO and collection classes.	Understanding (1) Applying (2)
COL3	Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.	Understanding (1) Applying (2)
COL4	Design event driven GUI and web related applications which mimic the real word scenarios	Understanding (1) Applying (2)

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	M	H	L	M	L			L		L		L	L	L	L	
CLO2	H	H	H	M	M		M	L	L	M	H	L	M	M	L	L
CLO3	M	M	M	M	M	L	L	L	M	L	M	L	M	M	M	M
CLO4	M	M	M	M	M		L		L	L	L	L	M	M	M	M

H: High, M: Medium, L: Low