



SILVER OAK UNIVERSITY

Computer Application

Integrated M.Sc(IT)

Subject Name: Object Oriented Programming

Subject Code:

Semester: 2

Prerequisite: Knowledge of the C programming language

Objective: To develop proficiency in creating console based applications using the Java Programming Language. To interpret the concepts of object oriented Programming Language and easily use Java. To design multi-threaded and IO applications using the Java Programming Language. To implement application including different file operations.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Evaluation Scheme				Total Marks
L	T	P	C	Internal		External		
				Th	Pr	Th	Pr	
4	0	4	6	40	20	60	30	150

Content:

Unit No.	Course Contents	Teaching Hours	Weightage %
1	Basics of JAVA: Features of Java, Byte Code, JVM, JDK, JRE, Program comments, Compiling and Executing a java program, Data types, Type Conversion and Casting, Variables, Operator- Arithmetic, Bitwise, Relational, Boolean logical, Assignment, ? operator, Control Statements – If , else, nested if, if-else ladders, Switch, while, do-while, for, for-each, break, continue, return, Single and Multidimensional Array, Command line argument, Use of Wrapper Class, String and StringBuffer class.	8	15
2	Classes, Objects & Methods: Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, this keyword, Garbage collection, finalize() method, Overloading Methods & Constructors, Using Objects as Parameters, Returning Objects, Recursion, Access Control, Understanding static, final, Nested and Inner Classes, Exploring the String Class, Varargs: Variable-Length Arguments	10	20
3	Inheritance: Use of Inheritance, types of inheritance, Inheriting Data members and Methods, constructor in inheritance, super keyword, Method	8	15

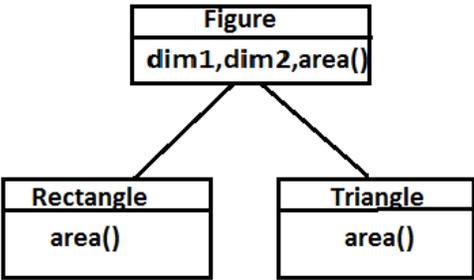
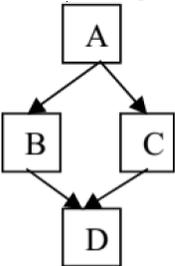
	overriding, dynamic method dispatch, abstract class, final with inheritance		
4	Packages & Interfaces: Use of Package, CLASSPATH, Import statement, Static import, Access control, Implementing Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces, Interfaces Can Be Extended	8	15
5	Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Displaying a Description of an Exception, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java's Built-in Exceptions, Custom Exception, Chained Exceptions	5	10
6	Multithreaded Programming: Use of Multithread programming, Thread class and Runnable interface , Multiple thread, isAlive() and Join(), Thread priority, Thread synchronization, Thread communication, Deadlock	5	10
7	IO Programming: Introduction to Stream, Byte Stream, Character stream, Readers and Writers, File Class, File InputStream, File Output Stream, InputStreamReader, OutputStreamWriter, FileReader, FileWriter, Buffered Reader	3	5
8	Collection Classes : List, ArrayList, LinkedList, Enumeration, Vector, Properties, Introduction to Java.util package	3	5
9	Networking with java.net InetAddress class, Socket class, DatagramSocket class, DatagramPacket class	2	5

Course Outcome:

Sr. No.	CO statement	Unit No
CO-1	Use various Java features, constructs and libraries for simple problems.	1
CO-2	Demonstrate how to define and use classes, methods, objects and interfaces, how to override and overload methods, compile and execute programs.	2, 3, 4
CO-3	Write an application using exception handling, multithreading with synchronization.	5, 6
CO-4	Write an application using I/O and collection classes.	7, 8
CO-5	Understand networking with java.net package concept in Java and implement.	9

List of Experiments/Tutorials:

1	Install the JDK (Download the JDK and install it) 1. Set path of the jdk/bin directory 2. Create the java program 3. Compile and run the java program Write a simple “Hello World” java program, compilation, debugging, executing using java compiler and interpreter.
2	Implement a JAVA program to find out the addition of two numbers and display the result.
3	Implement a JAVA program to find and display first n Fibonacci numbers.
4	Implement a JAVA program to swap the value of two variables.
5	Implement a JAVA program to find the largest number from two numbers.
6	Write a program that creates and initializes a four integer element array. Calculate and display the average of its values.
7	Implement a JAVA program to sort an array of 10 numbers.
8	Write a program to enter two numbers and perform mathematical operations on them.
9	Write an interactive program to print a string entered in a pyramid form. For instance, the string “SILVER” has to be displayed as follows: S S I S I L S I L V S I L V E S I L V E R
10	Write an interactive program to print a diamond shape. For example, if user enters the number 3, the diamond will be as follows: * * * * * * * * *
11	Write a program that declares a class named a “Person”. It should have instance variables to record name, age and salary. This should be a type of String, int and float. Use “new” operator to create an object. Create a person object. Set and display its instance variable.
12	Create a class named Box that has three instance variables length, breath and height and constructors. The first form accepts three arguments and initializes all the three variables and the second form has only one argument and initializes all the values to that value and one method volume() that finds the volume of box. The main() class instantiates the class Box prints volume().
13	Write a program to add two number using class and object. Read the numbers using Scanner class and object.
14	Define a class which provides the methods two methods having the same name area. One returns the area of circle based on given value of radius of circle. Other returns the area of rectangle based on given values of length and width of rectangle. Write a java program to find out the area of circle and area of rectangle using the class above and using the concept of method overloading.

15	Class A is having two data members type of int say i and j , a constructor to define the values of i and j for respective objects. Declare two objects of class A say Aob1 and Aob2. Add a method in class A to add and display the result of the addition of respective properties of object Aob1 and Aob2. Test the above class. Hint: Aob1+Aob2
16	Write a java program to swap the properties of two objects of same class.
17	Design a class which finds out the factorial of a given number using recursion. Test the above class.
18	Write a program in Java to demonstrate use of this keyword.
19	Class A is having two private data members say i and j, default constructor, copy constructor, parameterized constructor to define the values of i and j and method sum() which returns the summation of i and j. Class B is inherited from class A and it is having one private data member say k, default constructor, copy constructor, parameterized constructor to define k. Write a program to declare objects of class B and test above classes to find out the summation of i and j. Use the super to call the super class constructors.
20	Write a java program to demonstrate multilevel inheritance.
21	Write a java program to demonstrate the use of dynamic method dispatch.
22	<p>Consider the following inheritance.</p>  <pre> classDiagram class Figure { dim1 dim2 area() } class Rectangle { area() } class Triangle { area() } Figure < -- Rectangle Figure < -- Triangle </pre> <p>Write a Java program to find out the area of rectangle and triangle. Use the concepts of polymorphism. (Hint: Area of rectangle = dim1*dim2, Area of triangle = dim1*dim2/2)</p>
23	Rewrite the above program by considering the area() method define in Figure class as a abstract.
24	Write a program to sort all the characters of a given string in descending order using sort() of Arrays class.
25	Write a program to find the occurrences of a given character in a given string.
26	Design a package MyPackage. And then Design two classes Account and AccountBalance and use the package Mypackage.
27	<p>Write a program to demonstrate the multipath inheritance for the classes having relations as shown in figure1.</p>  <pre> classDiagram class A class B class C class D A < -- B A < -- C B < -- D C < -- D </pre> <p>Figure 1</p>
28	The Transport interface declares a deliver () method. The abstract class Animal is the super

	class of the Tiger, Camel, Deer and Donkey classes. The Transport interface is implemented by the Camel and Donkey classes. Write a test program that initialize an array of four Animal objects. If the object implements the Transport interface, the deliver () method is invoked.
29	Write a method for computing x^y doing repetitive multiplication. X and y are of type integer and are to be given as command line arguments. Raise and handle exception(s) for invalid values of x and y.
30	Write an application to generate custom exception if any value from its command line arguments its negative.
31	Write a program to replace all “word1” by “word2” from a file1, and output is written to file2 file and display the no. of replacement.
32	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.
33	Write a program that creates three threads. Make sure that the main thread executes last.
34	Write a program that executes two threads. One thread displays “Thread1” every 2,000 milliseconds, and the other displays “Thread2” every 4,000 milliseconds.
35	program illustrates connection within client and server. Server can communicate with various clients by sending messages.All clients that are connected within that server will receive the messages.quit- terminates the connection.

Major Equipment:

Computer, Laptop

Books Recommended:-

- 1) The Complete Reference, Java 2 (Seventh Edition), Herbert Schild, - TMH.
- 2) Programming with Java A Primer – E.Balaguruswamy,Mc Grawhill.
- 3) Intro to Java Programming, 10th edition, Y.Daniel Liang, Pearson
- 4) CORE JAVA volume -I Cay Horstmann, Pearson
- 5) Cay S Horstmann, Gary Cornell, “Core Java 2, Volume 1 – Fundamentals”, PearsonEducation

List of Open Source Software/learning website:

<https://www.tutorialspoint.com/java/>
<https://www.javatpoint.com/java-programs>
<https://docs.oracle.com/en/java>
<http://www.learnjavaonline.org/>
<http://java.sun.com/docs/books/tutorial/index.html>
<http://www.javaworld.com>