SILVER OAK UNIVERSITY

College of Technology (01)

Bachelor of Technology in (CE/IT) Engineering

Subject Name: Object Oriented Programming with UML

Subject Code: 1010043220

Semester: 4th

Prerequisite: None

Objective:

1. Main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm
2. To understand fundamental features of an object oriented programming language in Java which includes object & classes, interfaces, encapsulation, inheritance, polymorphism and error exception handling
3. To Prepare UML diagrams for software system.

Teaching and Examination Scheme:

Teaching Scheme					Evaluation Scheme				Total Marks
					Theory		Practical		
L	T	P	Contact Hours	Credit	CIE (TH)	ESE (TH)	CIE (PR)	ESE (PR)	
3	0	4	7	5	40	60	20	30	150

Content:

Unit No.	Course Contents	Teaching Hours	Weightage %
1	**Introduction to java and Basic programming:** Features of Java, Byte Code and Java Virtual Machine, JDK and IDE, Creating, compiling and Executing a simple java program, Programming style, documentation and errors, Reading input from console, identifiers and variables, Assignment statements, Named constants and naming conventions, Data Types (Numeric, Boolean, Character, String) its Operations and Literals, Evaluating Expressions and operator Precedence, Types of Operators (Augmented assignment, Increment and Decrement, Logical), operator precedence and associativity, numeric type conversions.	**4**	**10**
2	**Control Structure**	**3**	**5**

	If , else, nested if, if-else ladders, Switch, while, do-while, for, for-each, break, continue		
3	**Array and String:** Single and Multidimensional Array, String class, StringBuffer class, Operations on string, Command line argument, Use of Wrapper Class.	**5**	**10**
4	**Classes, Objects and Methods:** Class, Object, Object reference, Constructor, Constructor Overloading, Method Overloading, Recursion, Passing and Returning object form Method, new operator, this and static keyword, finalize() method, Access control, modifiers, Nested class, Inner class, Anonymous inner class	**5**	**15**
5	**Object oriented thinking:** Use of Inheritance, types of inheritance, Inheriting Data members and Methods, constructor in inheritance, super class and subclass, using super keyword, Final keywords, overriding and overloading methods, polymorphism, Dynamic method dispatch, Abstract class, Creation and Implementation of an interface, Interface reference, instanceof operator, Interface inheritance, Comparison between Abstract Class and interface	**8**	**15**
6	**Exception Handling** Exception and Error, Use of try, catch, throw, throws and finally, Built in Exception, Custom exception, Throwable Class.	**4**	**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	**4**	**10**
8	**Multithreaded Programming:** Use of Multithread programming, Thread class and Runnable interface , Thread priority, Thread synchronization, Thread communication, Deadlock	**4**	**10**
9	**UML :** Introduction to Object orientation, Modeling as a Design Technique Modeling Concepts, abstraction, The three models, Class Model, State model and Interaction model **Class Modeling** Object and class concepts, link and association, Generalization and Inheritance **State modeling** **E**vents, states, Transition and conditions, state diagram, state diagram behavior **Interaction Modeling** Use case Models, sequence models, activity models	**8**	**15**

Course Outcome:

Sr. No.	CO statement	Unit No
CO-1	Use various Java constructs, features and libraries for simple problems.	1,2,3
CO-2	Demonstrate how to define and use classes, interfaces, create objects and methods, how to override and overload methods, compile and execute programs.	4,5
CO-3	Write a program using exception handling, multithreading with synchronization.	6,8
CO-4	Write a program using Files and I/O for a given problem.	7
CO-5	Design and implement object oriented models using UML appropriate notations.	9

Teaching & Learning Methodology: -

The various methods or tools follows by the faculties to teach the above subject are:

1. The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
2. Lectures with live practical example using Projector and Computer.
3. Experiments shall be performed in the laboratory related to course contents.

List of Practicals:

(1)	Write a Program that displays Welcome to Java, This is my first JAVA program.
(2)	Write a program to convert rupees to dollar. 70 rupees=1 dollar.
(3)	Write a program that calculates percentage marks of the student if marks of 6 subjects are given.
(4)	Write a program that solves the following equation and displays the value x and y: 1) 3.4x+50.2y=44.5 2) 2.1x+.55y=5.9 (Assume Cramer's rule to solve equation ax+by=e x=ed-bf/ad-bc cx+dy=f y=af-ec/ad-bc)
(5)	Write a program that reads a number in meters, converts it to feet, and displays the result.
(6)	Write a program to count the number of words that start with capital letters.
(7)	Write a program that prompts the user to enter three integers and display the integers in decreasing order.
(8)	Write a program that prompts the user to enter a letter and check whether a letter is a vowel or constant.
(9)	Write an interactive program to print a string entered in a pyramid form. For instance, the string "stream" has to be displayed as follows: S S t S t r

	Stre Strea Stream
(10)	Write a program to find length of string and print second half of the string.
(11)	Write a program to find that given number or string is palindrome or not.
(12)	Assume a vehicle plate number consists of three uppercase letters followed by four digits. Write a program to generate a plate number.
(13)	Write a java program to demonstrate multilevel inheritance.
(14)	Write a java program to find out the area of circle and area of rectangle using the concept of method overloading.
(15)	Write a java program to find out the volume of rectangular box and volume of cub using the concept of constructor overloading.
(16)	Design a class which finds out the factorial of a given number using recursion.
(17)	Write a java program to demonstrate the use of dynamic method dispatch.
(18)	Write a java program to demonstrate the concept of interface.
(19)	Write a program to show divide by zero error through exception, and also try to catch the exception.
(20)	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.
(21)	Create a class called Student. Write a student manager program to manipulate the student information from files by using FileInputStream and FileOutputStream
(22)	Refine the student manager program to manipulate the student information from files by using the BufferedReader and BufferedWriter
(23)	Draw use case diagram for hotel management system.
(24)	Draw class diagram of bank management system.
(25)	Prepare a sequence diagram for issuing a book in the library management system.

Books Recommended: -

1) Intro to Java Programming, 10th edition, Y.Daniel Liang, Pearson
2) Java Fundamentals A comprehensive introduction By Herbert Schildt, Dale Skrien, McGraw Hill Education.
3) Object oriented programming with Java , Rajkumar Buyya,S Thamarai Selvi, Xingchen Chu, McGrawHill
4) Programming in Java, Sachin Malhotra, Saurabh Choudhary, Oxford
5) Programming with JAVA , E Balagurusamy, McGrawHill
6) Object Oriented Modeling and Design with UML, Michael Blaha and James Rambaugh – PEARSON second edition

List of Open Source Software/learning website:

- https://nptel.ac.in/