ITM(SLS) Baroda University
School of Computer Science, Engineering and Technology
B.Tech - Semester III

Course Name :Object Oriented Programming with Java
Course Code:C2310C1
Course Type: Core

Teaching Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical marks		
				External	Internal	External	Internal	
3	0	4	5	40	60	0	50	150

Preamble-The purpose of this course is to enable learners to solve problems by breaking it down to object level while designing software and to implement it using Java. This course covers Object Oriented Principles, Object Oriented Programming in Java, Inheritance, Exception handling, Event handling, multithreaded programming and working with window-based graphics. This course helps to develop Desktop GUI Applications, Mobile applications, Enterprise Applications, Scientific Applications and Web based Applications.

Prerequisite: Topics covered under the course Programming in C,Programming in Python-1 , Programming in Python-2.

What is Object Oriented Programming - Object-Oriented Programming is a methodology or paradigm to design a program using classes and objects. It simplifies software development and maintenance by providing some concepts:

- Object
- Class
- Inheritance
- Polymorphism
- Abstraction
- Encapsulation

Course Objective:

1. Understand fundamentals of JAVA programming such as variables, conditional and iterativeexecution, methods, etc.
2. Understand fundamentals of object-oriented programming in Java, including definingclasses, invoking methods, using class libraries, etc.
3. Be aware of the important topics and principles of software development.
4. Have the ability to write a computer program to solve specified problems.
5. Be able to use the Java SDK environment to create, debug and run simple Java programs.
6. Understand the concept of JAVA FX basics Control.

Course Learning Outcome:
After completing the course, the student shall be able to :

	Course Outcome	**Bloom's Level**
CO1	Use various Java constructs, features and libraries for simple problems.	Understanding
CO2	Demonstrate how to define and use classes, interfaces, create objects and methods, how to override and overload methods.	Understanding
CO3	Comprehend building blocks of OOPs language, inheritance, package and interfaces	Applying
CO4	Identify exception handling methods& JAVA FX Controls	Application
CO5	Implement multithreading in object oriented programs.	Application

Course Competency:

1. Understanding of the Java system architecture and its major components by Java Runtime
2. Environment (JRE) and the Java Development Kit (JDK).
3. Understanding of the object oriented programming concepts.
4. Understanding of the multithreading in object oriented programs.
5. Understanding of the exception handling methods & JAVA FX Controls.

Course Contents:

Unit #	***Topics (Programs) to be Completed***	***Total Hrs.***
1	**Basics of Java**: Features of Java, Byte Code and Java Virtual Machine, JDK, Data types, Operator, Control Statements –If , else, nested if, if-else ladders, Switch, while, do-while, for, for-each, break, continue. **Array and String**: Single and Multidimensional Array, String class, StringBuffer class, Operations on string, Command line argument, Use of Wrapper Class.	8
2	**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.	8
3	**Inheritance and Interfaces:** Use of Inheritance, Inheriting Data members and Methods, constructor in inheritance, Multilevel Inheritance –method overriding Handle multilevel constructors –super keyword,Stop Inheritance -Final keywords, Creation and Implementation of an interface, Interface reference, instanceof operator, Interface inheritance, Dynamic method dispatch , Comparison between Abstract Class and interface.	6

4	**JAVAFX UI controls and multimedia:** Labeled and Label, button, Checkbox, Radio Button, Text field, Text Area, Combo Box, List View, Scrollbar, Slider, Video and Audio. **Exception Handling**: Exception and Error, Use of try, catch, throw, throws and finally, Built in Exception, Custom exception, Throwable Class.	6
5	**Multithreaded Programming:** Use of Multithread programming, Thread class and Runable interface,Thread priority, Thread synchronization and Locks, Thread communication, Deadlock.DeamonThread.Methods of thread . **IO Programming**: Introduction to Stream, Byte Stream, Character stream, Readers and Writers, File Class, File Input Stream, File Output Stream, Input StreamReader, OutputStreamWriter, FileReader, FileWriter, Buffered Reader **Class Modeling**: Object, class concepts, link and association, Generalization and Inheritance.	8
		40

Reference :

Text Books:

1. Core Java Volume-I Fundamentals Horstmann& Cornell, -Pearson Education. -Eight Edition
2. Object Oriented Modelling and Design with UML Michael Blaha and James Rambaugh –PEARSON Second edition

Reference Books:

1. Java Fundamentals A comprehensive introduction By Herbert Schildt, Dale Skrien, McGraw Hill Education.
2. Programming with Java A Primer –E.Balaguruswamy,McGrawhill.
3. The Complete Reference, Java 2 (Fourth Edition),HerbertSchild, -TMH.
4. The Class of Java-Mr Praveen Jain

Case Studies:

Sr.No	Case Studies	Evaluation
C1	Development of Content Management System	1. Identification of algorithm. 2. Report preparation. 3. Presentation with VIVA
C2	Development of Employee Performance Software System	

Simulation and Animation: NA

TEDx Videos:

Sr. No	TEDx Video
T1	1. https://www.youtube.com/watch?v=qGW0GT1rCvs - A programming language to heal the planet together: Julia | Alan Edelman | TEDxMIT

NPTEL Video:

Sr. No	About Video	Link	Topic
O1	Concept of Java Programming Language-Dr.DebasisSanmant,IITKharagpur	https://www.youtube.com/watch?v=VksxhzfD8kQ&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=2	Core Concept
O2	Java Tools and Resourses	https://www.youtube.com/watch?v=1B5ppTif5ZY&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=3	Jdk Tools
O3	Java Applet Programming	https://www.youtube.com/watch?v=0pzR2FGTEhk&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=5	Applet Programming

Other Videos:

Sr. No	About Video	Link
O1	Java Framework	https://www.youtube.com/watch?v=cRL5TorHINY&list=PL7WFbgpeASD3117pvlNaXZwK5q6H3XhZZ
O2	Java Installation Guide.	https://www.youtube.com/watch?v=eixYN5v7jOY&list=PL7WFbgpeASD3117pvlNaXZwK5q6H3XhZZ&index=2
O3	Java Programming Steps	https://www.youtube.com/watch?v=VksxhzfD8kQ&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=2

Related MOOCs courses

Sr.No	MOOC Courses
M1	Programming, Java Programming by Prof.DebasisSamant 8 Weeks on NPTE
M2	Java Programming Specialization Offered By University of California San Diego National Research University Higher School of Economics(coursera)

Activity Based Learning(ABL):

S.NO	Name of Activity	Details of Activity	Outcome	Evaluation
01	**Chat Application Development**	A chat application is the process of exchanging messages between two systems continuously.It is a console application that is launched from the command line. The server and clients can run on different computers in the same network, e.g. Local Area Network (LAN).This application uses the concepts of Swing GUI widget toolkit, multithreading and Socket programming for communication over network.	Upon completion of this ABL, the students will be able to: • Perform basic GUI designing • Multitasking application development can be done using concept of multithreading • Communication over the network can be learned	Based on Chat application development process

Lab Experiments:

S.No	Experiment Name	Total Hrs
PS1	Write a Program that displays Welcome to Java, Learning Java Now and Programming is fun.	1
PS2	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)	1
PS3	Write a program that reads a number in meters, converts it to feet, and displays the result.	1/2
PS4	Body Mass Index (BMI) is a measure of health on weight. It can be calculated by taking your weight in kilograms and dividing by the square of your height in meters. Write a program that prompts the user to enter a weight in pounds and height in inches and displays the BMI. Note:- 1 pound=.45359237 Kg and 1 inch=.0254 meters.	1
PS5	Write a program that prompts the user to enter three integers and display the integers in decreasing order.	1
PS6	Write a program that prompts the user to enter a letter and check whether a letter is a vowel or constant.	1

PS7	Assume a vehicle plate number consists of three uppercase letters followed by four digits. Write a program to generate a plate number.	1
PS8	Write a program that reads an integer and displays all its smallest factors in increasing order. For example if input number is 120, the output should be as follows:2,2,2,3,5.	1
PS9	Write a method with following method header. public static intgcd(int num1, int num2) Write a program that prompts the user to enter two integers and compute the gcd of two integers.	1
PS10	Write a test program that prompts the user to enter ten numbers, invoke a method to reverse the numbers, display the numbers.	1
PS11	Write a program that generate 6*6 two-dimensional matrix, filled with 0's and 1's , display the matrix, check every raw and column have an odd number's of 1's.	2
PS12	Write a program that creates a Random object with seed 1000 and displays the first 100 random integers between 1 and 49 using the NextInt (49) method.	2
PS13	Write a program to implement Inheritance & its types	2
PS14	Write a program to implement Exception handling	2
PS15	Write a Program to implement multithreaded program	2
PS16	Write a GUI program that use button to move the message to the left and right and use the radio button to change the colour for the message displayed	2
PS17	Write a Program to implement Class Modeling	2

Mini Projects:

Sno.	**Title**
MP1	A Semantic Web-Based Scientific News Aggregator
MP2	Develop a Product on Advance Courier Service
MP3	Creation of Advance Web-based Multimedia Answer Generation