

Subject Code: 2ET4040502	Subject Title: JAVA PROGRAMMING
Pre-Requisite	Knowledge of C,C++

RATIONALE:

Open source platforms play significant role in the corporate world and are gaining popularity because these are freeware and ease of access. Java is a simple, portable, distributive, robust, secure, dynamic, architecture neutral, object oriented programming language. This technology allows the software designed and developed once for an idealized 'virtual machine' and run on various computing platforms. Companies of all sizes are using Java as the main programming platform to develop various applications/projects worldwide. 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. Many commercial applications as well as developing mission critical applications are using Java Technologies. This necessitates the corporate sectors to hire highly skilled Java developers. So, after learning this course, student can float themselves as Java developer in the software industry as well this course works as foundation course for advance Java programming for the forthcoming semester.

COURSE OBJECTIVE:

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- Explain object oriented programming concepts of java.
- Comprehend building blocks of OOPs language, inheritance, package and interfaces.
- Identify exception handling methods.
- Develop multithreading object oriented programs.
- Develop an object oriented program handling data file.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment
3	-	4	5	60	40	40	60

DETAILS OF COURSE CONTENTS:

Sr. No.	TOPIC	Total Hrs.	Weight (%)
1	Introduction to Java 1.1 Basics of Java, Background/History of Java, Java and the Internet, Advantages of Java 1.2 Java Virtual Machine & Byte Code 1.3 Java Environment Setup 1.4 Java Program Structure 1.5 Procedure-Oriented vs. Object-Oriented Programming concept 1.6 Basics of OOP: Abstraction, Inheritance, Encapsulation, Classes, subclasses and super classes, Polymorphism and Overloading, message communication 1.7 Compiling and running a simple "Hello World" program: Setting Up Your Computer, Writing a Program, Compiling, Interpreting and Running the program, Common Errors	04	09%
2	Building Blocks of the Language 2.1 Primitive Data Types : Integers, Floating Point type, Characters, Booleans etc 2.2 User Defined Data Type 2.3 Identifiers & Literals 2.4 Declarations of constants & variables 2.5 Type Conversion and Casting 2.6 Scope of variables & default values of variables declared 2.7 Wrapper classes 2.8 Comment Syntax 2.9 Garbage Collection 2.10 Arrays of Primitive Data Types 2.11 Types of Arrays 2.12 Creation, concatenation and conversion of a string, changing case of string, character extraction, String Comparison, String Buffer 2.13 Different Operators: Arithmetic, Bitwise, Rational, Logical, Assignment, Conditional, Ternary, Increment and Decrement, Mathematical Functions 2.14 Decision & Control Statements: Selection Statement (if, if...else, switch), Loops (while, do-while, for), Jump statements (break, continue, return & exit)	08	19%
3	Object Oriented Programming Concepts 3.1 Defining classes, fields and methods, creating objects, accessing rules, this keyword, static keyword, method overloading, final keyword, 3.2 Constructors: Default constructors, Parameterized constructors, Copy constructors, Passing object as a parameter, constructor overloading	06	14%
4	Inheritance, Packages & Interfaces	10	23%

	4.1 Basics of Inheritance, Types of inheritance: single, multiple, multilevel, hierarchical and hybrid inheritance, concepts of method overriding, extending class, super class, subclass, dynamic method dispatch & Object class 4.2 Creating package, importing package, access rules for packages, class hiding rules in a package. 4.3 Defining interface, inheritance on interfaces, implementing interface, multiple inheritance using interface 4.4 Abstract class and final class.		
5	Exception Handling & Multithreaded Programming 5.1 Types of errors, exceptions, try..catch statement, multiple catch blocks, throw and throws keywords, finally clause, uses of exceptions, user defined exceptions 5.2 Creating thread, extending Thread class, implementing Runnable interface, life cycle of a thread, Thread priority & thread synchronization, exception handling in threads	09	22%
6	File Handling 6.1 Stream classes, class hierarchy, useful I/O classes, creation of text file, reading and writing text files	05	12%

COURSE OUTCOME:

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

1. Explain object-oriented programming concepts of java.
2. Comprehend building blocks of OOPs language, inheritance, package and interfaces.
3. Identify exception handling methods.
4. Develop multithreading object-oriented programs.
5. Develop an object-oriented program handling data file.

LIST OF PRACTICAL:

SR. No.	Experiment
1	Install JDK, write a simple "Hello World" or similar java program, compilation, debugging, executing using java compiler and interpreter
2	Write a program in Java to generate first n prime numbers
3	Write programs in Java to use Wrapper class of each primitive data types
4	Write a program in Java to multiply two matrixes
5	Write a program in Java to demonstrate use of this keyword. Check whether this can access the private members of the class or not
6	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

7	Write a program in Java to demonstrate single inheritance, multilevel inheritance and hierarchical inheritance
8	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
9	Write a program in Java to develop user defined exception for 'Divide by Zero' error.
10	Write a program in Java to demonstrate the use of synchronization of threads when multiple threads are trying to update common variables.
11	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.
12	Write a program in Java to create, write, modify, read operations on a Text file.

LIST OF REFERENCES:

Sr No	Title	Author	Publication
1	Java: The Complete Reference, Seventh Edition	Herbert Schildt	Tata McGraw Hill
2	Programming with Java	E Balagurusamy	Tata McGraw Hill
3	Complete Reference Java 2	Herbert Schildt	TMH
4	Java Programming	Sachin Malhotra, Saurabh Choudhary	Oxford

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	H	M	M	M	L		L						H	M		
CLO2	H	M	H	M	L		L						H	H	M	
CLO3	M	H	M	M	M	L							M	H	M	
CLO4	M	H	H	H	L								H	H	M	
CLO5	M	M	H	H	L								H	H	H	

H:High, M:Medium, L:Low