Course Name : Computer Engineering Group

Course Code : CO/CM/IF/CW/CD

Semester : Fifth for CO/CM/IF/CW and Sixth for CD

Subject Title : Java Programming

Subject Code : 17515

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	04	03	100	50#	---	25@	175

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

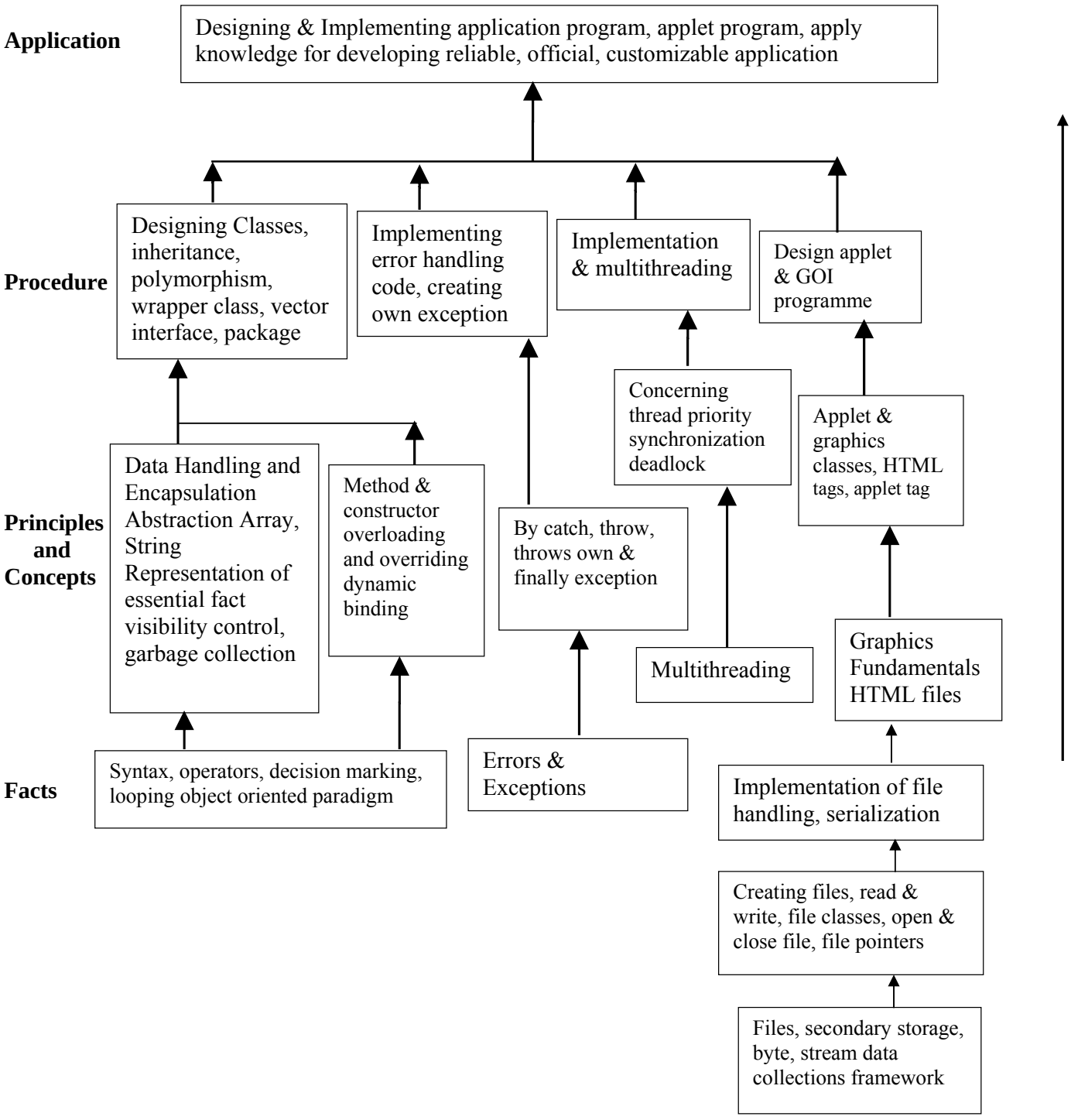
Nowadays, object oriented paradigm is of utmost importance for programming. Java language supports and is a very good means of understanding and implementing the OOP concepts. Java language enables the easy development of robust, secure, reusable and portable application. An application may be a standalone or it may be a web based. This subject provides an insight to understand and implement the OOP concepts, do the applet, graphics and multithreaded programming and Interact with the files. It also builds strong foundation for advanced java programming.

General Objectives:

Intellectual skills:

- Use of programming language constructs.
- To know apply different logics to solve the given problem.
- To be able to write program using different implementations for the same problem.
- Study different types of errors.
- Debugging of programs.
- Understand different steps to develop program such as
  a. Problem definition
  b. Analysis
  c. Design of logic
  d. Coding
  e. Testing
  f. Maintenance

Learning Structure:



Contents:

Chapter	Content	Hours	Marks
01	**Introduction to Java** Specific Objectives: ➢ To understand the features, Data types, Decision making and looping, constructs of java language. 1.1 Java Features and the Java Programming Environment. Object Oriented, Compiled, Interpreted, Platform independent, Portable, Robust and Secure, Dynamic. 1.2 Java Tokens & Data types Constants & Symbolic Constants, variables, dynamic initialization, data types, array & string, scope of variable, type casting, standard default values. 1.3 Operators & Expressions Arithmetic Operators, Relational Operators, Logical Operators, Increment & Decrement, Conditional Operators, Bit wise Operators, Instance of Operators, Dot Operators, Operator precedence & associativity, Evaluation of Expressions, Type conversions in expressions, Mathematical Functions - min(), max(), sqrt(), pow(), exp(), round(), abs(). 1.4 Decision making & looping If statement, if else statement, nested if else statement, if else if ladder, the switch statement, nested switch statement, The ?: operator, The while statement, the Do while statement, the 'for' statement, break, continue & return statement, nested loops, labeled loops, for-each version of the for loop.	08	16
02	**Classes, Objects & Methods** Specific Objectives: ➢ To create classes, objects and make use of arrays and strings. ➢ They will also learn the concepts of inheritance and garbage collection. 2.1 Defining a class, creating object, accessing class members, Constructors & methods, types of constructors, nesting of methods, argument passing the 'this' keyword, command line arguments, varargs: variable-length arguments, garbage collection, finalize() method, the object class. 2.2 Visibility Control Public, Private, Protected, default, friendly private Protected access. 2.3 More on Arrays & Strings Types of arrays, creating an array, strings, string classes & string buffer, vectors, wrapper, classes, enumerated types. 2.4 Inheritance Types of Inheritance, single Inheritance, multilevel Inheritance, Hierarchical Inheritance, method & constructor Overloading & overriding, dynamic method dispatch, final variables, final methods, use of super, abstract methods & classes, static members.	12	24

03	**Interface and Package** Specific Objectives: ➢ To create and use interface and packages. ➢ They will also learn the package naming, conventions and about the static import. 3.1 Interface Define Interface, implementing interface , accessing interface, variables& methods, extending interfaces, interface references, nested interfaces 3.2 Package Define package, type of package naming & creating packages, accessing package, import statement, static import, adding class & interfaces to a package.	06	12
04	**Exception Handling & Multithreaded Programming** Specific Objectives: ➢ To handle the exceptions in programs effectively. ➢ They will also learn 'how to make their programs multithreaded', set thread priorities, and the concept of deadlock. 4.1 Errors & Exception Types of errors, exceptions, try & catch statement, nested try statement, throws & Finally statement, build-in exceptions, chained exceptions, creating own exception, subclasses. 4.2 Multithreaded Programming Creating a Thread: By extending to thread class & by implementing runnable Interface. Life cycle of thread: Thread Methods: wait(), sleep(), notify(), resume(), suspend(), stop(). Thread exceptions, thread priority & methods, synchronization, inter-thread communication, deadlock.	08	16
05	**Java Applets & Graphics Programming** Specific Objectives: ➢ The students will be able to write interactive applets and make use of graphics in programming. ➢ They will also learn to change the background and the foreground color and to use the different fonts. 5.1 Introduction to applets Applet, Applet life cycle (skeleton), Applet tag, Adding Applet To HTML file, passing parameter to applet, embedding <applet>tags in java code, adding controls to applets. 5.2 Graphics Programming Graphics classes, lines, rectangles, ellipse, circle, arcs, polygons, color & fonts, setColor(), getColor(), setForeGround(), setBackGround(), font class, variable defined by font class: name, pointSize, size, style, font methods: getFamily(), getFont(), getFontname(), getSize(), getStyle(), getAllFonts() & getavailablefontfamilyname() of the graphics environment class.	10	20

06	**File I/O & collection frame work** Specific Objectives: ➢ The students will be able to work with File IO and collections frame work. ➢ They will also learn the concept of serialization**.** 6.1 File classes Stream classes, byte stream (FileInputStream&FileOutputStream), character stream (FileReader&FileWriter) serialization. 6.2 Introduction to collections frame work Array list, date class, set class, Iterator, map class.	04	12
	Total	**48**	**100**

List of Practical:

1. Understand the java programming environment to learn the different available tools
2. Develop a program to display all the even numbers between 1 to 20 using for loop & if statement
3. Develop a program to create a class Student with data membersstudent_name, roll_no& branch. Initialize and display values of data members.
4. Develop a program to convert a string from lowercase to uppercase using method of String class.

Practice Exercise/ Experiments

5. Develop a program that creates a vector toinsert and display five elements of different data types.
6. Develop a program to create a class "Chocholate" having data members 'ChocoName'& 'ChochoQuantity'.Derive a class "ChochoFlavor" having data member 'FlavorName'. Initialize the values for two objects of 'ChochoFlavor' class using constructor and display it.
7. Define a package named ''myPackage''to include a class named 'DisplayMsg' with one method to display some message. Develop a program to import this package in a java application and call the method defined in the package.
8. Develop a program to throw a user defined exception if the given number is not positive.

Practice Exercise/ Experiments

9. Develop a program to create two threads such that one threads displays the message "How do you do?" and the other thread displays the message "Fine, Thank you!"
10. Develop a program to create an applet to display the message "Welcome to the world of Applet".
11. Develop a program to copy the contents of the file "abc.txt" into a new file "xyz.txt".
12. Design & Develop a mini project. (With optional activity at the end)

Learning Resources:

Books:

Sr. No	Author	Title	Publisher
1	Junaid Khateel & Dr. G. T. Thampi	Computer Programming in JAVA	DreamTech Press
2	Sharnam Shah & Vaishali Shah	Core JAVA for Beginners	SPD
3	E Balagurusamy	Programming in JAVA a primer	TMH
4	Sachin Malhotra & Saurabh Chaudhary	Programming in JAVA	Oxford University Press
5	Rashmi Kanta Das	Core Java for beginners	Vikas Publishing House Pvt. Ltd