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| <b>Subject Code : 2CS2010203</b> | <b>Subject Title: PROGRAMMING WITH JAVA</b> |
| <b>Pre-requisite :</b>           | Knowledge of C/ C++ Programming             |

**Course Objective:**

The objectives of the course are to:

- Get better understanding of the concepts of Object Oriented Programming Language and use of Java.
- Develop proficiency in creating console based and GUI based applications using the Java Programming Language..
- Able to develop Applets for embedding in a web page.
- Gets a good understanding of developing multi-threaded applications using Java Programming Language.

| Teaching Scheme (Hours per week) |          |           |        | Evaluation Scheme (Marks) |                       |                       |                       |       |
|----------------------------------|----------|-----------|--------|---------------------------|-----------------------|-----------------------|-----------------------|-------|
| Lecture                          | Tutorial | Practical | Credit | Theory                    |                       | Practical             |                       | Total |
|                                  |          |           |        | University Assessment     | Continuous Assessment | University Assessment | Continuous Assessment |       |
| 4                                | -        | 3         | 7      | 60                        | 40                    | 30                    | 20                    | 150   |

| Subject Contents |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |            |
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| Sr. No           | Topic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Total Hours | Weight (%) |
| 1                | <b>Object Oriented Programming &amp; Introduction to Java:</b><br>Basics of Object Oriented Programming, Features of the Java Language, Creating an simple java application, Compiling and executing Java Application<br><b>Data Types, Variables , Arrays and String Handling:</b><br>Simple data types, Literals & Variables ,Type conversion and casting, Arrays, String and StringBuffer class, Operations on String<br><b>Operators:</b><br>Arithmetic, Bitwise, Relational, Boolean Logical, Assignment, Conditional Operators, Operator Precedence<br><b>Control Statements:</b><br>Selection Statements, Iteration Statements , Jump Statements                                                                                                                                                                                                                                                 | 9           | 25         |
| 2                | <b>Defining a class:</b><br>Various members within a class, instance variables , Methods and their overloading, Constructors and their overloading, Garbage Collection and finalize method, static variables and methods, Initializer and Class Initialize Block<br><b>Inheritance and subclassing:</b><br>Defining sub-classes, Use of super , Methods and variable binding, Using final with variables, methods and classes<br><b>Abstract Classes and Interfaces:</b><br>Abstract classes and abstract methods, Single inheritance of classes, Interfaces<br><b>Packages and use of access specifiers:</b><br>Uses of package and import statements, use of static imports , use of CLASSPATH for class loading, Access specifiers<br><b>java.util package and the Collection Framework:</b><br>Date, TimeZone and Calendar classes, Collection Framework - Set and List Interfaces<br>Map Interface | 9           | 25         |

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| <b>3</b> | <b>Exception Handling:</b><br>Exception Handling Fundamentals , Types of Exceptions , Dealing with Exceptions<br>Java's Built-in Exceptions , Defining Your Own Exceptions , Chained Exceptions<br><b>Multi-threading:</b><br>Understanding Java Thread Model, Creating a Threads, Thread Priorities, Synchronization ,<br>Inter thread Communication | 6 | 15 |
| <b>4</b> | <b>Input and Output:</b><br>I/O Basics, Reading Console Input, Writing Console Output, PrintWriter Class<br>Accessing the files & Directories, Reading and Writing Files<br><b>Java Beans:</b><br>An overview of Java Beans, Design consideration and Naming conventions of Java<br>Beans, Developing a simple bean                                   | 6 | 15 |
| <b>5</b> | <b>GUI Programming:</b><br>Overview of the AWT Components, Component Properties and Graphics Context ,<br>GUI Containers and Layout Managers, Event Handling, Building Applets                                                                                                                                                                        | 7 | 20 |

#### Course Outcome:

At the end of this course, the student would be able

- To create appropriate classes using the Java Programming Language for solving real world problems.
- To develop console based and GUI based applications using the Java Programming Language.
- To develop multi-threaded applications using the Java Programming Language
- To create Applets for simple web based application.

#### List of References:

1. Herbert Schildt, "The Complete Reference Java2", Fifth Edition ,Tata McGRAW-Hill
2. Pravin Jain, "The class of Java" Pearson Education, (2010).
3. Ivor Horton, "Beginning Java 2", JDK 5 Edition, Wiley Computer Publishing, (2007)

#### List of Experiments:

**Note:** The experiment list provided beneath is for reference only. The course teacher may Change/formulate it as per his/her methodology and requirement.

| Sr.No     | Practical Experiments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <b>1.</b> | 1.1 Write a program to find sum of all integers greater than 100 & less than 200 and are Divisible by 5.<br>1.2 Write a simple java application to print a pyramid with 5 lines. The first line has one character; second line has two characters and so on. The character to be used in the pyramid is taken as a command line argument.<br>1.3 Write a Java application which takes several command line arguments, which are supposed to be the names of students and prints output as given below:<br>Number of arguments = 3<br>1: Tom<br>2: Dick<br>3: Harry<br>1.4 Write a Java program to sort the elements of an array provided as command line in ascending order.<br>1.5 Write a java application that will take two different String objects and perform different operations on them like checking the equality of two strings, reverse the string, change case etc. |
| <b>2.</b> | 2.1 Define a class called Student. Each Student has a rollno, name, marks and percentage. Define variables, methods and constructor for the Student class. Also write a class called TestStudent; with main method to test the methods and constructors of the Student class.<br>2.2 Define a class called Cartesian Point, which has two instance variables, x and y. Provide the methods get X() and get Y() to return the values of the x and y values respectively, a method called move() which would take two integers as parameters and change the values of x and y                                                                                                                                                                                                                                                                                                       |

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|           | <p>respectively. A method called display() which would display the current values of x and y. Now overload the method move() to work with single parameter, which would set both x and y to the same values. Provide constructors with two parameters and overload to work with one parameter as well. Now define a class called Test Cartesian Point, with the main method to test the various methods in the Cartesian Point class.</p> <p>2.3 An educational institution wishes to maintain a database of its employees. The database is divided into a number of classes whose hierarchical relationships are as follows:<br/> Staff (code, name): the base class<br/> Teacher (subject, publication): child class of the Staff<br/> Officer (grade): child class of the Staff.<br/> Note that the information given in brackets specifies the minimum information required for each class. Specify all classes and define functions and constructors to create the database and retrieve information as and when needed.</p> <p>2.4 Write a program that demonstrates the concept of abstract methods and class.</p> <p>2.5 Write a program that import the user define package and access the members of the classes that contained by the package.</p> <p>2.6 Write a java application that take current date from system and perform the followings.<br/> ✓ Display the date in format like "dd-MMM-yy".<br/> ✓ Apply comparison of two dates.</p> <p>2.7 Write a program that demonstrates the concept of Vector class constructors and its all methods.</p> <p>2.8 Write a program that demonstrates the concept of HashMap constructors and its all methods.</p> <p>2.9 Write a program that demonstrates the concept of ArrayList constructors and its all methods.</p> |
| <b>3.</b> | <p>3.1 Write a java program that demonstrates the concept of multithreading.</p> <p>3.2 Write a java program which shows the use of wait() and notify() methods.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>4</b>  | <p>4.1 Write a program which lists all files in a specific directory with its name, length, last modification date. The directory name should be passed as command line argument.</p> <p>4.2 Write a program that copies all the content from one file to another.</p> <p>4.3 Write a program to compare two files. The filename must be passed as command line argument. Provide proper error messages and perform appropriate exceptions handling where ever required.</p> <p>4.4 Write program that creates simple javabeen which will give the appropriate message such as Good Morning, Good Noon or Good Night to the user based on the hours of the day.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>5</b>  | <p>5.1 Create a frame with three text Fields and two buttons add and subtract. User will enter numeric values in the Text Fields. When add button is pressed, the addition of the two values should be displayed in the third Text Field. Same the Subtract button should perform the subtraction operation</p> <p>5.2 Make a frame that contains three scroll-bars. The scroll-bars adjust the Red, Green and Blue components of the frame color.</p> <p>5.3 Write a program that create a scrolling list with several choices and informs you about selection of items using a label.</p> <p>5.4 Write a program to display the focus status of components in the label.</p> <p>5.5 Make font size and font type List Boxes and give that effect in your Label or Text Box.</p> <p>5.6 Create a user entry form for student data. User will enter roll no, name, department and semester in the form. Use Radio Button for department. When user clicks on the Insert button all the value should be displayed in the Text Area.</p> <p>5.7 Write a program to draw line, rectangle, oval and text using graphics method.</p> <p>5.8 Write a program to create the Menu within the Frame.</p> <p>5.9 Write a program to display Load and Save file dialog &amp; display the name of a selected file from the file dialog.</p> <p>5.10 Write a program to explain the concept of adapter class for window listener.</p> <p>5.11 Create an applet which has a TextField to accept a URL string, and displays the document of the URL string in a new browser window.</p>                                                                                                                                                                                                            |