Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester I
MCA-11: Object Oriented Technology

Rationale:

1. To emphasize on the use of object oriented technology and the paradigm (Core Java is taken as the platform to describe the technology) and the importance of practical oriented learning.
2. To develop proficiency among students in creating console based and GUI based applications using the Java Programming Language.
3. To give the flavor of “Write Once, Run Anywhere” concept to the students
4. To give students a good understanding of developing multi-threaded applications using the Java Programming Language.

Prerequisite: Working/Basic knowledge of Object Oriented Programming Language (C++)

Learning Outcomes:

At the end of the course, student will be able to:

1. Become comfortable with object oriented programming: Learn to think in objects
2. Understand the use of APIs in robust, enterprise three level application developments.
3. Understand the essentials of the Java class library, and understand how to learn about other parts of the library when you need them.
4. Develop event driven Graphical User Interface (GUI) programming

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test,

Regular Attendance, etc.

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Contents:

UNIT – I : JAVA FUNDAMENTALS [20%]

Java’s magic : The Bytecode, A First Simple Program, Lexical Issues, Difference between object- oriented programming language and object-based programming language.Data Types, Variables, Arrays ,Wrapper Classes, java.util classes: Date, Calander, Math, Scanner , Operator, Operator Precedence, Using Parenthesis, Control Statements

UNIT – II : OOPS CONCEPTS [20%]

Class FundamentalsDeclaring objects, Introducing methods, Constructors, The this keyword, Garbage collection, The finalize() method, Overloading methods, Understanding static, Introducing final, Using command line arguments Inheritance Basics, Using super, Method overriding, Dynamic Method Dispatch, Using Abstract Classes

Packages - Defining a Package, Access Protection, Importing Packages, Interfaces – Defining an Interface, Implementing Interfaces

EXCEPTION HANDLING

Exception handling fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, Java's Built-in exceptions, Creating your own exception sub classes.

UNIT – III : INPUT OUTPUT AND STRING [20%]

INPUT OUTPUT

I/O Basics, Reading Console Input – Reading characters, Reading Strings, Reading & Writing files, File - Directories.

INPUT OUTPUT: Exploring java.io

The Stream Classes, The Byte streams – InputStream, OutputStream, FileInputStream, FileOutputStream, Buffered Byte streams- BufferedInputStream, BufferedOutputStream, The Character streams - Reader, Writer, FileReader, FileWriter, BufferedReader, BufferedWriter. **STRING HANDLING**

The String Constructors, String Length, Special String Operations - String Literals, String Concatenation, Character Extraction - charAt(), getChars(), String Comparison - equals() and equalsIgnoreCase(), compareTo(), Searching Strings, Modifying a String, StringBuffer – StringBuffer Constructors, length() and capacity(), append(), insert(), delete(), deleteCharAt(), replace().

UNIT – IV [20%]

SYNCHRONIZATION IN MULTITHREADED PROGRAMMING

Java Thread Model, Creating a Thread – Implementing Runnable, Extending Thread, Thread Priorities, Synchronization – using synchronized methods, Inter thread Communication, Suspending, resuming and Stopping Threads.

THE COLLECTIONS FRAMEWORK

Generics types, Collections Overview, The Collection Interfaces - The List Interface, The Set Interface - HashSet , TreeSet Map Interface- HashMap, TreeMap, The Collection Classes – ArrayList Class, HashSet Class.

UNIT – V [20%]

SWING FRAMEWORK

The Origins of Swing, Two Key Swing Features, Components & Containers - Understanding Layout Managers – FlowLayout, BorderLayout, GridLayout, CardLayout, GridBagLayout, The Swing Packages, A Simple Swing Application, differentiate Swing & Applet, GUI Events-Event Delegation Model, and Exploring Swing Components.

ANNOTATION IN JAVA

What is Annotations,where we can use annotations? built-in annotations in java.

Text Book(s):

1. The Complete Reference Java, Herbert Schildt, TMH, Seventh Edition

Unit wise Coverage from Text book(s):

Unit 1: Chapter: 1,2,3,16(Page:386 to 398,415),18, 4,5,6
Unit 2: Chapter: 6 (Continue),7,8,9
Unit 3: Chapter: 13,19,15
Unit 4: Chapter: 10,11(Full)
Unit 5: Chapter: 17(Selected Topics),22,29,30

Other Reference Books:

1. Java Programming ,Hari Mohan Pandey,Pearson Publication
2. The Java Hand Book, Patrick Naughton, TMH, Eleventh Reprint, 2002

Note: Practicals of Unit 1 should be developed using command prompt and Unit 2 onwards IDE like Eclipse or NetBeans can be used

Experiment List

UNIT-1:

- Observe the interaction involved in the process of booking a bus ticket. Identify the various objects involved and the interaction between the objects in order to solve the problem of bus ticket booking.
- Demonstration of wrapper classes and the related data types
- Convert binary number to decimal equivalent and print it.
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- Demonstration of logical, relational and shift operators.

UNIT-2:

- Write a program to make use of a parameterized method inside a class. Take the following case: Create a class Box and define a method in this class which will return the volume of the box. Initialize two objects for your class and print out the volumes respectively.
- Write a program to store values in one array, sort it and store it in another array.
- Display both the arrays. (Write function for sorting. Apply Selection sort.)
- Write a super class called SquareArea with a method named area (double area) which calculates the area of square. Create one subclass calls CubeArea with an overriding method named area (double area) which calculates the area of cube.
- Write a program to calculate the simple interest and compound interest using abstract class as well as interface.
- Create Package for any one of the above programs or take a case study.

UNIT-3:

- Write a program that takes the marks of subjects from user, calculates the percentage and displays the result on screen. (Use I/O classes and its methods)
- Write a program that will count the number of characters, words and lines present in a file.
- Write an application that reads two different strings from two different files and write the concatenated string into another file. All file names must be given as command line arguments.
- Taking a case study show the demo of various string methods using mutable and immutable classes.

UNIT-4:

- Write a program to sort the given set of integers in ascending order. Include a try block to find the array out of bounds exception and catch it.
- Write a program to create a Student class. If the mark is greater than 100 it must create an exception called MarkOutofBounds Exception and throw it.
- Write an application illustrating how a program can wait for threads to complete. The ThreadM class extends Thread class and displays a string every second for 10 iterations. The ThreadN class also extends Thread class and displays a string every two seconds for 20 iterations. The main( ) method creates and starts these two threads and displays a message after they have both completed.
- Write an application that demonstrates two threads at different priorities showing the lowest and highest priority.

UNIT-5:

- Design a text editor similar to notepad using swing.
- Write java application using slider control to change the current Fahrenheit to centigrade and display the result in Jlabel
- Taking a case study show the use of all the components and containers