Marwadi University

Syllabus for Bachelor of Technology

Information and Communication Technology

Subject Code: 01CT0105

Subject Name: Object Oriented Programming

B. Tech. Year – I (Semester II)

Objectives:

1. To gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. To understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms
3. To understand the principles of inheritance, packages and interfaces
4. To understand Multithreading and I/O files in Java
5. To understand the fundamental of AWT, SWING and Graphics based window
6. To understands Collection of classes and basic java utensils packages

Credits Earned: 04 Credits

Course Outcomes: After completion of this course, student will be able to:

1. List and use Object Oriented Programming concepts for problem solving
2. Write Java application programs using OOP principles and proper program structuring
3. Produce design stability for various applications- by applying exception handling and inheritance
4. Use inheritance, package and interfaces in the applications of Java
5. Use multithreading to reduce the wastage of CPU time
6. Create GUI based window with user based input and numerical calculations with MVC architecture.
7. Use I/O files for designing applications using Java

Pre-requisite of course: Basic knowledge of C

Teaching and Examination Scheme:

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial / Practical Marks		Total Marks
				E	I		V	T	
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term Work	
3	0	2	4	50	30	20	25	25	150

Contents:

Unit	Topics	Contact Hours
1	**Introduction to object-oriented programming** Object oriented paradigm, object and classes, data abstraction and encapsulation, inheritance, polymorphism, dynamic binding, benefits and application of OOP.	3
2	**Java evaluation and overview** Java evaluation: Java History, Java features, difference with other language, java with internet, www and web browsers, Java environment, JDK Java overview: Java program structure, java program implementation on various IDE's like NetBeans and Eclipse, Byte Code and JVM.	2
3	**Strings** String class, String Buffer class, Operations on string, Command line argument, Use of Wrapper Class.	2
4	**Object, Classes and Methods** Introduction to class, objects, members data and member functions, declaration of fields and methods, accessing class members, constructors and destructors, method overloading, static members, Inheritance, method overriding, final variable, final member, final class, finalizer methods, Abstract method and class, Visibility modifiers in classes.	6
5	**Interfaces (Multiple Inheritance)** Introduction to interface, declaration of interface, extending interface, implementing interface, accessing interface variables.	4
6	**Java Packages** Introduction and declaration of Packages in Java, creating and accessing package, adding class to a package, static import.	2
7	**Errors and Exception Handling in Java** Types of Errors, Exceptions, syntax of exception handling code, single and multiple catch statements, importance and execution of throws and Finally statement, Built in Exception, Custom exception, Throwable Class.	4
8	**Collection Framework** Collection Framework, Collection interface, Set and List interfaces, Map interface Generics in the Collection Framework	3
9	**Multithreaded Programming** Introduction to thread, Creating and Extending thread class, stopping and blocking thread class, Life cycle of thread, thread exception, thread priority, Synchronization, implementing "Runnable" interface, Introduction to JavaBeans and Network Programming	5

10	**Managing I/O file in Java** Concept of Stream and Stream classes, Byte Stream, Input/output Stream, Characters Stream, Reader Stream, Writer Stream, File Class, File Input Stream, File Output Stream, Input Stream Reader, Output Stream Writer	3
11	**GUI** Comparing AWT and swing features, AWT Components, Overview of the AWT components, Component properties, Graphics context, Containers, Container class, Layout Managers, Top-level containers, Window class, Decorated windows Frame and Dialog, Panel class, Events, Event Delegation Model, AWT Events, Adapter classes, Swing and MVC, J component, J option Pane, Showing Message, Confirm and Input Dialogs	8
	Total	42

Suggested Text books / Reference books:

1. Programming with Java A Primer, E.Balaguruswamy, Fourthedition, Mc Grawhill.
2. The Complete Reference, Java 2, Herbert Schild, Tata McGraw-Hill
3. Java Fundamentals A comprehensive introduction, Herbert Schildt, Dale Skrien, McGraw Hill Education.
4. Object Oriented Modeling and Design with UML, Michael Blaha and James Rambaugh, Pearson

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
15%	15%	30%	15%	10%	15%

Suggested List of Experiments:

1. Use eclipse or Netbean platform and acquaint with the various menus, create a test project, add a test class and run it see how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.
3. Develop an applet that displays a simple message
4. Develop an Applet that receives an integer in one text field & compute its factorial value &

returns it in another text filed when the button "Compute" is clicked

5. Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box
6. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
7. Write a java program that connects to a database using JDBC and does add, deletes, modify and retrieve operations
8. Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown.
9. Write a java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea( ) that prints the area of the given shape.
10. Suppose that a table named Table.txt is stored in a text file. The first line in the file header and the remaining lines correspond to row in the table. The elements are separated by commas. Write a Java program to display the table using labels in grid layout.
11. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes)
12. Write a java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t).it takes a name or phone number as input and prints the corresponding other value from the hash table(hint: use hash tables)
13. Implement the above program with database instead of a text file.
14. Write a java program that takes tab separated data (one record per line) from a text file and inserts them into a database
15. Write a java program that prints the meta-data of a given table.

Additional Experiments:

1. Write a Java program that prints all real solutions to the quadratic equation ax 2 +bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2 -4ac is negative, display a message stating that there are no real solutions?
2. The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1, 1. Every subsequent value is the sum of the 2 values preceding it. Write a Java program that uses both recursive and non-recursive functions to print the nth value of the Fibonacci sequence?

3. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer?
4. Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome?
5. Write a Java program for sorting a given list of names in ascending order?
6. Write a Java program to multiply two given matrices?
7. Write a Java program that reads a line of integers and then displays each integer and the sum of all integers. (use StringTokenizer class)?
8. Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes?
9. Write a Java program that reads a file and displays the file on the screen, with a line number before each line?
10. Write a Java program that displays the number of characters, lines and words in a text.

Supplementary Resources:

1. https://ocw.mit.edu/courses/electrical...and.../6...programming.../lecture-14/
2. https://beginnersbook.com/2013/04/oops-concepts/
3. www.oracle.com/technetwork/java/oo-140949.html
4. nptel.ac.in/courses/106106147/3