CLUSTER UNIVERSITY SRINAGAR

SYLLABUS (FYUP UNDER NEP 2020)

Offered By Department of INFORMATION TECHNOLOGY

Semester 3rd (Minor Course)

Course Title: Understanding OOPs through Java

Course Code: UGICT22N301 **Max. Marks 150**
Credits: 6 (Theory: 4, Practical: 2) **Theory External: 80; Min Marks: 32**
Contact Hrs: 120 (Theory: 60, Practical: 60) **Theory Internal (Continuous Assessment): 20 Marks, Min Marks: 08**
Practical Experimental Basis= 30, Min. Marks: 12
Practical Experimental (Continuous assessment) = 20, Min. Marks: 08

Objectives:

1. To understand the basic concepts and fundamentals of platform independent object-oriented language.
2. To demonstrate skills in writing programs using exception handling techniques and multithreading.
3. To understand streams and efficient user interface design techniques.

Learning Outcomes:

After successful completion of the course, the students should be able to
1. Use the syntax and semantics of java programming language and basic concepts of OOP.
2. Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
3. Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.
4. Design event driven GUI and web related applications.

UNIT 1: **15 Hrs**

An overview to Java, Comparison with other languages (C & C++), Java and Internet, Features of Java, Introduction to Java Virtual machine, Object Oriented Programming Concepts (Abstraction, Encapsulation, Inheritance, Polymorphism). Data types: Integers, Floating point, Character type, Boolean. Variables: Assignment, Initialization and Conversions. Operators: Arithmetic, Assignment, Modulus, Relational, Boolean, Bitwise, Precedence Summary, Unicode Character Set.

UNIT 2: **15 Hrs**

Arrays: Single and Multidimensional. Input, Output, Error Statements, Control Statements and Looping Structures, Typecasting.
Classes and Inheritance: Classes, Objects, Constructors, Overloading Method, Access Control, Static and Final Keywords, Nested and Inner Classes, Abstract Class, Object Class, Inheritance, Overriding Methods, Using Super, Dynamic method Dispatch. Packages, Access Protection, Importing Packages.

UNIT 3: **15 Hrs**

Defining and implementing interfaces. Exception Handling: Fundamentals of Exceptions, Exception types, Using Try and Catch, Throwing Exceptions, Built-in Exceptions in Java, User defined Exceptions. Multithreaded Programming: Java Thread Model, Creating & working with threads, Thread priorities, Inter Thread Communication, Introduction to Synchronization and Dead locks.

UNIT 4: **15 Hrs**

String Handling: String Constructor, String Operations, Character Extraction, String Searching & Comparison, String Buffer Class, String Buffer v/s String Class. Lang Package: Simple Type Wrappers, Runtime & Introduction to Memory Management.
Introduction, Working with AWT Controls and Layout Managers, Event Handling. Introduction to Swings, JDBC

Practical/Lab Course, Credits=2) **60 Hrs**

1. Write a program in Java to generate first n prime numbers.
2. Write a program in Java to find maximum of three numbers using conditional operator.
3. Write a program in Java to reverse the digits of a number using while loop.
4. Write a java program to calculate a factorial of a number.
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. WAP to create a simple class to find the area and perimeter of a rectangle using super keyword also show use of this keyword in class.
7. WAP to design a class using abstract methods and classes.
8. WAP to show usage of access modifier in java.
9. WAP to sort the elements of an array in java.
10. WAP to implement Matrix operations using multidimensional arrays in Java.
11. Write a program in Java to develop overloaded constructor.
12. WAP to develop the copy constructor to create a new object with the state of the existing object.
13. Write a program in Java to demonstrate the use of 'final' keyword in the field declaration. How it is accessed using the objects.
14. Write a program in Java to demonstrate single inheritance, multilevel inheritance and hierarchical inheritance.
15. WAP to implement Method overriding.
16. Write a program in Java in which a subclass constructor invokes the constructor of the super class and instantiate the values.
17. Write a program in Java to demonstrate use of final class.
18. Write a program in Java to demonstrate multiple try block and multiple catch exception.
19. WAP that implement the nested try statements.
20. WAP to handle the exception using try and multiple catch block.
21. WAP to handle the user defined exception using throw keyword.
22. WAP to create a package that access the member of external class as well as same package.
23. WAP that import the user define package and access the member variable of classes that is contained by package.
24. WAP to show implementation of interfaces.
25. Write a java AWT program to perform various string operations
26. WAP TO create multiple threads in Java
27. WAP to implement thread using runnable interface.
28. WAP to design a String class that perform Method (Equal, reverse the string, change case)
29. WAP to use string buffer class to concatenate strings in Java
30. WAP to perform basic calculator operations in java.

SUGGESTED READING:

1. Programming with Java by E.Balaguruswamy
2. Java The complete Reference by Herbert schildt.
3. Advanced Java programming by Uttam k. Roy.
4. Java How to Program by Paul Deitel, Harvey Deitel