Programming II (Java)

Course Code: CIT1015
Year : 1
Semester : 2
Credit Hour: (2TH + 1 PR)

Course Objectives:

The purpose of the course is to provide fundamental knowledge of Object Oriented Programming. This course focuses on enhancing the computer programming skills of the students following Object Oriented Programming Principles. It also aims the students to understand and develop event driven graphical user interfaces (GUIs) applications, database applications and network programs.

Course Content:

1. **Introduction to Object Oriented Programming:**
   Object Oriented Programming concepts and benefits, Difference from Procedure Oriented Programming (Java versus C/C++) **4hrs**

2. **Introduction to Java:**
   History of Java, Features of Java, Java Development Kit (JDK), bytecode **3hrs**

3. **Java Basics:**
   Main Program Execution, Main Method, Class and Objects, Variable, Constants, Data types, Array and String **5hrs**

4. **Operators and Control Flow:**
   Operators (arithmetic, logical, relational, bitwise,ternary assignment), control flow(If-else, switch, for, while, break, continue) **4hrs**

5. **Inheritance, Package and Interface:**
   Inheritance, Abstract classes, Access Protection , Inheritance , Package and Interface, Interfaces versus Abstract Classes **6hrs**

6. **Exceptions and streams:**
   Exceptions, handling error and exception, Exception Classes, Common Exceptions Examples, Exception Handling and Debugging Techniques **5hrs**

7. **Java I/O and streams:**
   java.io, Streams Concept, Stream Classes, Readers and Writers, Random Access Files, Serialization . **5hrs**

8. **Event Handling:**
   Event concepts and Classes, Event Hierarchy and Delegation Model, Event Listener; Event-Handling, Adapter Classes, Inner Classes, Anonymous Classes **6hrs**

9. **GUI with AWT & Swing**
   Overview and difference between Swing and AWT , Components and Containers, Separating GUI and Application code, Multicasting, Layout management **7hrs**

Laboratory Work:

1. Programming examples for each chapters (from chapter 2 to 9) . Minimum practical sessions include:
   (a) Introduction to Basic Java Program Structure, Simple Programs without classes and methods.
   (b) Program to learn the concepts of classes, objects and constructors.
   (c) To illustrate Inheritance and Abstract classes

(d) To illustrate interface and Package

(e) To illustrate the java programs using Exception handling (e.g. try catch throw) and Stream (e.g. byte, character, etc.)

(f) To illustrate Multithreading concept in java.

(g) To illustrate GUI components using AWT and Swing

(h) To illustrate Layout management and Event Handling

(i) To illustrate Graphics and multimedia example with text, image and font.

2. Use of open source platforms preferable

3. Course Project with a maximum 4 students in a group should submit a group project before the final exam.

References:

1. Devkota B., 2016, Java Programming Basic,MK Publishers

2. Balagurusamy E., 2019, Programming in Java: Sixth Edition, Tata McGraw Hill

3. Dietel H.M and Dietel P.J., 2017, Java: How to Program, Eleventh Edition, Pearson Education Asia

4. Cay S. Horstmann, 2019, Big Java, John Wiley & Sons

5. Sierra, k. and Bates, B., Head First Java, O'Reilly Media, Incorporated