CS-22: Programming with Java

Objectives:

- To provide fundamental concepts of Object-Oriented Programming and familiar with Java environment and its applications.
- To be able to understand control structures, classes, methods and argument passing and iteration graphical user interface basics programming and documentation style.

Prerequisites:

- Basic knowledge of object-oriented approach in programming with basic skills using Java.

Unit No.	Topic	Detail
1	**History, Introduction and Language Basics, Classes and Objects**	• History and Features of Java • Java Editions • JDK, JVM and JRE • JDK Tools • Compiling and Executing basic Java Program • Java IDE (NetBeans and Eclipse) • Data Type (Integer, Float, Character, Boolean) • Java Tokens: Keyword, Literal, Identifier, Whitespace, Separators, Comments, Operators: • Operators: Arithmetic, Relational, Boolean Logical, Bitwise Logical, Assignment, Unary, Shift, Special operators • Java Keywords (assert, strictfp, enum) • Type Casting - Decision Statements (if, switch) • Looping Statements (for, while, do..while) • Jumping Statements (break, continue, return) • Array (One Dim., Rectangular, Jagged) • Command Line Argument Array
		• OOP Concepts (Class, Object, Encapsulation, Inheritance, Polymorphism) • Creating and using Class with members • Constructor • finalize() method • Static and Non-Static Members • Overloading (Constructor & Method) • Varargs, IIB (Instance Initialization Block) in Java

2	**Inheritance, Java Packages**	• Universal Class (Object Class) • Access Specifiers (public, private, protected, default, private protected) • Constructors in inheritance • Method Overriding • Interface, Object Cloning, • Nested and Inner Class • Abstract and Final Class • Normal import and Static Import • Introduction to Java API Packages and imp. Classes o java.lang, o java.util o java.io, o java.net o java.awt, o java.awt.event o java.applet, o java.swing • java.lang Package Classes (Math, Wrapper Classes, String, StringBuffer) • java.util Package Classes (Random, Date, GregorianCalendar, StringTokenizer, Collection in Java • Vector, HashTable, LinkedList, SortedSet, Stack, Queue, Map • Creating and Using UserDefined package and sub-package
3	**Exception Handling, Threading and Streams (Input and Output)**	• Introduction to exception handling • try, catch, finally, throw, throws • Creating user defined Exception class - Thread and its Life Cycle (Thread States) • Thread Class and its methods • Synchronization in Multiple Threads (Multithreading) • Deamon Thread, Non-Deamon Thread
		• Stream and its types (Input, Output, Character, Byte) • File and RandomAccessFile Class • Reading and Writing through Character Stream Classes (FileReader, BufferedReader, FileWriter, BufferedWriter) • Reading and Writing through Byte Stream Classes (InputStream, FileInputStream, DataInputStream, OutputStream, FileOutputStream, DataOutputStream) • StreamTokenizer Class • Piped Streams, Bridge Classes: InputStreamReader and OutputStreamWriter • ObjectInputStream, ObjectOutputStream
4	**JavaFx Basics and**	• Basic Structure of JAVAFX program,

	Event-driven programming and animations	• Panes, • UI Control and Shapes, • Property binding, • the Color and the Font class, • the Image and Image-View class, • layout panes and shapes, • Events and Events sources, • Registering Handlers and Handling Events, • Inner Classes, anonymous inner class handlers, • mouse and key events, • listeners for observable objects, • animation
5	**JavaFx UI controls and multimedia**	• Labeled and Label • Button • Checkbox • Radiobutton • Textfield • Textarea • Combobox • Listview • Scrollbar • Slider • Video and Audio

Seminar - 5 Lectures
Expert Talk - 5 Lectures
Test - 5 Lectures

Total Lectures 60 + 15 = 75

Reference Books:

- Java: A Beginner's Guide – Jul 2014 by Herbert Schildt
- Java Programming (Oracle Press) by Poornachandra Sarang
- Java The Complete Reference, 8th Edition – by Herbert Schildt
- Ivor Horton's "Beginning Java 2" JDK 5 Edition, Wiley Computer Publishing.
- Ken Arnold, James Gosling, David Holmes, "The Java Programming Language", Addison-Wesley Pearson Education
- JavaFx A Beginners Guide by J. F. DiMarzio, McGraw Hill Computing
- Getting Started with JavaFx by Oracle: https://docs.oracle.com/javase/8/javafx/JFXST.pdf
- James Gosling, Bill Joy, Guy Steele, Gilad Bracha, "The Java Language Specifications", Addison-Wesley Pearson Education (3rd edition) Download at http://docs.oracle.com/javase/specs/

Course outcomes:

- Understand basic concepts and Java Programming Constructs
- Demonstrate Object Oriented Programming Concepts using JAVA
- Develop robust application by demonstrating professionally acceptable coding
- Design attractive user interface using AWT