Course Title: Advanced Java Programming   **Full Marks: 60+20+20**
Course Code: CSC-403   **Pass Marks: 24+8+8**
Credit Hours: 3
Nature of Course: Theory + Lab

Course Synopsis: A study in Java language techniques beyond the introductory course. Emphasis will include GUI and event-driven programming, Database Connectivity, Socket Programming, Remove Method Invocation and JSP Technology.

Goal: The purpose of this course is to present the concept of GUI programming and JDBC, Socket programming and remote objects, and JSP Technology. Since software components are best learned by implementation, each student will complete a project independently which will involve the design and implementation of three software components.

Prerequisites: Any one course in Object oriented Programming.

Unit 1: Programming in Java   **8 Hrs.**

1.1 Introduction to Java: Java Architecture, Advantages of Java, PATH and CLASSPATH variables, Compiling and Running Java Programs
1.2 Class and Object: Creating Classes, Interfaces, Creating Objects, Access Modifiers, Arrays, Packages, Inheritance
1.3 Exception Handling and Threading: Try, Catch, Finally, Throws, Creating Multithreaded Programs, Thread Life Cycle
1.4 File IO: Byte Stream Classes (FileInputStream and FileOutputStream), Character Stream Classes (FileReader and File Writer), Random Access File Class

Unit 2: User Interface Components with Swing   **10 Hrs.**

2.1 Swing and MVC Design Patterns: Design Pattern, MVC Pattern, MVC Analysis of Swing Buttons
2.2 Layout Management: Border Layout, Grid layout, Gridbag Layout, Group Layout, Using NO layout managers, Custom layout Managers
2.3 Text Input: Text Fields, Password Fields, Text Areas, Scroll Pane, Label and Labeling Components
2.4 Choice Components: Check Boxes, Radio Buttons, Borders, Combo boxes, Sliders
2.5 Menus: Menu Building, Icons in Menu Items, Check box and Radio Buttons in Menu Items, op-up Menus, Keyboard Mnemonics and Accelerators, Enabling and Disabling menu Items, Toolbars, Tooltips
2.6 Dialog Boxes: Option Dialogs, Creating Dialogs, Data Exchange, File Choosers, Color Choosers
2.7 Components Organizers: split Panes, Tabbed Panes, Desktop Panes and Internal Frames, Cascading and Tiling

2.8 Advance Swing Components: List, Trees, Tables, Progress Bars

Unit 3: Event Handling   4 Hrs.

1.1 Introduction: Standard Event Handling, Using Delegated Class, Using Action Commands, Listener Interfaces, Adapter Classes

1.2 Handling Events: Action Events, Key Events, Focus Events, Window Event, Mouse Event, Item Events

Unit 4: Database Connectivity   4 Hrs.

4.1 Design of JDBC: Driver Types, Typical Uses of JDBC

4.2 JDBC Configuration: Database URLs, Driver JAR Files, Starting Database, Registering Driver Class, Connecting to the database

4.3 Executing SZL Statements: Managing Connections, Statements, Result Set, SQL Exceptions, Populating Database

4.4 Query Execution: Prepared Statements, Reading and Writing LOBs, SQL Escapes, Multiple Results, Scrollable Result Sets Updatable Result Sets, Row Sets and Cached Row Sets, Transactions

Unit 5: Network Programming   5 Hrs.

5.1 Networking Basics: Transmission control Protocol (TCP), User Datagram Protocol (UDP), Ports, IP Address Network Classes in JDK

5.2 Working with URLs: Connecting to URLs, Reading Directly from URLs, InetAddress Class

5.3 Sockets: TCP Sockets, UDP Sockets, Serving Multiple Clients, Half Close, Interruptible Sockets, Sending Email

Unit 6: Java Beans   3 Hrs.

6.1 Introduction: Creating, Updating and Reading From JAR Files, Java Beans, Advantages of Java Beans, Class Vs. Beans, BDK and Bean Box

6.2 Java Bean: Creating a Java Bean, Creating a Bean Mainfest File, Creating a Bean JAR File, Using a New Bean, Adding Controls to Beans, Giving a Bean Properties, Creating Bound Properties, Giving a Bean Methods, Giving a Bean an Icon

Unit 7: Servlets and Java Server pages   8Hrs.

1.1 Servlets: Introduction to Servlets, Life Cycle of Servlets, Java Servlets Development Kit, Creating, Compiling and running servlets, The servlets API (javax.servlet package), Reading the servlet Parameters, Reading Initialization Parameter, The javax.servlet.http.Package, Handling HTTP Request and Response (GET/POST Request), Using Cookies, Session Tracking

1.2 Java Server Pages: Advantages of JSP technology (Comparison with ASP/Servlet), JSP Architecture, JSP Access Model, JSP Implicit Object, Object Scope, Synchronization Issue, Exception Handling, Session management, Creating and Processing Forms

Unit 8: RMI and CORBA   **3 Hrs.**

    8.1 Remote Method Invocation: Introduction of RMI, Architecture of RMI, Remote Objects, Creating and Executing RMI Applications

    8.2 CORBA: Introduction to CORBA, Architecture of CORBA, functioning of CORBA Applications, CORBA Services

Text Books:

1. Cay Horstmann and Grazy Cornell, Core Java Volume – I Fundamentals, Eighth Edition
2. Cay Hortsmann and Grazy Cornell, Core Java Volume – II Advance Features, Eighth Edition

Reference Books:

1. Steven Holzner, Java 2 Programming – AWT, Swing, XML and Java Beans Black Book, Dreamtech Press
2. Pallvi Jain and Shadab Siddiqui, J2ee Professional Projects, Premier Press

Laboratory Work:
Student should design at least two Projects. Desktop Application (Address Book, Library System, etc.), Simple network Application (e.g. Chatting Application) or Simple Web Applications (online banking application, Online Music Application, etc.)

Instructions for Laboratory Work:
1. Programming Assignments on Objects/Classes, Exception Handling, File I/O, Multithreading etc. [5 Hrs.]
2. Programming Assignments to intensive applications design using Swing components, Event Handling, Database Connectivity [10 Hrs.]
3. Programming assignments to develop the network applications such as Client-Server Program using TCP and UDP, Multithreading Server to Server multiple clients, E-mail Sending Applications. [5 Hrs.]
4. Programming Assignments to create Java based Web Applications, Distributed Applications and customizable components using Java Servlets/JSP, RMI, Java Beans, etc. [5 Hrs.]
5. Stand alone or Web based mini Project using any Java IDEs and Java Frameworks [15 Hrs.]

Model Question (Advance Java Programming)

Tribhuvan University
Institute of Science and Technology
B.Sc. CSIT 7th Semester

Subject: Advance Java Programming

Course No.: CSC-403   **FM: 60**

Time: 3 Hrs.   **PM: 24**

Section A

Attempt all Questions. [8×5=40]

1. Why concept of interface is important? How multiple-inheritance is supported by interface? Explain with suitable example.
2. When the exception handling constructs throws and finally is important? Explain both of them with suitable example.
3. Write a program to read ID, Name, address, salary of twenty students from keyboard and write in into the file "emp.doc". Again read records of the employees and display records of those students whose salary is more than 25000.
4. Why adapter classes are important? Compare it with listener interface with suitable example.
5. Write a program using RMI to find sum and difference of two numbers. Methods sum and difference should to invoke from some remote machine.
6. How java beans are different form java classes? Explain bean writing process.
7. Write a java program using TCP that enables chatting between client and server.
8. What is internal frame? Write a program that displays an internal frame within some parent frame.

Section B

Attempt all Questions. [10×2=40]

9. Write a program to Design an interface containing fields User ID, Password and Account type, and buttons login, cancel, edit by mixing border layout and flow layout. Add events handling to the button login and cancel such that clicking in login checks for matching user id and password in the database and opens another window if login is successful and displays appropriate message if login is not successful. Clicking in cancel terminates our program.
10. Compare and contrast between Servlets and Java Server pages? How web server responds to servlets and JSP page? Write down sample example. Handling HTTP Request and Response using servlets.