SCHOOL OF TECHNOLOGY

DEPARTMENT OF SOFTWARE DEVELOPMENT & INFORMATION SYSTEMS

BACHELOR OF SCIENCE IN SOFTWARE DEVELOPMENT

Course Title: Advanced Java Programming
Code: BSD 2304
Meeting Time: Tuesday, 7:00 AM
Total Contact Hours: 42 Hours
Pre-requisite: Java Programming

Purpose / Aim

This course is designed to help students develop and test distributed Java applications using technologies such as JavaBeans, TCP/IP socket programming, and servlets.

Course Objectives

By the end of this course, students should be able to:

1. Develop error-free, well-documented graphical user interface (GUI) Java programs.
2. Build distributed applications using Remote Method Invocation (RMI) and TCP/IP socket programming.
3. Implement Java applications using JavaBeans.
4. Develop server-side Java programs, particularly in the form of servlets.

Week	Topic	Learning Outcomes	Activities
1	GUI Programming: Swing & AWT Components	- Understand Swing and AWT components - Explore JComponent and its subclasses - Learn event handling in GUI programs	- Lecture on Swing vs. AWT - Practice using components like JButton, JLabel, JTextField - Hands-on exercise: Develop a simple Swing application
2	Event Handling & Swing Applets	- Write event-driven applications - Implement Swing applets using JFC - Understand the event delegation model	- Create Swing applets with event handling - Lab: Create a Swing calculator with basic event handling
3	Introduction to Servlets	- Define servlets and understand their lifecycle - Learn advantages of servlets - Compile and deploy a servlet	- Develop a simple HelloWorld servlet - Practical: Deploying servlets on a local server and testing with browsers
4	Session Tracking & InterServlet Communication	- Implement session tracking in servlets	- Lab: Implement session tracking using cookies - Practical: Build a multi-servlet application

		- Facilitate communication between servlets	that communicates between different servlets
5	JDBC & Database Integration	- Understand JDBC API - Use JDBC drivers - Implement database queries using JDBC	- Hands-on: Establish database connections using JDBC - Write SQL queries to retrieve and update data from a database
6	Working with ResultSet & Stored Procedures	- Explore ResultSet and ResultSetMetaData - Create and call stored procedures using JDBC	- Lab: Retrieve data using ResultSet object - Practical: Implement stored procedures and access them using Java applications
7	Introduction to JavaBeans	- Define JavaBeans and understand their importance - Learn the software component model - Create and customize JavaBeans	- Lecture: Overview of JavaBeans - Lab: Create a custom JavaBean with properties and events
8	JavaBeans Properties & Event Handling	- Understand properties and events in JavaBeans - Implement various types of properties	- Practical: Develop JavaBeans with custom properties - Lab: Implement event handling in JavaBeans
9	Remote Method Invocation (RMI)	- Understand distributed applications - Implement RMI client and server - Outline RMI architecture and packages	- Lecture: RMI structure and steps to implement - Lab: Create an RMI-based distributed application
10	Implementing RMI on Remote & Local Hosts	- Create and deploy RMI applications on remote and local servers - Explore parameter passing in RMI	- Lab: Implement a remote object and test it on different hosts - Practical: Build a distributed calculator using RMI
11	Network Programming: Clients & Servers	- Learn client-server architecture - Use java.net package for network communication - Understand Sockets and ServerSockets	- Practical: Build a simple server-client communication system using Sockets - Lecture: Ports, addresses, and protocols in network programming
12	Advanced Network Programming	- Explore concurrent servers - Use URL and URLConnection classes for web-related applications	- Lab: Create a multi-threaded server using ServerSocket - Practical: Use URLConnection class to interact with web resources
13	Input/Output Streams & Multimedia Programming	- Understand Java I/O classes and serialization - Explore multimedia programming for image processing	- Lab: Work with File I/O and stream classes - Practical: Implement a simple image processing tool in Java

Learning & Teaching Methods

- **Lectures**: Concept delivery and theory

- **Tutorials**: Hands-on practice and application
- **Laboratory Exercises**: Practical coding exercises, testing, and debugging distributed Java applications

---

Instructional Tools

- Classroom with audio-visual aids
- Computer laboratory with internet access

Course Assessment

Type	**Weighting (%)**
Examination	70%
Continuous Assessment (Assignments, Lab Work, Quizzes)	30%
Total	100%

Recommended Reading

---

1. **Holzner, Steven (2005)** – *JAVA 2 Programming Black Book*, DreamTech
2. **Wigglesworth, L., & Lumby, D. (2002)** – *JAVA Programming*, NCC
3. **Farrell, Joyce (2004)** – *Java Programming, Second Edition*, Thompson Course Technology

---

Additional Resources

- Various multimedia systems and electronic information resources
- Application manuals, URL searches, and relevant journals as prescribed by the lecturer.