Woldia University
Institute of Technology
School of Computing

Course Title	**Advanced Programming**
Course Code	SEng3062
CP	6 (3hr Lecture, 3hr Labl)
Pre-requisites	Object-Oriented Programming (SEng2062)
Target group	Bsc. Software Engineering, Year III, Semester II
Instructor	Name: Demeke G. Office: GB-G+3-Programming Chair Office Email: demekeg@wldu.edu.et

Course Description

This course is designed to provide a comprehensive understanding of Java programming, covering essential concepts and advanced topics. Students will learn to develop robust applications, create graphical user interfaces using JavaFX, handle file I/O, implement multi-threading, establish network connections, and interact with databases through JDBC. The course also introduces Java Servlets for web development, emphasizing hands-on experience through practical examples and projects.

Course Goals or Learning Outcomes

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

- Understand and apply core concepts such as data types, variables, arrays, and decision-making constructs in Java programming.
- Comprehend the architecture and program structure of JavaFX applications
- Design graphical user interfaces using various layout components and basic UI controls
- Work with input/output streams for efficient data processing
- Manage files and directories in Java, including object streams for serialization
- Differentiate between threads and processes
- Implement multiple threads, prioritize them, and synchronize their execution
- Explore networking concepts and understand various types of connections
- Develop socket programming skills, covering sockets, ports, and URIs.
- Gain an introduction to database systems and Structured Query Language (SQL)
- Learn basic JDBC programming concepts, including populating databases and executing queries
- Understand Servlet architecture and its role in web development
- Handle HTTP methods, redirect requests, and implement multi-tier applications using JDBC from Servlets.

Course contents

Weeks	Chapters and Topic to Be Discussed

Week 1, 2, 3	**Chapter 1: Java GUI using JAVAFX**
	• JAVAFX architecture and Program structure
	• JAVAFX layout components
	• Basic UI controls
	  ○ Event handlers
	  ○ UI controls
	• Composite UI controls
	• Shapes
	  ○ Color, Texts, Fonts
	  ○ Lines, Circle, Rectangle
	  ○ CSS styling
	• Properties and Bindings
	• Graphics and Animation

Week 4 - 5	**Chapter 2: Streams and File I/O**
	• Input output streams
	  ○ Various stream classes
	  ○ Using Streams
	  ○ Object Streams
	• File management

Week 6 - 7	**Chapter 3: Multi-threading concept**
	• Thread vs process
	• Multiple threads
	  ○ Thread priorities
	  ○ Thread synchronization

Week 8 - 9	**Chapter 4: Networking in Java**
	• Networking overview
	  ○ Types of connections
	• Socket programming
	  ○ Socket, port and URI
	  ○ Implementing Socket programming

Week 10- 11	**Chapter 5: Java - Database connectivity**
	• Introduction to database systems
	• Structured query language (SQL)
	• Basic JDBC programming concept
	  ○ Populating database
	  ○ Executing queries
	  ○ Manipulating query results

Week 12, 13	**Chapter 6: Servlets** • Servlet overview and architecture • Handling HTTP methods (GET and POST requests) • Request redirecting • Multi-tier applications using JDBC from servlet
Week 14-15	**Chapter 7: Remote Method Invocation** • Overview of RMI • The RMI Registry • The Remote Interface • Implementing RMI

Summary of Teaching Learning Methods

The learning–teaching methodology will be student-centered with appropriate guidance of instructor/s during the students_ activities. There will be Lecture, Demonstrations, Lab work Tutorials, Reading assignments and Group Discussions

Summary of Assessment Methods

Assessment Type	# Assessments	Total Weight
Quiz	2	5%
Individual Assignment	1/2	5%
Group Assignment	2/3	10%
Project	1	20%
Mid Exam	1	20%
Final Exam	1	40%
Total		100%

References

[1] S. Horstmann and Gary Cornell, Core Java 2 – Volume II- Advanced Features, Sun Microsystems Press
[2] Harvey M. Deitel and Paul J. Deitel, Java How to Program, Deitel & Associates Inc.
[3] java.sun.com/docs/books/tutorial

Approval Section

This course outline is approved by:

	Name	Signature	Date
Instructor	Demeke G.	_____	_____
Quality Assurance	Demeke G.	_____	_____
Department Head	Zeleke Chekol	_____	_____