North South University

Department of Electrical and Computer Engineering
CSE 215: Programming Language II
(Section- 8 & 9)
Course Outline – Spring 2022

Instructor: Professor Dr. Mohammad Abu Yousuf (MAY)
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Office hours: 2:30-4:00(ST)

Class hours: Section: 8→8:00-9:30(ST), 11:20-12:50(ST)(CSE215L)
              Section: 9→9:40-11:10(ST), 1:00-2:30(ST)(CSE215L)
Classroom: SAC-402, LIB-605 (Theory), LIB-610 (Lab)

Credit: 3 credit hours.

Course Summary

This course introduces the basic concepts and techniques of object oriented programming. Actual computer programs are constructed by apply object oriented programming concepts and using an OOP language. Java is primarily chosen as the programming language in this course. The following topics are covered in this course: Java syntax with elementary programming, primitive data types, strings, operators, statements, arrays and methods, introduction to OOP, classes and objects, constructor, polymorphism, abstract classes and interfaces, file IO operations, handling exceptions in Java, GUI, multithreading, generics and related concepts.

Course Objectives

The objectives of this course are

1. to become use to the basics of elementary programming such as variables, conditional and iterative execution, arrays and methods in Java;
2. to understand the attributes of object oriented programming (encapsulation, polymorphism, etc.) and concepts of OOP such as method overloading, method overriding, static and dynamic binding, abstract class, interface, visibility modifiers;
3. to design a programming solution using the object oriented programming concept, and apply the concepts of exception handling, graphical user interface (GUI), event-driven programming, multi-threaded programming, generics in Java;
4. to introduce Java SDK and Java IDE tools to develop Java applications with debugging;
5. to work in a project team to support as a team member to develop applications.

Course Outcomes (COs):

Upon Successful completion of this course, students will be able to:

Sl.	CO Description	Weightage (%)
CO1	apply the basics of elementary programming such as variables, conditional and iterative execution, arrays and methods in Java;	10%
CO2	apply the attributes of object oriented programming (encapsulation, polymorphism, etc.) and concepts of OOP such as method overloading, method overriding, static and dynamic binding, abstract class, interface, visibility modifiers;	30%
CO3	design a programming solution using the object oriented programming concept, and apply the concepts of exception handling, graphical user interface (GUI), event-driven programming, multi-threaded programming, generics in Java;	30%
CO4	use Java SDK and Java IDE tools to develop Java applications with debugging;	25%
CO5	support as a team member to develop applications as a project team;	5%

Textbook:

1. Intro to Java Programming, Comprehensive Version, Y. Daniel Liang

Reference Book:
1. Java The Complete Reference: Herbert Schildt.
2. JAVA How To Program (10th Edition), by Deitel and Deitel, Prentice/Hall International.
3. Java, Java, Java™: Object-Oriented Problem Solving (3rd edition), by Ralph Morelli, Ralph Walde, Prentice Hall.
4. The Java Programming Language – Ken Arnold, James Gosling, David Holmes

Additional reading materials will be provided by the instructor.

Marks distribution:

Assessment Tools	Theory Weightage (%)	Lab Weightage (%)
Class Performance	5	5
Assignment	5	10
Quizzes	20	20
Midterm Exam	30	20
Final Exam	40	25
Term Project		20

Lecture wise course outline:

Lecture	Topic	Discussion points
1	What is Object-Oriented Programming?	1. Object-Oriented Programming 2. Encapsulation 3. Polymorphism 4. Inheritance.
2	An Overview of Java, Data Types, Variables, and Arrays	1. Data Types, Variables, and Arrays 2. Type Conversion and Casting 3. Automatic Type Promotion in Expressions 4. Strings
3	Operators and Control Statements	1. Arithmetic and Assignment Operators 2. Bitwise and Relational Operators 3. Java's Selection Statements 4. Iteration and Jump Statements
4	Introducing Classes	1. Class Fundamentals 2. The General Form of a Class 3. Declaring Objects 4. Assigning Object Reference Variables.
5	Introducing Methods, Access Control	1. Overloading Methods 2. Using Objects as Parameters 3. Argument Passing 4. Access Control
6	Nested and Inner Classes	1. Nested and Inner Classes 2. Exploring the String Class 3. Using Command-Line Arguments 4. Variable-Length Arguments
7	Member Access and Inheritance-1	1. A Superclass Variable Can Reference a Subclass Object 2. Using super 3. Creating a Multilevel Hierarchy 4. When Constructors Are Called
8	Member Access and Inheritance-2	1. Method Overriding 2. Dynamic Method Dispatch 3. Using Abstract Classes 4. Using final with Inheritance
9		**Mid Term Exam 1**
10	Abstract Class	1. Abstraction in Java 2. Abstract class in Java 3. Abstract method in Java 4. Real example of using abstract class
11	Java Interfaces	1. Defining and Implementing Interfaces 2. Nested Interfaces 3. Applying Interfaces 4. Variables in Interfaces
12	String Handling 1	1. The String Constructors 2. String Length

		3. Special String Operations
		4. String Comparison
13	String Handling 2	1. Character Extraction
		2. Searching Strings
		3. Modifying a String
		4. Data Conversion Using valueOf( )
14	Input/Output Streams	1. Overview of Streams
		2. Converting Byte Streams to Character Streams
		3. PrintWriter Class
		4. Reading and Writing Objects
15		**Mid Term Exam 2**
16	Java Exception Handling-1	1. Exception-Handling Fundamentals
		2. Exception Types
		3. Using try and catch
		4. Multiple catch Clauses
17	Java Exception Handling-2	1. Nested try Statements
		2. throw, throws
		3. Finally
		4. Java's Built-in Exceptions
18	Multithreaded Programming1	1. The Java Thread Model
		2. The Main Thread
		3. Creating a Thread
		4. Creating Multiple Threads
19	Multithreaded Programming2	1. Thread Priorities
		2. Synchronized Methods
		3. The synchronized Statement
		4. Inter-thread Communication
20	Multithreaded Programming3	1. Suspending a thread
		2. Resuming, and Stopping Threads
		3. isAlive( ) and join( ) method
		4. Deadlock
21	Graphical User Interface: JavaFX Basics	1. Understand stages, scenes and nodes
		2. Create user interface using panes, UI controls and shapes
		3. Commonly used properties styles and rotates nodes
		4. Layout nodes and display text using text class
22	Graphical User Interface: event driven programming	1. Describe events, event source, event class.
		2. Define handler class, register handler objects.
		3.Develop GUI application using mouse events, key events
		4. Create listener for processing a value change
23	Binary IO	1. Discover how I/O is processed.
		2. Distinguish between text I/O and binary I/O
		3. Read and write bytes using File Input

		Stream and File Output Stream.
		4. implements serializable interface
24	Generics	1. What Are Generics?
		2. A Generic Class with Two Type Parameters
		3. The General Form of a Generic Class
		4. Creating a Generic Method, Generic Constructors
25	**Final Exam**	

Lab : Lab Outline and Manuals will be provided Separately. Though Lab has separate credit hour, but absence in any lab will result zero mark in attendance for both Theory and Lab for that Particular day. Also**, "Fail" in Lab will make you "Fail" in Theory Course as well and Vice Versa.**

Exams and Quizzes: Exams and quizzes will be closed book and closed notes. No electronic devices except non-programmable calculators will be allowed during exams. Calculators cannot be shared with friends. There will be **no makeup quizzes**, as I will drop one quiz with the lowest score. If you miss a quiz, you will get zero for that. **Final exam will be comprehensive.**

Home works: Home works are always due at the time of class on the due date. There will be several home works throughout the semester and the lowest score will be dropped. No late submission will be accepted. To be successful in the exam, you should solve homework problems independently, although you may discuss with your friends to understand a more comprehensive picture of the problems.

Grading policy:

Numerical Scores	Letter Grade	Grade Points Per Credit
93 and above	A Excellent	4.0
90 – 92	A-	3.7
87 – 89	B+	3.3
83 – 86	B Good	3.0
80 – 82	B-	2.7
77 – 79	C+	2.3
73 – 76	C Average	2.0
70 – 72	C-	1.7
67 – 69	D+	1.3
60 – 66	D Poor	1.0
Below 60	F* Failure	0.0

Class etiquette: Distracting others in class is violating others rights to be attentive. So, laptop, tablets, cell phones or any other devices cannot be turned on during class time. You have to share any talk with the whole class. Attendance will be counted at the beginning of the class and if you are late then no late attendance will be counted (There is a good possibility that you can't participate in class lecture if you are late.).

Grade dispute: If you dispute your grade on any homework, project or exam, you have one week time from the date that the graded paper was returned to you to request a change in the grade. After this time, no further change in grade will be considered.

General course administration: The class presentations will be interactive lectures. Instructor will provide lecture slides after the lecture sessions.

Academic Honesty: Any means of unauthorized assistance in preparing materials which a student submits as original work is deemed to be cheating and constitutes grounds for disciplinary action. Instructors are expected to use reasonably practical means of preventing and detecting cheating. Any student judged to have engaged in cheating might receive a reduced grade for the work in question, a failing grade in the course, or such other lesser penalty, as the instructor deems appropriate. Serious instances may be referred to the Disciplinary Committee in the Office of the Vice Chancellor.

(Professor Dr. Mohammad Abu Yousuf)