ELEC 301: Object-Oriented Programming

Term: Winter 2025

Instructor: Kayne Lee

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Office Hours: Mondays 9-10AM

Class Schedule: Monday 10:30-11:30AM @ Stirling Hall Aud, Wednesday 10:30-11:30AM @ Chernoff Aud, Friday 10:30-11:30AM @ Biosciences Complex 1101

Course Description

This course provides an in-depth introduction to object-oriented programming (OOP) using Java. Topics include the principles of OOP such as encapsulation, inheritance, polymorphism, and abstraction. Students will develop a strong understanding of class design, object relationships, and the practical application of OOP concepts to create robust software systems. By the end of the course, students will be able to design and implement object-oriented solutions to solve complex computational problems.

Grading Breakdown

- **Assignment 1: Class Design & OOP Principles (15%)** – Due Week 5
- **Assignment 2: Inheritance & Polymorphism (15%)** – Due Week 9
- **Assignment 3: Cumulative Project (20%)** – Due Week 12
- **Midterm Exam (25%)** – Week 7
- **Final Exam (25%)** – Exam Period

Course Schedule

Week 1: Introduction to Object-Oriented Programming

- Overview of OOP concepts
- Introduction to Java programming language
- Classes and Objects in Java
- Basic Java Syntax

Week 2: Methods and Constructors

- Defining Methods and Constructors
- Method Overloading
- Constructor Overloading
- **Assignment 1 Released: Simple Class Design**
  - Students will create a class with multiple methods and constructors based on real-world objects.

Week 3: Encapsulation & Access Modifiers

- Access Modifiers: public, private, protected
- Getters and Setters
- Data Hiding and Encapsulation

Week 4: Inheritance

- Extending Classes
- Method Overriding
- The `super` keyword
- **Assignment 1 Due**

Week 5: Polymorphism

- Runtime Polymorphism
- Method Overloading vs Method Overriding
- Interfaces vs Abstract Classes

*Week 6: Midterm Exam

- Covers Weeks 1-5

Reading Week – No Classes

Week 7: Abstraction & Interfaces

- Abstract Classes
- Interfaces and Multiple Inheritance
- **Assignment 2 Released: Creating a Class Hierarchy**
  - Students will design a class hierarchy using inheritance, polymorphism, and interfaces.

Week 8: Collections Framework

- Introduction to Collections
- Lists, Sets, Maps
- Iterators and For-Each Loops

Week 9: Exception Handling & Debugging

- Handling Exceptions in Java (`try-catch`)
- Throwing Exceptions
- Debugging Techniques
- **Assignment 2 Due**

Week 10: File I/O in Java

- Reading and Writing Files
- Handling File Exceptions
- Serialization

Week 11: Final Project Development

- **Assignment 3 Released: Object-Oriented Application**

- Students will design and implement a comprehensive Java application applying OOP concepts.

Week 12: Review & Final Exam Prep

Policies & Expectations

- **Late Submissions:** 10% deduction per day, up to 3 days.
- **Academic Integrity:** All work must be your own; plagiarism will result in penalties.