

CSI 2310: Object-Oriented Computing II

**Credits Hours:** 4 credits, 3.57 contact hours/week.

**Instructor:** Lunjin Lu, Ph.D.

**Text book:** Data Structures and the Java Collections Framework, Third Edition, William J. Collins, Publisher: John Wiley & Sons, Pub. Date: January 11, 2011, Print ISBN: 978-0-470-48267-4 Web ISBN: 0-470482-67-2 (known in this course as “DS&JCF”)

**Supplementary Text:** Agile Java: Crafting Code with Test-Driven Development, Jeff Langr, 2006, Prentice-Hall, ISBN-13: 978-0-13-148239-5 (known in this course as “AJTDD”)

### **Specific course information**

This is NOT a review course in basic Java. You should already be skilled in the objectives stated above for CSI 2300. There will be a BRIEF introduction & review of Java programming from the command line. I will assign the first week’s homework to test your skills in the objectives of Java programming from the command line. The “Programming in Java” reference below is an excellent way to review Java programming on your own. This reference is a workbook with lots of Java programming examples and problems with solutions. If you are weak in Java programming, I recommend this inexpensive workbook. Even though it is old (2004), it has excellent examples and problems that apply CSI 2300 basic Java programming principles.

**Prerequisites:** CSI 2300

**Required course** for CS major

**Course Objectives:** Upon successful completion of this course, students should be able to

- Design Java programs using Abstract Data Types (ADT) [ABET CS: (a, b, c, j, k)]
- Implement ADT using array--based and pointer--based representation [ABET CS: (a, c, j, k)]
- Implement/ use linked lists, binary trees, stacks, queues, priority queues [ABET CS: (a, c, j, k)]
- Describe /use traversal, search and sorting procedures [ABET CS: a, c, j, k]
- Use recursion in ADT implementations [ABET CS: (a, c, j, k)]
- Describe concepts of and basic operations on hash tables and B trees [ABET CS: (a, c, j, k)]

### **List of Topics:**

- Fundamentals of Java
- Object-Oriented Technology
- Test-Driven Development (TDD) with JUnit
- Algorithms
- Introduction to the Java Collections Framework (JCF)
- Recursion

- Array-Based Lists
- Linked Lists
- Stacks & Queues
- Binary Trees
- Sorting
- Tree Maps & Tree Sets
- Hashing
- Graphs, Trees, Networks