

# CPE 360 Computational Data Structures & Algorithms

## Course Syllabus

**Course Objective:** Data structures and computer algorithms are the building blocks in computer programming. This course will give students a comprehensive introduction of common data structures, and algorithm design and analysis.

**Prerequisite:** E115 Introduction to Programming or knowledge of C++ programming

**Instructor:** Dr. Yingying (Jennifer) Chen

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(To shorten turn-around time, please include "CPE360" in the subject line for all the emails.)

**Grader:**

Email:

Phone:

**Textbook:** Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, 3rd Edition, Published by Addison-Wesley, 2006.

### Reference Books:

- Data Structures, Algorithms, and Applications in C++, 2nd Edition, Sartaj Sahni, Silicon Press.
- Introduction to Algorithms, 2nd Edition. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, MIT Press.

**Course Website:** <http://www.ece.stevens-tech.edu/~ychen/cpe360/index.html>

### Main Topics:

- Review of C++
- Introduction of algorithm analysis
- Sorting and order statistics: heap sort, merge sort, bubble sort, quick sort, bucket sort
- Elementary data structures: arrays, stacks, queues, linked lists
- Advanced data structures: heaps, trees, hashing
- Searching algorithms: linear and binary search
- Elementary graph algorithms: representations, breath-first search, depth-first search
- Minimum spanning trees: Prim's Algorithm, Kruskal's Algorithm
- Single-source shortest paths and all-pairs shortest paths

**Grading:** The grade for the class will be based upon homework, quizzes, and exams.

- Homework: (25%) There will be regular homework assignments including theory problems and programming assignments.
- Quizzes: (15%) There will be two to three in-class quizzes to test students' understanding of the current materials. For each quiz, a notice will be given one class ahead to allow students to prepare.
- Midterm: (25%) There will be one midterm exam.
- Final Exam: (35%) There will be a final exam. The final exam is comprehensive.

All exams and quizzes are closed book. Make certain to do the homework and everything should be fine!