Data Structures & Algorithms II
CSC 222
Course Syllabus

Spring 2020

Instructor: Dr. Grey Ballard
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Office: Manchester 234
Office Hours: Tues 1-3pm and Fri 2-4pm, or by drop-in or appointment
Teaching Assistant: Ziqin Chen
TA Office Hours: Tues 6-8pm, Manchester 017 (and Mon/Wed 6-8pm in CS Center)
Class: 1–1:50 MWF, Manchester 241
Text: *Algorithms* by Dasgupta, Papadimitriou, Vazirani (McGraw-Hill 2008)
Course Schedule: `http://users.wfu.edu/ballard/teaching/CSC222/`

1 Course Description

Study of algorithms, algorithm design strategies, and the derivation of time complexity bounds. Case studies illustrate greedy algorithms, divide and conquer, backtracking, and dynamic programming techniques. An introduction to the classes P, NP, NP-complete, and Turing decidability is included.
Here are the big questions we'll tackle in this class:
Given an algorithm,

- is it correct?
- how long does it take?
- can we do any better?

Given a problem or computation, how do we come up with an efficient algorithm for solving it? What algorithmic techniques might be effective?

2 Learning Outcomes

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

1. analyze algorithms using asymptotic complexity analysis (Big-Oh and related notation);
2. prove correctness of algorithms using rigorous techniques such as mathematical induction and proof by contradiction;
3. design efficient algorithms for combinatorial problems, using approaches that include
   - divide and conquer,
   - dynamic programming,
   - greedy methods, and
   - parallelization;
4. identify NP-complete problems and devise strategies to deal with them.

This class is a theoretical computer science class; there will be both proofs as well as programming. Compared to CSC 221, there will be much more rigor in the theoretical analysis of algorithms.

3 Assessment

There will be weekly homework or programming assignments, quizzes, a midterm, and a final exam.

Homework assignments will focus on the design and analysis of algorithms and will include writing pseudocode and mathematical proofs. Programming assignments will reinforce the design and implementations of algorithms.

Quizzes will be in-class and last 10 minutes. They will be announced about a week in advance. The lowest quiz score will be dropped. The midterm and final will both be in-class. The midterm will cover material from the first half of the semester and the final will focus on material from the second half. Make-up tests and quizzes will be administered only if excused in advance.

4 Grading

Course grades are determined using the following weightings:

- 25% homework assignments
- 25% programming assignments
- 10% quizzes
- 20% midterm

- 20% final

Letter grades are assigned based on the following categorization:

A	93 or above	**C**	73–76.99
A$^-$	90–92.99	**C**$^-$	70–72.99
B$^+$	87–89.99	**D**$^+$	67–69.99
B	83–86.99	**D**	63–66.99
B$^-$	80–82.99	**D**$^-$	60–62.99
C$^+$	77–79.99	**F**	below 60

5 Contacting Me

In general, email is the best way to reach me, and I'm happy to take questions over email. The easiest way to find me in person is to stop by my office during office hours, though please feel free to drop by any time. If you want to be sure to find me then you can also email ahead to schedule a time; it helps to propose a few times that work for you so that I can choose one that works for me too. Please contact me as soon as possible if you know you will miss class due to a university-sponsored activity, such as athletics.

6 Academic Integrity

All tests and quizzes are to be done independently. Programming assignments and homework assignments may be discussed with other students, however the work submitted must be your own work and reflect your understanding of the material. Copying of work from other students or from Internet-based resources is not acceptable and will be dealt with through the Honor System. I recommend that you retain drafts of your homework assignments and programs until the end of the semester in case a question arises as to authorship.

7 Learning Assistance Center

If you have a disability that may require an accommodation for taking this course, then please contact the Learning Assistance Center (758-5929) within the first two weeks of the semester and bring it to my attention as appropriate.

8 Supporting Fellow Students in Distress

As members of the Wake Forest community, we have a personal responsibility to ensure that this classroom and the campus as a whole remains a healthy and safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you, either for the classmate's wellbeing or yours. If this should occur, you are encouraged to send

your concern to the Wake Forest CARE Team at `http://careteam.wfu.edu/how-to-make-a-report/`. By utilizing your insights and observations, we can work together to help individuals get connected to appropriate resources and keep our community safe.

9 Emergency Preparedness Policy

In the unlikely event of a major disruption of normal university activities (such as might result from a health emergency or other disaster), a course continuation contingency plan will be enacted in order to allow completion of the course. During this time, students should continue with the reading and other assignments listed on the syllabus and monitor email, Sakai, and the WFU website for information. If students have questions or are in doubt about how to proceed, they should contact the instructor by email if available, otherwise they should contact by phone.