

CS 155 (Section 1): Introduction to the Design and Analysis of Algorithms, Fall 2017

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My office hours for Fall 2017

- Tuesday, 9:00-11:00
- Other times available, set up an appointment by email.

Class Meetings:

- Section 1: MH 223, Mon/Wed noon-1:15

Course Format

Most of class time will be spent for lectures and answering questions, with reading and homework assignments assigned for completion outside of class.

Course Website

The course website can be found at <http://www.cs.sjsu.edu/faculty/taylor/term/fall17/CS155/>. This site contains a link to this greensheet, a schedule of classes thus far, and other information and announcements.

Catalog Description

Algorithm design techniques: dynamic programming, greedy algorithms, Euclidean and extended Euclidean algorithms, Discrete and Fast Fourier transforms. Analysis of algorithms, intractable problems and NP-completeness. Additional topics selected from: selection algorithms and adversary arguments, approximation algorithms, parallel algorithms, and randomized algorithms.

Prerequisite Courses

You must show me that your prerequisite courses have been satisfied. **If you do not show me by Tuesday, September 5 (the day before drop date), you will be dropped from the course, if other students have been regularly attending in hopes of getting a space. Note, there are office hours, but no class meeting on Tuesday.** Further, I will not give out any add codes without first seeing prerequisite proof. You should show me grades for CS146.

Textbooks

This textbook is very widely used, and I hope it will come in handy beyond this course. The 3rd edition, for the material we cover, is quite similar to the 2nd edition. (The 2nd edition managed to obfuscate a few issues from the 1st edition while clarifying others.) I think the majority of changes from the 2nd to the 3rd edition are in sections we don't cover, though some of the exercises and readings have changed. When possible, I will post assignments for both the 2nd and 3rd editions of the book.

Introduction to Algorithms, 3rd Edition
Cormen, Leiserson, Rivest, and Stein
ISBN-10: 0262033844
ISBN-13: 978-0262033848
MIT Press, 2009

You can find errata (bug reports) for the book <http://www.cs.dartmouth.edu/~thc/clrs-bugs/bugs-3e.php>, for whichever printing of the book you get.

Student Learning Outcomes

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

- have a full understanding of various algorithmic design techniques: greedy, divide-and-conquer, and dynamic programming
- understand the general notion of complexity classes, P and NP, completeness and hardness, and the relationships between classes by reduction
- know when to use exact, heuristic, and approximation algorithms
- think recursively for algorithm design

Workload

The following will be regularly assigned for time outside of class:

- Readings from textbook or handouts
- Written homework problems
- Programming assignments (maybe)
- Rote homework problems may be given in Canvas.

During the introduction of new material, homework is our chance to learn by making mistakes. It is expected that you will make an effort in all of the above for the sake of learning the material, and to give yourself feedback for your own learning.

For written homework problems, they will not be graded on correctness, but on whether or not enough of an attempt was made to answer that problem. You may discuss problems with others (it should be documented). You should not simply copy solutions, nor look for solutions (on the web or elsewhere), but if needed you can have somebody explain a problem to you in full, until you understand the solution. I might only return solutions for those problems for which you turn in evidence of putting in enough effort.

For both Canvas and written homework, you should do each homework, unless you are positive that you

understand the topic so well that doing the homework would not be a good use of your time. And for those students? They should be the ones helping classmates to understand the material, as outlined in the two preceding paragraphs.

If we have programs, you are expected to code your own, but can get help from others. Talking is good. Sharing code is not, and this includes reading their code and retyping it, or having them dictate it to you. Do not look for premade solutions. If you get help from others, it should be documented in comments. **Do not copy code.** You should understand what your code does. (We can go into program expectations more if we actually have programs this term.)

Class Participation

Class participation and feedback are very important to keep the course interesting. *If I am covering material too slowly or quickly, or if I am not clearly explaining things, you must let me know.* I prefer an interactive learning environment. If you disagree with something I say, speak up. Argue with me in front of the class. It will make the class better, and right or wrong, constructive interaction will not hurt your grade. If you are correct, clearly my mistake should be corrected. If you are incorrect, probably I have not explained something clearly anyway, and at least half of the class is confused by it. Point it out right then and there. In cases of exceptional participation that seem to benefit the class as a whole, I reserve the right to improve a student's grade by up to 1/3 grade.

University Policies

University Policies: Office of Graduate and Undergraduate Programs maintains university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc.

You may find all syllabus related University Policies and resources information listed on GUP's [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

Grading

Each of two exams during the semester will count as 25% of your grade. The final exam will be 50%. Exam curves may be modified due to how much homework the class, as a whole, attempts (with good effort, rather than correctness, for written homework problems).

Final:

- For Section 1, the final exam will be Tuesday, December 19, at 9:45-noon

Recording Lectures or Sharing Course Materials

You can make audio recordings of class for your own personal use, but they should not be reproduced or distributed. If, for some reason, you want video, please come discuss it with me.

Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.

Drop Date

Note that for this semester, the last day to drop without consequence is *Wednesday, September 6*, and the last day to add is *Wednesday, September 13*. After these dates it becomes very difficult to drop or add a class, so be sure you are where you want to be before these dates arrive!

Tentative Class Schedule

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Approximate Date Subject to change	Topics Covered
August 23	Introductions, Administrivia, Greedy
August 28	146 Review, Greedy, Proofs
August 30	146 Review, Greedy, Proofs
September 6	GCD, Strassen
September 11	FFT
September 13	FFT
September 18	Geometric
September 20	Geometric
September 25	Geometric
September 27	Geometric
October 2	Review
October 4	Midterm 1
October 9	Exam Return, Dynamic Programming
October 11	Dynamic Programming
October 16	Dynamic Programming
October 18	Dynamic Programming
October 23	Dynamic Programming
October 25	Dynamic Programming
October 30	NP
November 1	NP
November 6	NP
November 8	NP/Approx
November 13	NP/Approx
November 15	Review
November 20	Midterm 2
November 27	Online/Randomized

November 29	Online/Randomized
December 4	Online/Randomized
December 6	Online/Randomized
December 11	Revieww

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