

CMPS 102 Syllabus, Winter 2019

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Lecture: MWF 4-5:05pm in Baskin Auditorium 101

Sections: 7, see class schedule (Fri at 9:20 section moved to E2-194)

Instructor office hours: Mondays 2-3 (after 1/15) and Thursdays 2-3 (these are tentative, and subject to change)

TA Office hours: TBD

Webpage: <https://courses.soe.ucsc.edu/courses/cmcs102/Winter19/01>

Text: *Algorithm Design* by Kleinburg and Tardos

Discussion Forum and other materials: on Piazza

General Information This course is a theory course covering advanced topics. Although there is no programming, the home work is time-consuming and involves extensive proof writing. You are strongly encouraged to typeset your solutions using \LaTeX .

Students are expected to have extensive programming experience as well as familiarity with: asymptotic notation, the reading and writing of formal proofs, elementary data structures (lists, stacks, queues, sorted arrays, heaps, trees, etc.), graphs (depth- and breadth-first search, shortest paths, etc.), basic mathematical tools (arithmetic and geometric series, logarithms, polynomials, and exponential functions, counting permutations and subsets), logic (negation and quantification, $\forall \exists$), basic calculus (integration, differentiation, limits), vectors and matrices.

Course outline: We will cover Chapters 1 through 7 in the text (with chapter 5 before chapter 4). These topics include:

1. Introduction
2. Stable Matching and other motivating problems, Ch 1.
3. Basics of Algorithm Analysis, Ch 2 (review, mostly in sections)
4. Graphs, Ch 3 (review, mostly in sections)
5. Divide and Conquer algorithms (Ch 5)
6. Greedy Algorithms (Ch 4)
7. Dynamic Programming (Ch 6)
8. Network Flow (Ch 7)
9. NP and NP-completeness if time permits (unlikely)

Evaluation will be based on 4-5 homework assignments, a midterm, and a final exam. Lecture attendance is mandatory, I will take attendance at selected lectures via short surveys to be turned in. This will be un-announced, bring paper and pen/pencil to every class. You are also required to attend at least one section, although attendance will not be taken there,

and students are welcome to attend multiple sections. The **final exam** will be at the scheduled time: Monday March 18 from 7:30pm to 10:30pm). The Midterm is tentatively scheduled for Friday February 15th.

Your overall score will be weighted as follows:

attendance	homework	midterm	final
10%	30 %	20%	40%

Students should strive to master the material and demonstrate their mastery. At least the top 25% percent of the class will get A's, the top 50% will get A's or B's, and the top 75% will pass. If everyone demonstrates thorough mastery of the material and techniques, then everyone will pass, although historically this is very unlikely. The point threshold to demonstrate such mastery is not immediately clear, I have not taught the course in a while and it depends on the strictness and leniency of the TAs and graders.

Other Points:

- Students are responsible for their own understanding. If anything is unclear, ask questions in lecture, sections, office hours, or the class forum.
- Students should check the forum regularly (daily or at least every other day) for announcements and clarifications.
- Both lectures and the reading are important. It is important to keep up with the reading, and reading ahead is often helpful. Lectures and discussion sections are mandatory, and students are responsible for the material covered there.
- Due dates are firm, and it is each student's responsibility to manage their time and complete the assignments on time. Students should read and think about the assignments the day they are assigned so they can ask questions and get the help they need well before the due date.
- Academic Honesty violations (cheating), such as submitting the un-attributed work of others, are serious issues and will result in a zero on the assignment, a lowered grade in the course, and a report to the department, and Dean of Graduate Studies. Improperly borrowed work can be as large as an entire solution or as small as a single sentence, figure, or idea. The CSE department has a zero-tolerance policy on academic dishonesty. Consequences within the class range from a zero on the entire assignment to failing the course, and are reported to the College Provost who will set formal proceedings in motion that can lead to suspension or expulsion from the university. See also http://www.ucsc.edu/academics/academic_integrity/undergraduate_students
- Cheating is presenting someone else's work as your own. This includes copying another student's homework or allowing a student to copy your solutions. Any help you get on a homework (from any source other than the TAs, instructor, and text book) must

be clearly described and acknowledged on your submission. Such help includes key discussions with other students, help from the MSI tutors, and information from the web or solution manuals.

You may discuss homework problems with fellow students, but use the following rule of thumb: **What you turn in must represent your own understanding and be something that you could reproduce using nothing but pen, paper, and a copy of the textbook.** When you do work on homeworks together, you must credit them as indicated above.

It is **not** allowed to “lend”, “borrow”, “trade”, or “show” written solutions to problems, or in any way share the act of writing up your answers.

- If you qualify for classroom accommodations because of a disability, please get an accommodation Authorization from the Disability Resource Center (DRC) and submit it to me in person during my office hours or by appointment within the first two weeks of the quarter. Contact the DRC by phone at 831-459-2089, or by email at drc@ucsc.edu for more information.
- If you need accommodation due to conflicts, family emergencies, illness/injury, or other difficulties, inform the instructor as soon as possible. An “incomplete” can only be given by request when there is a medical, family, or similar emergency that prevents a student who has been doing clearly passing work from finishing the course.
- Thanks to Professors Abhradeep Guha Thakurta and Dimitris Achlioptas for access to their materials from previous offerings of the course.