

## CSE 102 Syllabus, Spring 2020

Instructor: David Helmbold, [dph@ucsc.edu](mailto:dph@ucsc.edu)

TAs: Zekun Zhao [zzhao99@ucsc.edu](mailto:zzhao99@ucsc.edu)

Vishal Chakraborty [vchakrab@ucsc.edu](mailto:vchakrab@ucsc.edu)

Siman Wang [swang324@ucsc.edu](mailto:swang324@ucsc.edu)

*Although instructor and TA E-mails have been provided, the lectures, sections, office hours, and piazza are the preferred ways to contact the course staff. We will be unable to keep the class running smoothly if we are swamped with E-mails.*

First Lecture: Monday March 30 at 8:00 am by zoom: <https://ucsc.zoom.us/j/7490636776>

Discussion Sections: 6 by zoom, currently planned for:

Tuesday	8:30 - 9:35	(ZZ)
Wednesday	12:00 - 1:00	(SW)
Wednesday	5:00 - 6:05	(ZZ)
Thursday	1:30 - 2:25	(VC)
Thursday	5:00 - 6:05	(VC)
Friday	1:20 - 2:25	(SW)

**Sections will meet the first week** of class, partly to ensure that the technology is working. You are expected to attend at least one section, although attendance may not be taken, and students are welcome to attend multiple sections.

Instructor office hours (by zoom): Mondays 9:30-10:30 and TBD

TA Office hours: TBD

SOE Webpage: <https://cse102-spring20-01.courses.soe.ucsc.edu/home>  
(log-in at lower right)

Text: *Algorithm Design* by Kleinburg and Tardos (required)

Discussion Forum and other materials: Piazza (coming)

**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 L<sup>A</sup>T<sub>E</sub>X.

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 nested 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. Divide and Conquer algorithms (Ch 5, Ch4 in some versions of text)
5. Greedy Algorithms (Ch 4, Ch5 in some versions of text)
6. Dynamic Programming (Ch 6)
7. Network Flow (Ch 7)

Chapter 3 on Graphs should be review, and will be covered mostly in sections as their use arises. The network flow unit may be abbreviated if we run out of time. In the unlikely event that things move faster than anticipated, I will talk about P, NP and NP-completeness.

**Evaluation** In these uncertain times I reserve the right to change the evaluation criteria as I gain experience with what works. The **final exam** will be at the scheduled time: Tuesday June 9 from 8:00am to 11:00am, although I may shorten it to a 2-hour exam. In addition to regular homework assignments, there will be 4 (or possibly 5) quizzes during the quarter instead of a midterm. I will also record attendance at some fraction of the lectures.

Your overall score will be weighted as follows:

attendance	homework	quizzes	final
10%	30 %	30%	30%

The material is difficult, and students should strive to demonstrate their mastery. Because the problems are often difficult, students may score lower than in other classes and can get discouraged. At the end of the quarter I will look at the score distributions across the class and ensure that 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 80% will pass. I reserve the right to attach +/- modifiers as I see fit. If everyone demonstrates thorough mastery of the material and techniques, then everyone will pass, although historically this is unlikely. The point threshold to demonstrate such mastery will not be clear until all the scores are in, and depends on the strictness and leniency of the TAs and graders as well as any flawed or overly-difficult problems. Students should be aware that extraordinary measures may be necessary in these uncertain times. This could include adjusting the weight distribution, truncating the course (no final and/or fewer assignments/quizzes) and/or switching to P-NP grading depending on campus policies, so students should not over-rely on later work to pull up their scores.

### 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](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.** Additionally, you should be able to clearly explain your solution to the course staff. If you discuss possible homework solutions with other students, 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 it is explicitly a group assignment, then this applies to students outside your group.

- UC Santa Cruz is committed to creating an academic environment that supports its diverse student body. If you are a student with a disability who requires accommodations to achieve equal access in this course, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me by email, preferably within the first two weeks of the quarter. I would also like us to discuss ways we can ensure your full participation in the course. I encourage all students who may benefit from learning more about DRC services to email the DRC office at [drc@ucsc.edu](mailto:drc@ucsc.edu).
- 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.