Teaching Staff

<table>
<thead>
<tr>
<th>Section</th>
<th>Instructor</th>
<th>Email</th>
<th>Office</th>
<th>Office Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>Suresh K. Lodha (SKL)</td>
<td><a href="mailto:lodha@soe.ucsc.edu">lodha@soe.ucsc.edu</a></td>
<td>E2-361</td>
<td>TBD</td>
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</tbody>
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Teaching Assistants: TBD
Tutors/Readers: TBD

Class Location

<table>
<thead>
<tr>
<th>Meeting Times</th>
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<tr>
<td>Online (zoom links on canvas) Login using ucsc.edu email</td>
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Zoom, Laptop, and Internet Connection

In order to have a successful experience with the course, students are expected to be competent in using zoom – raising hands, sharing screen, asking questions, making class presentations, using (or muting) video, using (or muting) audio, using a virtual background while using a video.

Students are expected to have a working laptop with adequate internet speed to attend zoom lectures and take during-the-class quizzes, midterms and the final exam.

Students will have to log into zoom using ucsc.edu email account. Login process will require registration. Zoom will automatically record every student’s entry and exit time for each class. Thus, zoom automatically provides attendance record of every student.

Lectures

Lectures will be delivered via zoom at the class meeting times. Every attempt will be made to make the recorded lectures available in a few days after the lecture day (assuming that the course is assigned a digital assistant to help with zoom-related tasks). However, availability of recorded lectures is NOT guaranteed in case of technical problems during the recording beyond the control of the instructor.

Class Attendance

Although attendance is not required during classes, quizzes will be given during the class times. We encourage students to attend classes. More information is provided on the quizzes later in this document.

Discussion sections (delivered through zoom) will be held by the teaching assistants on topics covered in the lecture and associated topics potentially including additional algorithms (not covered in the class) to enrich the understanding of the material. Discussion sections may or may not be recorded. Discussion sections will NOT be made available to the students.

Although attendance in discussion sections is not mandatory, they are recommended. Students can choose to attend any discussion section. We strongly recommend that every student enroll in one discussion section which they are most likely to attend. If there is an overcrowded discussion section, students who are enrolled in the section will be given priority by teaching assistants in addressing their questions.
Prerequisites

CSE 101 or CMPS 101. CSE 102 is a theory course. No programming is required. Students are expected to have 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.

Syllabus (tentative)

1. Introduction to Analysis of Algorithms
(Recurrence and Induction, Asymptotic Growth, Common Functions and Masters Theorem)
2. Motivating Examples
3. Basics of Algorithm Analysis
4. Divide and Conquer Algorithms
5. Greedy Algorithms
6. Dynamic Programming
7. Network Flow

Graph Algorithms may be reviewed. In the unlikely event that things move faster than anticipated, P, NP and NP-completeness will be discussed.

The instructor will focus on providing high quality education. Online instruction will not be diluted in quality or cover less material. On the contrary, online instruction expects students to be even more disciplined and motivated to learn the materials, sometimes ahead of time, or at their own initiative, because valuable in-person learning and engagement with the teaching staff will not be available.

Textbooks


Additional Recommended Book:
- Algorithm Design by Kleinberg and Tardos, Pearson Education, 2012

Learning Management Platforms

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<tr>
<th>Platform</th>
<th>Description</th>
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<tbody>
<tr>
<td>Canvas</td>
<td>Canvas will be used for quizzes and examination and communicating all grades including assignment grades</td>
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<tr>
<td>Piazza</td>
<td>Access to Piazza Page is through Canvas. Piazza page will be used for uploading all course materials including syllabus, week-by-week outline of lectures, all announcements and discussions</td>
</tr>
<tr>
<td>GradeScope</td>
<td>Access to the GradeScope Page is through Canvas. Gradescope will be used for submitting assignments, grades on assignments, and receiving feedback on assignments</td>
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Communication Policy
All questions related to the course should be posted on Piazza. You can also post private notes visible only to the instructors. The teaching staff will attempt to answer them promptly. Piazza forum should NOT be used to post complaints or grievances against any teaching staff or peers (once you start working on groups). Any student who violates this rule may be barred from Piazza and be asked to drop the class.

Additionally, we encourage students to ask all course-related questions – contents or delivery – during online zoom sessions during lecture times or during office hours (in-person or online).

It may not be possible for the teaching staff – instructor, teaching assistants, tutor-readers – to respond to emails from students of such a large class.

Zero Tolerance Policy
There will be zero tolerance policy against zoom-bombing. This includes use of offensive language in chat sessions during class times, or use of offensive virtual background during video chats. Students will be immediately removed from the class and strict action will be taken. Zoom links for the class must not be shared with anyone.

Disability Accommodation
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 Academic Access Letter from the Disability Resource Center (DRC) to me privately during my office hours or by , at the earliest, preferably within the first week of the quarter and definitely within the first two weeks of the quarter. At this time, 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 contact DRC by phone at 831-459-2089 or by email at drc@ucsc.edu.

Grading and Evaluation Policy
Context
The instructor is aware of the current COVID-19 crisis facing our society and additional immense stress associated with undesirable events in USA and around the world. This stress may continue during Fall 2020. The situation is uncertain and fluid. Due to these circumstances, several grading policy changes have been introduced for online Spring 2020 classes. These changes include: (i) option of taking CSE 102 as a P/NP course all the way approximately till the end of 9th week of classes (please check with the university for the exact date) and still count the course towards your major, and (ii) some courses may also make the final optional and award a grade on the basis of the work performed on pre-final work.

At this time, it is not known whether students will or will not be allowed to take CSE 102 on a P/NP basis. Please note that the instructor does not have the authority to decide. When a decision is made one way or the other, the authorities will communicate this information to all students. For now, unless otherwise informed, you should assume that the course must be taken on a letter grade basis.

At this time, you should assume that a final examination will not be optional and will be held at the exam time allocated to this course by UCSC.
Grading Policy
The final grade will be decided on a combined weight of homework, in-class-quizzes, mid-term examination, and final examination. Weight distribution of these components has not been decided at this time. One possible scenario is 10% homework, 40% quizzes, and two 20% mid-term and no finals. Another possible scenario is 0% homework, 60% quizzes and 20% interviews, 20% final examination. The grading policy will be described in the first class. Most likely, a quiz will be administered during the 2nd week of class.

However, there are some guiding principals that I expect to adopt that are described below.

First, given the unusual stressful environment, the instructor is flexible in adopting a grading policy that will allow multiple pathways to students who may be struggling to pass the course. These pathways will also be available to students who choose to take the course on a P/NP basis (assuming that this option is made possible by the higher authorities). Multiple pathways will include possibilities to make up lost points by (i) attending lectures (keeping a journal and self-reporting this information), (ii) attending discussion sections (keeping a journal with the name of TA and self-reporting this information), (iii) substituting quiz or exam points through homework points (if completed in a timely manner), (iv) working on additional problems beyond those assigned in class to demonstrate effort, (v) participating in an interview with the teaching team to explain the homework or quiz solutions. This flexibility will be adopted only towards the students who are at the risk of failing the class in order to make up the lost points to increase the total to a passing score.

Second, students who experience ecstasy of mathematics through analysis of algorithms may be provided opportunities to push the frontiers of their knowledge by doing projects on exciting and new algorithms above-n-beyond. This project-based methodology may be coupled with engagement with the teaching team (provided we have enough resources = teaching staff time). There may also be an opportunity to present your work.

Third, the instructor will attempt to provide opportunity to the students who take the course on a letter grade basis (and certainly P/NP students if they choose so) to demonstrate their knowledge in ways that can garner bonus points to make up lost points, to a limited extent, in traditional methods of evaluation such as quizzes/mid-term examinations or final examination.

Homework
Homework will be assigned regularly. However, they may carry very low weight towards the final grade, somewhere from 0% to 10%.

Students can use any resource found on the internet, past courses, chegg.com, heroes.com, an old friend, ex-students, paid help, peers (or work in groups), learning center/MSI tutors, and God to find solutions to homework. None of this will be considered cheating. In fact, students are encouraged to peer tutor others. Bonus points will be awarded, to a limited extent, for this service. But you must cite all your sources including full names of individuals (other than the teaching staff of the class), write the solutions in your own words (and not copy-paste them) and must understand the solutions that you submit. You may be asked to explain the solutions via zoom meetings at any later time in the course. If you cannot explain the solutions, the allocated points may be reversed. If it is found that you did not cite sources (remember many of your peers will cite), that will be considered cheating and negative penalty points may be imposed.
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. 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. You are allowed to explain the solutions to your peers once, twice, thrice, ad infinitum ……

Homework is likely to be time-consuming and involves extensive proof writing. Students are **required** to typeset their solutions using LATEX. Solutions which do not satisfy the requirements, will not be accepted. There will be approximately 5 assignments during the whole quarter. Due dates of assignments are firm. Late submissions will be given zero credit. No exceptions.

**Quizzes**
Quizzes will be given out regularly. Currently, the minimum weight assigned to the quizzes is expected to be 40%. However, it is possible that the quizzes may carry 60% weight with only one final examination (or two mid-term examination) or quizzes may carry 100% weight (with no mid-term or final examination). Accordingly, the number of quizzes and times allocated to each quiz will be decided later.

There may be approximately 30 minute in-class 6 quizzes or 15 minute 12 quizzes (out of 19 classes) throughout the course. There will be no quiz during the first week of classes or on the pre-thanksgiving date (Nov 25) during the whole quarter. Quizzes will be open book and open notes. No assistance from any internet sources or from any human being is allowed. Use of cell phones or social media during the quizzes and exams is strictly prohibited. At least one or may be two lowest scoring quizzes will be dropped from the final grade; for example, best 5 out of 6 quizzes or 10 out of 12 best quizzes will be counted towards the final grade.

We are aware of the widespread cheating that may take place during quizzes and examinations, every effort will be made to curb cheating. Students will be required to keep their video on while taking the quiz. Proctor-U or some other university-approved services may be used during quizzes or examinations. Therefore, it is important that you have video connectivity during these times.

Specific date may or may not be pre-announced during the lecture for a quiz date (in order to discourage cheating. The quiz may be administered at the beginning, or the middle, or at the end of the class. Quizzes may be randomized so that every student does not get the same quiz but level of difficulty will remain the same to maintain fairness. There may be as many as 12 short quizzes rather, a time frame of next 1-2 weeks may be announced for the next quiz. It is students’ responsibility to ensure that s/he is present in the class for the quiz.

**Mid-Term Examination** There may be two mid-term examinations worth 20% each.

**Final Examination** There may be a final exam during the registrar allocated time. The allocated time is 3 hours, but it is possible that it may be shortened to 2 hours. Exam will be open book and open notes. No assistance from any internet sources or from any human being is allowed. Use of cell phones or social media during the quizzes and exams is strictly prohibited. Same policy described under the quiz will be used here.
**Interviews:** Online zoom interviews will be conducted, subject to resource availability, where students will be asked to explain the homework or quiz or examination solutions that they have submitted. As described before, the points may be allocated to homework, quiz, or examination only if student can explain the solution (and negative penalty points may be imposed if student is unable to explain the solution and has not cited the sources).

**Project (Optional):** Students who want to experience the ecstasy of mathematics may choose this option at their own risk (and strive to obtain an A+)!

**Bonus Points (Optional):** Students may be provided option to solve problems not assigned in homework to earn bonus points that may either make up lost points in quizzes (for P/NP students) or add to the total point score (for students on a letter grade) to help earn a better grade

It is not practical to have homework, and quizzes, and three mid-term examination, and one final examination and interviews and projects, and extra problem solving. After all, we all have a life beyond CSE 102. Just change some of the “and”s to “or”,s in the sentence above, and relax! Go back to the guiding principle. **Flexible** grading policy to help students pass the course, help students enjoy mathematics, and help students learn the material in a variety of ways. It is much more work for me, but hopefully not for you, unless you choose to.

**Honesty and Integrity**
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 students 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.

**Exceptional Circumstances**
If you need accommodation due to family emergencies, or serious illness or injury, inform the instructor as soon as possible. An “incomplete” may be awarded in exceptional circumstances.
**Relationship with Section 01 of CSE 102**
Sections 01 and 02 will be offered simultaneously MW 5:20-6:55pm. Although some lectures *may* be delivered jointly by the instructors using the same zoom link (posted on canvas), there may be important differences between the two sections. The student is responsible to read the syllabus of the other section and make informed decision on which section is likely to work best.

Potential differences include but not limited to:

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<tr>
<th>Section 02</th>
<th>Section 01</th>
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<tbody>
<tr>
<td>Suresh Lodha</td>
<td>Vishal Chakraborty</td>
</tr>
<tr>
<td>Grading Policy: Flexible as described above</td>
<td>Read Grading Policy of Section 01</td>
</tr>
<tr>
<td>HW, Quiz, and Exam may not be the same as Section 01.</td>
<td>HW, Quiz, and Exam may not be the same as Section 02.</td>
</tr>
<tr>
<td>Accommodations related to time zones may <em>not</em> be available.</td>
<td>Accommodations due to students being in different time zones (if local time falls between 10pm-8am) will be available after verification.</td>
</tr>
<tr>
<td>Video connectivity is <em>mandatory</em> and students will be barred from taking examinations and quizzes if they do not have video connectivity.</td>
<td>Accommodations for students who do not have/want video connectivity will be available.</td>
</tr>
<tr>
<td>Proctor-U may be used for final examination and quizzes. <em>Different exams and quizzes will be offered in Sections 01 and 02.</em></td>
<td>Proctor-U or video connectivity will not be required for taking the final examination or quiz. <em>Different exams and quizzes will be offered in Sections 01 and 02.</em></td>
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**If accommodation is essential for the student either due to time zone or video connectivity, the student should enroll for Section 01.**

Acknowledgments
Thanks to Professors Abhradeep Guha Thakurta, David Helmbold, Dimitris Achlioptas, and Patrick Tantalo for access to their materials from previous offerings of the course.

Posted: 06/08/2020