Course Missive

What’s CS22?

Suppose you go to the ice cream shop, and you’re told that you can get 2 scoops of ice cream and that there are 25 different flavors from which you can choose for each scoop. You then wonder to yourself: how many different possible combinations of flavors could I get? Suppose we tell you there are 325 different combinations of flavors. Would you believe us? What would we need to do to convince you this were true?

In this class, we consider assertions about the world of discrete mathematics (rather than ice cream shops), and we think about how we can convince each other that these assertions are either true or false. It’s one thing to be told that an assertion is true or false: it’s another to be convinced of it. Convincing other people that an assertion is true or false requires understanding why it is. Understanding why things are true in the world of discrete mathematics is therefore a major part of this class.

The math in this class has a very different flavor from math in high school like algebra or trigonometry. It is much less mechanical than that, much more creative than that, and much more about understanding than that.

In this class, our world will consist of Set Theory, Number Theory, Logic, Combinatorics, Probability, and Graph Theory. If you’ve never heard of these before, not to worry: you're in exactly the right place. This course assumes no prior experience with these topics, and we’ll be building the ideas within these topics from the bottom-up.

What sort of skills will I develop in this course?

First and foremost, the skill you will develop is writing good proofs. What is a good proof? This is something we’ll talk about a lot, but for now, we’ll say this: a good proof for a claim makes all members of the 22 community understand why the claim is true.

Writing a good proof is a skill that requires:

1) Being able to communicate aloud with other people about mathematical ideas,
2) Having a toolbox of techniques you can draw from to approach a question,
3) Being fluent in reading and using different notations, and
4) Being able to write arguments that engage a diversity of individuals.
Time

Getting the most out of this course will take up a lot of your time. Everyone is different, and we therefore can't tell you exactly how much time you'll end up spending on this course. However, we'll just say this: the critical reviews for this course are not exaggeratory. Please keep this in mind as you're planning out your schedule for this semester! Also, if you don't have the time to put in the work this semester, please remember that it's offered every spring, and we recommend taking it when you have more time on your hands.

Course components

Lectures

Professor Klivans will hold lectures on Mondays, Wednesdays, and Fridays from 1:00pm to 1:50pm in Macmillan Room 117. Course-related announcements may be made in class and, while you are not required to attend, you are responsible for anything covered in lecture. We will release very brief class notes, but they are meant to reinforce the lectures, not replace them. Another available resource to reinforce the material from lecture is the course textbook, which can be found (for free!) on our course website.

Homework

Homeworks will be released every Thursday, and they are due the following Wednesday at 12:55pm on Gradescope. You get three late homework passes to be used at 3 times of your choosing throughout the semester: the late homework deadline is Thursday at 12:55pm. Note that these homework passes do not “stack”; that is, you cannot turn in an assignment two or three days late.

Any subsequent late homeworks will receive no credit. Extensions on assignments can only be requested by contacting Professor Klivans at caroline_klivans@brown.edu; only she can grant extensions.

After the second homework, all homeworks must be typed up using something called LaTeX. To give you some time to learn it, we will allow non-LaTeX submissions for the first two homeworks. Starting on Homework 3, any handwritten or non-LaTeXed submission will get no credit. Resources for learning LaTeX will be available on the website within the first week of the course. We will additionally release the LaTeX source of our homeworks and solutions so that you can see how we write our own LaTeX. Note that you may hand-draw diagrams on your submission!
Exams

There will be two midterms and a final. The midterms will be held on the evenings of March 6th and April 17th, locations to be announced. The final will be held on May 14th from 9am-12pm, location to be announced. If you have any conflicts with the exams, please email cs0220headtas@lists.brown.edu at least one week before the scheduled exam time.

Hours

Hours will be held throughout the week (see the calendar on our course website for times and locations). If any changes are made to the hours schedule, these changes will be reflected in the calendar.

Writing good proofs usually requires communicating with other folks in the class, and hours are a great way to meet people! Hours are a space that allow you to collaborate with other students in the class on homeworks with the guidance of a TA. TAs are there to help you discover the answers to your questions and to help you develop strategies that you can use to solve future problems. While attending TA hours is not required in this course, it is often the key ingredient to succeeding.

Recitations

Each week, there will be two identical recitations (see calendar for times and locations). At recitation, you’ll have the chance to work with other students and TAs to hone your understanding of concepts learned in lecture, practice solving problems related to the homework, and explore really any questions related to the course material that excite you. You are strongly encouraged to attend, but they are not required.

Piazza

When you have questions about an assignment or the course material in general, we encourage you to use Piazza! Piazza is an online forum that allows you to ask questions either publically to the class (including the TAs) or just the TAs. More details on Piazza will be covered on Homework 0.

Grading

The following is an approximate guide to the grading breakdown:

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homeworks</td>
<td>45 %</td>
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Midterm Exams (2)  |  30 %
Final Exam         |  25 %

**Accomodations**

Please inform Professor Klivans early on in the term if you have a disability or other condition that might require accommodations or modification of any of the course procedures. If you would like to discuss the process for requesting accommodations, you can contact Student and Employee Accessibility Services at 401-863-9588 or SEAS@brown.edu.

**Contacting Us**

If you have any administrative questions about the course, you can email the TA list at cs0220tas@lists.brown.edu at any time.

If you’d like for your question to be read only be the HTAs and the Professor, or if you have thoughts on how to improve the class, you can reach us at cs0220headtas@lists.brown.edu. We are all passionate about ensuring that all students have a positive experience in this course, so your suggestions are absolutely welcome!