

Course  
Website

Course materials will be posted on the course website:

<http://www.cs.princeton.edu/~smattw/Teaching/cos445sp18.htm>

Course Staff

Instructors	Office	Email
Matt Weinberg	<i>CS Building 317</i>	smweinberg@princeton.edu
Teaching Assistants		
Wei Hu	<i>CS Building 216</i>	huwei@cs.princeton.edu
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Ariel Schvartzman	<i>CS Building 216</i>	acohenca@cs.princeton.edu
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Graders		
Sung Won Chang		
Leila Clark		
Heesu Hwang		
Jackey Liu		
Andreea Magalie		
Dylan Mavrides		
Eric Neyman		
Evan Wildenhain		
Andrew Wonnacott		
Daphne Yang		
Jonathan Yu		

Lectures and  
Precepts

Class	Time	Place
Lecture	T/Th 1:30 - 2:50pm	CS Building 104
Precept P01	Th 7:30 - 8:20pm	Friend 008
Precept P02	F 1:30 - 2:20pm	Friend 008
Precept P03	F 2:30 - 3:20pm	Friend 008
Precept P04	W 7:30 - 8:20pm	CS Building 105

Office Hours

Time	Place	Staff
Monday 1:30 - 2:30pm	Friend 016	Divya, Wei
Monday 5:00 - 6:00pm	Friend 016	Matheus, Ariel
Tuesday 3:00 - 4:00pm	CS 317	Matt
Tuesday 4:00 - 5:00pm	CS 216	Ariel
Wednesday 11:00am - 12:00pm	CS 217	Divya
Wednesday 4:00-5:00pm	CS 216	Wei
Thursday 3:00-4:00pm	CS 317	Matt
Friday 4:00-5:00pm	CS 217	Matheus

Grading

- Take-home Midterm I – 15%;
- Take-home Midterm II – 15%;
- Take-home Final – 30%.
- Problem sets – 35%.
- Participation – 5%.

**Outline**

The primary objective of this class is to develop the necessary skills to solve problems that involve both computation and incentives. Most lectures and assignments will focus on mathematical proofs, but some assignments will require implementation and test your skills in a simulation environment. Below is a tentative list of topics that the course will cover.

- matching markets
- auction design
- basic game theory and equilibrium concepts
- information cascades
- computational social choice
- behavioural game theory
- scoring rules
- fair division
- incentives in cryptocurrencies
- price of anarchy

**Reference materials**

- “Algorithmic Game Theory” by Nisan, Roughgarden, Tardos, and Vazirani;
- “Game Theory, Alive” by Karlin and Peres;
- “Networks, Crowds, and Markets” by Easley and Kleinberg;
- “Introduction to Economics and Computation” by Parkes and Seuken;
- “Twenty Lectures on Algorithmic Game Theory” by Tim Roughgarden;
- “Handbook of Computational Social Choice” by Brandt, Conitzer, Endriss, Lang, and Procaccia;
- Tim Roughgarden’s lecture notes for CS 269I: <http://theory.stanford.edu/~tim/f16/f16.html>.

**Mechanical TA**

We will use Mechanical TA for submission and grading of assignments. This is a peer-evaluation software developed by researchers at the University of British Columbia. **Your grade on every assignment will be determined solely by the course staff, without looking at any peer evaluation. How your peers evaluate your assignment will have no impact on your grade.**

- **Purpose:** Evaluating your peers’ assignments has pedagogical value, both to the grader and the grader.
- **Purpose:** With such a big class, staff grading may take several weeks. You will get quicker feedback from your peers while the assignment is still fresh in your mind.
- **Purpose:** Tools from this class are necessary to design good peer-evaluation mechanisms (e.g. how to incentivize peers to evaluate thoroughly and accurately), so there is also pedagogical value specific to this class.
- Two days after assignments are due, you will be randomly assigned three submissions to grade. These will be due roughly a week later.
- Your evaluation will **not** factor into the grader’s grade.
- Performing useful evaluations is part of your participation grade. Course staff will periodically spot check your evaluations to confirm that you are providing useful feedback.

### Homework Policy

- Homeworks will be due on Mondays at 11:59pm, and assigned at least one week prior to the due date. Homeworks will be due approximately every two weeks.
- **You should not consult collaborators or external references while writing your solutions.**
- Unless otherwise specified, you **may** collaborate with any number of other students in the class, or consult outside references to come up with your solutions. You may brainstorm, write on a whiteboard, and even completely solve the problem with others. **But you must write up your own solutions without collaboration.**
- You **must** list all collaborators or external references consulted (once per PSet).
- Every student is responsible for their own assignments. These are **individual assignments**. We allow collaborations and reference consultations for their pedagogical value. Violating these rules is a violation of Princeton University Honor Code.
- A portion of each homework assignment may be designated as a *no-collaboration* portion, in which case you **may not** collaborate with other students or consult outside references. You **may** still discuss the problem with course staff.
- There will be several problems in each assignment. You must type the solution to each problem in a separate file. You may use the provided LaTeX templates to type your solutions.
- Handwritten solutions will not be accepted. Solutions must be submitted through Mechanical TA.
- Some assignments will feature extra credit. Extra credit will not add to the assignment score, but will contribute towards participation. Extra credit will typically not be assigned partial marks.
- Late policy: you may use up to 4 late days throughout the semester, but not more than 2 days on a given assignment. On each instance, you may only use an integer number of late days. Outside of this policy, no late submissions will be accepted.
- Regrade requests: you are encouraged to discuss any grading questions with the teaching staff during office hours. Regrade requests should be submitted through Mechanical TA within 10 days of the assignment being graded. A regrade request on a problem will cause the entire assignment to be regraded.
- You may or may not include identifying information at the top of your submission. Three other students, in addition to the course staff, will see whatever you submit.

### Midterms

There will be two take-home midterms. Each will last one week. The format will be similar to homeworks, except **you may not collaborate or consult outside references at all**. You may visit office hours to ask clarifying questions, but the TAs will in general not provide guidance. The midterms will take place roughly once in early March and once in early April.

### Final

There will be a take-home final announced roughly at the beginning of finals period, and due at the end. The format will be the same as the midterms.