

**Course ID and Title: CSCI699 Fair and Efficient Social Decision Making**

**Units: # 4**

**Term—Day—Time:** [Fall 2024] — [Fri 1–4:20pm]

**Course Website:** <https://evi-micha.github.io/Teaching/699/index.html>

**Location:** KAP 145

**Instructor: Evi Micha**

**Office:** TBD

**Office Hours:** contact the instructor

**Contact Info:** [pmicha@usc.edu](mailto:pmicha@usc.edu)

**Catalogue Description**

Computational Social Choice, Algorithmic Fairness

**Course Description**

The course focuses on advanced topics at the intersection of theoretical computer science, economics, and machine learning. Topics include, but are not limited to, computational social choice, voting, matching, fair division and algorithmic fairness.

**Learning Objectives**

The primary goal is to familiarize students with modern applications of social choice theory in artificial intelligence. The main duty of the course is a research project, through which students will learn to think about research directions, present research findings, and collaborate with other students.

**Course Notes**

Grading type: Letter

**Required Readings and Supplementary Materials**

There are not required readings

**Optional Readings and Supplementary Materials**

- *Handbook of Computational Social Choice* edited by Felix Brandt, Vincent Conitzer, Ulle Endriss, Jérôme Lang, and Ariel D. Procaccia. [Online Version](#)
- *[FML] Fairness and Machine Learning: Limitations and Opportunities* by Solon Barocas, Moritz Hardt, and Arvind Narayanan. [Online Version](#)

- *Algorithmic Game Theory* edited by Noam Nisan, Tim Roughgarden, Eva Tardos and Vijay Vazirani. [Online Version](#)

## Description of Assignments and How They Will Be Assessed

### Participation

The students are expected to participate in fruitful discussions during the lectures.

### Grading Breakdown

Assessment Tool (assignments)	% of Grade
Homework 1	20
Homework 2	20
Research Project	50
Class Participation	10
<b>TOTAL</b>	<b>100</b>

### Course Project:

Students can choose any course-related topic of interest for their research project. The project can be experimental, such as testing different algorithms discussed in the course, or theoretical, such as proving new insights about these algorithms or designing a new algorithm for a specific problem.

Students will work in teams of 2-3 members. A project proposal must be submitted by the 9th week of the semester, with feedback from the instructor provided by the 11th week. The students will present their findings in the last lecture of the course. They will submit a project report in the last week of the course, documenting the motivation of the project, the related work, the model, the results, and the conclusions. The length of the report can vary, but 4-5 pages are expected.

### Grading Scale

The standard grading scale of USC.

### Assignment Submission Policy

The students will have two weeks to work on each assignment.

### Academic Integrity

- All assignments are expected to be individually. However, you are allowed to discuss the assignments with other students.

### *Use of Generative AI in this Course*

Generative AI permitted but limited as follows: In this course, you are permitted to use artificial intelligence (AI)-powered programs to help you, but only on assignments that explicitly indicate a permitted use of AI. However:

- You should also be aware that AI text generation tools may present incorrect information, biased responses, and incomplete analyses; thus, their answers may not meet the standards of this course.
- To adhere to our university values, you must cite any AI-generated material (e.g., text, images, and other content) included or referenced in your work and provide the prompts used to generate the content. Using an AI tool to generate content without proper attribution will be treated as plagiarism and reported to the Office of Academic Integrity.

Please review the instructions in each assignment for more details on how and when to use AI Generators for your submissions.

## Course Schedule

	<b>Topics/Daily Activities</b>	<b>Deliverables</b>
<b>Week 1</b>	Voting 1: Axioms in Voting I	
<b>Week 2</b>	Voting 2: Axioms in Voting II	
<b>Week 3</b>	Voting 3: Distortion	
<b>Week 4</b>	Voting 4: Committee Selection and Impartial Selection	
<b>Week 5</b>	Voting 5: Applications of voting (Liquid Democracy, Participatory Budgeting, RLHF)	Homework 1
<b>Week 6</b>	Matching, Facility Location, Impartial Selection	
<b>Week 7</b>	NO CLASS- Fall Recess	
<b>Week 8</b>	Fair Division 1: Cake Cutting	Homework 1 Due
<b>Week 9</b>	Fair Division 2: Divisible and Indivisible Goods	Project Proposal
<b>Week 10</b>	Fair Division 3: Best-of-Bost worlds guarantees and applications (citizens' assemblies)	
<b>Week 11</b>	Fairness in Clustering	Homework 2
<b>Week 12</b>	Fairness in Classification- Fairness through Social Choice in AI and beyond (application such as Peer Review)	
<b>Week 13</b>	Discussion of the course and ethics in AI	Homework 2 Due
<b>Week 14</b>	<b>NO CLASS- Thanksgiving</b>	
<b>Week 15</b>	Students' Presentations	Project Report Due
<b>FINAL</b>	Not applicable	

## Statement on Academic Conduct and Support Systems

### Academic Integrity:

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see [the student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

### Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

### Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. [The Office of Student Accessibility Services](#) (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each

course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at [osas.usc.edu](https://osas.usc.edu). You may contact OSAS at (213) 740-0776 or via email at [osasfrontdesk@usc.edu](mailto:osasfrontdesk@usc.edu).

### **Support Systems:**

#### [Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

#### [988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

#### [Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

#### [Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

#### [Reporting Incidents of Bias or Harassment](#) - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

#### [The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

#### [USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

#### [Diversity, Equity and Inclusion](#) - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

#### [USC Emergency](#) - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

#### [USC Department of Public Safety](#) - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

#### [Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or [otfp@med.usc.edu](mailto:otfp@med.usc.edu)

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.