Social Choice Theory (Econ 211)
Spring 2017
Monday and Wednesday 2-3:30pm.
Instructor: SangMok Lee

This course is intended to introduce you to various topics in social choice theory, which is a formal analysis of general preference aggregation, voting, and fair division. The course also covers modern analysis by using game theory, empirical analysis, and laboratory experiments.

Course Logistics

Office hours: Monday (9-11am)
Office: McNeil 462
Email: sangmok@sas.upenn.edu

Teaching Assistants: Ashwin Kambhampati (McNeil 426, akambh@sas.upenn.edu)
TA Office Hours: Tuesday (10am-12pm) in Econ undergraduate lounge (McNeil 3rd floor)

No Class: Jan 18th (Wed).

We will use Canvas for announcements, handouts, notes, homework assignments, etc.

Course Description

Prerequisites: This class is Math intensive. You are expected to have a solid background of Mathematical reasoning, analysis, and statistics. The minimum course prerequisites include Econ 101 (Intermediate Micro Theory), Econ 103 (Statistics), Math 104, and either Math 114 or Math 115 (Calculus Part I and II). Econ 212 (Game Theory) is highly recommended.

Textbooks: I do not require any textbook, but this is for the financial purpose only. I will scan and distribute some selected parts of textbooks below. You are **required to read** the distributed materials.

Theory:
- *Mathematics of Social Choice: Voting, Compensation, and Division, by Christoph Borgers (https://bookstore.siam.org/OT119).*
- *Fair Division and Collective Welfare.* The MIT Press, 2004, by Hervé Moulin.

Application:
- *Excursions in Modern Mathematics (8th Edition) by Peter Tannenbaum*
  (A pretty good source of lots of real life examples)
- *Liberalism against Populism*, by William H. Riker, Waveland Press, 1982.

Requirement and Grading Policy

1**. Important Dates and Grades**

	Grade	Due/Exam dates
Three assignments	3 x 10%	Feb 8, March 15, April 26
TA Recitations	-	Feb 9, March 16, April 27 (5pm)
Two midterm	2 x 15%	Feb 15, March 22 (In class)
Final exam	30%	May 2 (Tuesday), 9-11am
Class Participation	10%	-

2. **Assignments** will be given one-week before the due dates and will be due at the start of the lecture on the day they are due. You can submit in class. The dues are on Wednesdays, followed by TA sessions on Thursdays (5pm) and exams on the following Wednesdays. The solutions will be typed and posted on Canvas.

3. **Examinations** will be *in-class* and *closed-book*. Collaboration on the examinations is prohibited. If you miss one mid-term exam, with a compelling and verifiable reason, the other mid-term and the final exam will make up 20 and 40 percent of your total grade. A request for a re-grade of a problem set or an exam must be submitted to me in writing within 1 week after the graded assignment has been returned. I will reevaluate your complete homework set or exam.

4. **Other course Policies**
- Laptops and Tablets are allowed for the purpose of notetaking only.
- Late assignments will not be tolerated.
- All hand written answers to exam questions should be legible. Anything that the TA or I cannot read or understand is wrong.
- Assignments and exams will be returned to you during class. You are responsible for picking them up.

Topics

I. Elements of Social Choice Theory

1. Intro: Course Introduction. Motivating examples. Some mathematical background.

2. Discrete Mathematics: Sets, Logic, and Mathematical Induction.

II. General Social Choice Theory

1. A Special Case with Two Alternatives: Simple majority. May's theorem, Condorcet winner. Condorcet paradox.

2. General difficulties of preference aggregation: Binary relations. Preferences. Preference aggregation rule. Arrow's Impossibility Theorem with proof

3. Voting rules: Majoritarian methods (Sequential majority. Copeland voting rule). Positional methods (Plurality. Approval voting. Borda score voting rule). Evaluating voting rules. Gibbard-Satterthwaite Impossibility Theorem.

4. Some Possibility Results: Decision under restricted domains (single peaked preferences, voting over resource allocation, and intermediate preferences), Approval voting

III. Strategic Voting

1. Background: Game Theory. Nash Equilibrium.

2. Strategic Voting: Illustration with examples. Case studies. Theoretical and Empirical Analysis.

   Myerson Roger, and Robert Weber. 1993. A Theory of Voting Equilibria. *American Political Science Review* 87:102-14.

   Kawai, Kei, and Yasutora Watanabe. 2013. "Inferring Strategic Voting." *American Economic Review*, 103(2): 624-62.

IV. Vote Markets

1. Vote Market – General Election: Partial Equilibrium, Experimental Economics of Vote Market.

   Alessandra Casella, Aniol Llorente-Saguer & Thomas R. Palfrey, 2012. "Competitive Equilibrium in Markets for Votes," *Journal of Political Economy*, University of Chicago Press, vol. 120(4), pages 593 - 658.

2. Vote Market – Information Aggregation:

   Information Aggregation Through Voting and Vote-Trading Thomas Piketty, mimeo.

   Vote Trading and Information Aggregation, *Journal of Finance*, by CHRISTOFFERSEN, GECZY, MUSTO, and REED.

V. Compensation and Fair Division:

1. Basic Concepts: Fairness, Envy freeness, Pareto-optimality, Equitability

2. Compensation: Knaster's Procedure

3. Fair-Division – for two people: "I cut, You choose", The Geometry of Pareto-Optimal Division

4. Fair-Division – General cases: Steinhaus's Method, Hall's Marriage Theorem, Kuhn's Method. The Method of Selfridge and Conway