

MATH 19-01: MATHEMATICS OF SOCIAL CHOICE

TUFTS UNIVERSITY DEPARTMENT OF MATHEMATICS
SPRING 2016

Professor: Moon Duchin (Moon.Duchin@tufts.edu)
TA: Murphy Fields (Murphy.Fields@tufts.edu)
Lectures: MWF from 10:30-11:20 (E block) in BP 2
Textbook: Mathematics of Social Choice by Christoph Börgers
Office Hours: after class and by appointment, BP 113
Midterms: Monday Feb 22 (open block) and Friday March 18 (in class)
Final Exam: Monday May 9, 3:30-5:30pm

OVERVIEW AND TOPICS

Social Choice Theory is the study of methods of incorporating many individual preferences into a collective decision. The centerpiece of social choice theory is voting, but it also encompasses problems of compensation and fair division of resources. This course focuses on the *formal* (mathematical/logical) elements of social choice, but I will also bring in topics from history, political science, civil rights, political philosophy, sociology, and psychology to provide context for, and explain limitations of, the mathematical content.

For the first 8–9 weeks of the term we will cover the **Voting** material (Part I, Ch 1–12) from Börgers’s book. Topics after that include **Matching** (Ch 18) and **Districts and Gerrymandering**. If time permits we will also cover **Randomness and Fraud** and **The Mathematics of Public Opinion**.

Math 19 meets the following Learning Objectives: basic understanding of higher mathematics; written communication; problem solving skills.

ASSIGNMENT STRUCTURE

This course has one weekly problem set and up to one quiz per week. Typically HW will be due Mondays and returned Fridays and the quiz will be on Wednesdays, but this is subject to modification as needed. There will be two midterms and a final, and there are no makeup exams. See <http://math.tufts.edu/courses/examPolicy.htm> for information on excused exam absences.

There is an *optional* project: a 1-2 page paper expanding on a topic from class and connecting it to other classes or to a real-world example.

Problem sets. Average of 5 problems per week from the text. Homework is due in the beginning of class to the front desk and no late HW will be accepted (though lowest 2 scores will be dropped). To be accepted, homework must have your name or identifying information at the top and must say whom you worked with.

Approximate score breakdown. Problem Sets (20%), Midterms (20% each), Final (30%), Project/Quizzes (10%)

There is absolutely no pre-determined grade cutoff for an A, B, etc. Typically, in my classes, 80% can earn an A, and I will be delighted to give A grades to everyone if that is appropriate. I will offer grade estimates after the first midterm so you know how you are doing.

GENERAL COURSE POLICY

Academic integrity. You are encouraged to work together but your written work must be in your own words, and you must indicate working partners and other sources. Academic integrity is taken very seriously in this course; please refer to the Code of Conduct in the Student Handbook (<http://students.tufts.edu/student-affairs/student-life-policies/student-handbook>) to review University policy with respect to plagiarism and related issues.

Accessibility accommodations. We will gladly work to accommodate any disabilities brought to our attention. If you are requesting an accommodation due to a documented disability, please register with the Student Accessibility Services Office at the beginning of the semester. To do so, call 617-627-4539 to arrange an appointment.

Homework identifiers. Because homework is collected and returned in class and spends some time in mailboxes, you have the right to use a *unique identifier* instead of your name in order to protect your privacy. Your educational record is privileged information under the federal Family Educational Rights and Privacy Act (FERPA), and using your name as identifier means that you opt out of this guaranteed confidentiality with respect to homework assignments and scores.