

## PSC 281/ECO 282 Formal Models in Political Science

Fall, 2014  
T, Th 12:30–1:45  
Hylan 306

Professor Duggan  
Office: Harkness 111A  
Hours: MW 1:30-2:30pm  
Email: [dugg@ur.rochester.edu](mailto:dugg@ur.rochester.edu)

The course covers a variety of formal models used in political science. We will study the mathematical foundations of majority voting (and applications to left-right politics), general aggregation rules called “social welfare functions,” the mathematical foundations of utilitarianism, strategic incentives for misrepresentation of preferences, the behavior of parties and interest groups in elections, and the possibility of agenda setting in legislatures.

Much of the analysis in the course is axiomatic: after setting up a problem in mathematical terms, we formulate postulates (or “axioms”) and deduce sometimes unexpected implications of our axioms. Other material uses ideas related to non-cooperative game theory to analyze mathematical models of politics. The goal of the course is to expose students to some of the main concepts in formal political science, to provide insight into new ways of thinking about political processes, and to introduce techniques in formal analysis of politics.

We will adhere to fairly high standards of rigor: there will be some mathematical notation; I will sometimes provide the ideas behind the proofs of the theorems presented in class; and problem sets will require students to use mathematical formalism. There are no official prerequisites for the course, but some aptitude for logical or mathematical reasoning is desirable.

**Readings:** The main textbook for the course is *Analyzing Politics*, by Ken Shepsle. Lectures will be based on — but not limited to — the material in this book. An optional text, *Public Choice III*, by Dennis Mueller, is more advanced and covers many topics of interest.

**Course work:** Work in the course will consist of readings from the textbook; homeworks assigned approximately every two weeks; possibly some short quizzes throughout the semester; a mid-term; and a final. One or two homeworks may take the form of a short essay.

Collaboration on homeworks is permitted if it facilitates the understanding of course material for the students involved. Students may not copy work from others.

The worst of the homework grades will be dropped, and, for this reason, I will not accept late homeworks. (If you come to me with pressing circumstances, like illness, *before* an assignment is due, we may be able to work out an alternative arrangement.)

Note: Because I drop the worst homework grade, the homework policy provides you with some insurance against random disasters (like, “I forgot the homework was due.”). You should try not to take advantage of it too early in the semester!

**Class attendance:** Attendance of the lectures is not required, but it does factor into the “participation” component of the course grade, as explained below. Furthermore, because lectures will not strictly follow the textbook, failure to attend lectures will hamper your understanding of the material and quite possibly have an adverse affect on grades for homework, exams, etc. I will attempt to make copies of lecture notes available online, but these are intended to be a complement—not a substitute—for class attendance.

**Grading:** Final grades will be determined on the basis of course work with the following weights: 20% homework, 30% mid-term, 40% final, and 10% participation. Your “participation” mark will depend on attendance, participation in class (asking/answering questions), quizzes (if any), and generally demonstrating an interest in the material.

**Outline:** Below, I list the main topics to be covered during the semester and their approximate timing. *The mid-term exam is tentatively scheduled for Tuesday, October 28.*

Week

1. Introduction to course and Background on formal methods
2. Lessons from economics: Why government?
3. Majority rule: May’s theorem
4. Spatial voting model
5. Social welfare functions and Arrow’s theorem
6. Utilitarianism and Choice via agendas
7. Voting rules and Strategy-proof choice
8. MIDTERM
9. State of nature: Why politics?
10. Collective action and Public good provision
11. Two-party elections and Special interest groups
12. Electoral accountability
13. Agenda setting and Pivotal politics
14. Legislative bargaining