Mathematical Models: Game Theory II
ICPSR 2010

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Course Description
This course is designed for students who have already taken a graduate-level course in game theory, but who desire greater proficiency in the more advanced topics. The course focuses on canonical games of incomplete information that are used widely in all fields of political science and political economy but will also introduce students to theoretical topics that are beginning to play a prominent role in recent contributions to the literature. The course is suitable for students who, in the course of their own research, wish to evaluate, critique, or otherwise engage formal-theoretic work, as well as those who anticipate using game theoretic techniques themselves. Questions concerning the interpretation of models and the evaluation of models will discussed extensively.

Course Requirements
In order to maximize the benefits from taking this course, it is essential that students treat the assignments as learning tools, alongside lectures and reading assignments. Toward this end, we strongly encourage the students to work through the assigned problems on their own before comparing notes with classmates.

Students will be assigned 1-2 problems at the end of each lecture, to be submitted for grading at the beginning of the next lecture. Barring exceptional circumstances, late problem sets will not earn credit. (See the “Homework Policy” and “Tips from the TA” for details on the grading of problem sets.) There will also be a comprehensive exam at the end of the course.

Required Game Theory Texts:

Other required readings:


**Recommended Game Theory Texts**

Although you will be held responsible only for the material in the lectures and in the assigned readings you may wish to consult in your preparation other game theory texts, in particular those listed below. Which of these additional texts is best suited to your needs should be a function of your background knowledge and how much you hope to do with game theory.

Fudenberg, David and Jean Tirole. 1991. *Game Theory*. Cambridge: MIT Press. Although it is somewhat dated, this book is still the most comprehensive survey of game theory available. It is a great reference book for anyone who intends to write game-theoretic models, but it makes substantial demands on the analytical skills of the readers and often expects that the basic material is already known.

Osborne, Martin and Ariel Rubinstein. 1994. *A Course in Game Theory*. Cambridge: MIT Press. This text is somewhat more analytically demanding than Gibbons’. It provides a much more detailed discussion of some of the more advanced topics, e.g. equilibrium refinements in extensive-form games of incomplete information, which makes it an excellent companion to such a text, although it is a comprehensive introduction in its own right.

This book presents the most systematic and nuanced, but mathematically unsparing, treatment of the subject. It is the best textbook for people who are very comfortable with mathematical tools.

This book is less analytically demanding than Myerson’s or Fudenberg and Tirole’s. Its balance of formal rigor and conceptual intuition is comparable to Gibbons’.

This introductory book contains many extensively worked examples from political science. It also includes a systematic introduction to utility theory and a mathematical appendix.

**Mathematics Reference Book**
This is the best comprehensive introduction to the math for microeconomics, and may be a good purchase if you intend to pursue formal theory beyond this course.

**Topics:**

**Week 1**

1. Introduction to Mechanism Design
Read: Gibbons, pp. 164-168
Application: Banks (1990)

2. Introduction to Sequential Games of Incomplete Information
Read: Gibbons, pp. 173-83; Osborne and Rubinstein, Ch.12

3. Costly Signaling Games
Read: Gibbons, pp. 183-210, 233-244; Banks (1989), Ch. 1-2
Application: Gordon and Hafer (2007)
Application: Gordon, Huber, and Landa (2007)

4. Equilibrium Refinements in Sequential Games of Incomplete Information
Read: TBA

**Week 2**

5. Signaling Games and Cheap Talk
Read: Gibbons, pp. 210-218; Banks (1989), Ch. 1-2
Application (and Review): Banks and Calvert (1992)

6. Introduction to Monotone Comparative Statics
Read: Ashworth and Bueno de Mesquita (2005); Vives (1999) Ch. 2

7. Introduction to Timing Games: The War of Attrition
Application: TBA

8. Introduction to Markov Games and Markov-Perfect Equilibrium
Application: Acemoglu and Robinson (2001)

9. Review and Matters of Interpretation
Read: Landa (2007); Rubinstein (1991)

Final Exam