ECON 673: Information, Game Theory and Market Design

Lecture: Mondays, 6:30 – 9:15pm
1400 16th St., NW

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Office Hours: By appointment; 30 minutes before and after lectures

Grader: Sungho Noh

Required Text: Markets, Games, & Strategic Behavior, Pearson, Charles A. Holt
Game Theory for Applied Economists, Princeton University Press, Robert Gibbons

Course Description
This course studies strategic decision-making and the design of organized markets, focusing on efficient organization and the incentives created by market rules. Applications include online auction markets, government auctions of natural resources, procurement auctions, spectrum auctions, electricity markets, environmental auctions, matching markets (students to classes or schools, medical residents to hospitals, kidneys to recipients). The analysis relies on a mix of documenting the rules of real-world markets, game theoretic analysis, empirical analysis, and experimental work.

Prerequisites
All students admitted to the Masters in Professional Studies in Applied Economics program have satisfied prerequisites for this course.

Supplemental Texts: Each of these has a section dedicated to game theory that might be useful
Microeconomics, Prentice-Hall, Robert Pindyck and Daniel Rubinfeld
Microeconomics, Worth Publishers, Austan Goolsbee, Steven Levitt, and Chad Syverson
Microeconomic Analysis, W. W. Norton and Co., Hal Varian

Structure of the Course
The course is taught in a seminar format meeting once per week for 2.5 hours. Each topic will begin with an explanation of fundamental microeconomic principles and will be followed by a discussion of economic models and empirical evidence related to specific issues of market design. Student participation and discussion in class are essential. In addition, students are expected to participate in online discussions in between classes, which will be monitored by me. Grades are determined as follows:

- 20% class & online discussion participation
- 20% problem sets
- 30% in-class midterm
- 30% group presentation
Given the limited time we have together, attendance is mandatory. If you need to miss a class for an emergency, you must contact one of us prior to class. Homework is due at the beginning of class. Homework submitted more than 15 minutes into class will not be accepted. Students who must miss an exam and submit appropriate documentation explaining their absence will be offered a make-up exam. It will probably be harder.

**Group Project:**
The objective of the project is to study an existing market, describe the relevant market design questions, and evaluate how the current market design works and/or propose improvements on the current design. Specifically, the presentation (20 minute in-class presentation and 2 page class handout) should do the following:

- Describe the market (who participates, why do they participate, what is being traded)
- What is the purpose of the market
- What incentives exist in the market, both incentives that are consistent with the primary objective of the market operator and incentives that are inconsistent with those objectives
- What market failures are present.

Each group should be 3-4 people so we have no more than 4 presentations during the last class. Presentation should be no more than 20 minutes, which means no more than 15 slides. Grades will be based on the presentation, answers to questions from classmates and professors, and the quality of the written handout.

**Course Outline:**
Students are expected to have done the readings prior to class so they can participate in the class discussion (except the first class).

**2 June 2014: What is Market Design and why do we need it?**
- Closed markets, market design
- **Game:** Pit market

**3 June 2014: Introduction to Game Theory**
- Normal form games, dominant/dominated strategies
- **Game:** Pit Market, Prisoner’s dilemma
- **Reading:** Gibbons 1.1 and 1.2 (supplemental: Holt chapter 3)
- **Homework #1:** due June 16

**9 June 2014: Game Theory and Introduction to Auctions**
- Cournot, Stackleberg, Bertrand game
- Intro to Auction Theory: Static and Dynamic auctions, effect of competition
- **Game:** Private value auction
- **Reading:** Gibbons 3.1 and 3.2 (supplemental: Holt chapter 6)
- **Reading:** Roth, Alvin E. "What have we learned from market design?" Hahn Lecture, Economic Journal, 118 (March), 2008, 285-310.
- **Homework #2:** due June 23
16 June 2014: Continuation of Standard Games + Introduction to Auction Theory
- Private Values, Common Value, Winners Curse
- **Game**: Common Value auction
- **Readings**: Holt, chapter 19 and 21
- **Homework #3**: due June 30

17 June 2014: More Auction Theory + Private Value Auction Application
- Emission auctions, Spectrum Auctions, DME Auctions, Part D, Land auctions
- **Game**: Emissions permits

23 June 2014: Auction Application – Common Values; Theory II
- Theory: Reserve prices
- Applications: Sears outlet pricing, Oil and Gas auctions, FCC
- **Game**: Multi-round auctions
- **Reading**: Holt chapter 20 and 22

30 June 2014: Matching Markets
- Matching, unraveling, school choice, interns
- **Game**: Price/Quality market
- **Reading**: Holt chapter 10

7 July 2014: *****In-Class Midterm*****

14 July 2014: No Market Design Class

21 July 2014: Prediction Markets
- **Game**: Bayes Rule
- **Reading**: Holt chapter 34
- **Homework #4**: due July 28
28 July 2014: Additional Topics
- Coordination Games, Two-sided markets (online advertising, credit cards)
- **Game:** Effort Game
- **Readings:** Holt chapter 26
- **Reading:** Electricity: Wolak, Frank A. 2001. "What Went Wrong in California's Restructured Electricity Market?" Presentation at the AEI.

4 August 2014: Evidence-Based Policy
- Large Scale Field Experiments, Market Microstructure, Circuit breakers, Short sales, Congestion pricing (easy pass and changing prices)
- **Game:**

11 August 2014: No Market Design Class

18 August 2014: *****In-class Presentations*****

**Academic Integrity:** The University of Maryland has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards applicable to all undergraduate and graduate students, and you are responsible for upholding these standards as you complete assignments and take exams in this course. Please make yourself aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information see www.studenthonor council.umd.edu.

**Student Conduct:** Students are expected to treat each other with respect. Disruptive behavior of any kind will not be tolerated. Students who are unable to show civility to one another or myself will be referred to the Office of Student Conduct. You are expected to adhere to the Code of Student Conduct.

**Medical Excuses:** University policy requires students who are absent due to illness/injury should furnish documentary support to the instructor. I ask students to contact me by email or by phone prior to class time to indicate that you have an illness or injury. For a single missed class, an email or phone call will suffice. For illness or injury that causes a student to miss more than one consecutive class, you must provide written documentation verifying your illness/injury immediately upon your return to class.

**Students with Disabilities:** The University of Maryland does not discriminate regardless of differences in age, race, ethnicity, sex, religion, disability, sexual orientation, class, political affiliation, and national origin. Reasonable accommodations will be made to students with documented disabilities. I will make every effort to accommodate students who are registered with the Disability Support Services (DSS) Office and who provide me with a University of Maryland DSS Accommodation form (found here).

**Academic Progress:** The graduate school requires that students maintain a minimum GPA of 3.0 in order to maintain good academic standing. Students whose cumulative GPA falls below 3.0 are not making adequate progress in the program.