Game Theory for Applied Economists (AEM 7020)

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Objective: This class will develop students’ skills in game theory in an applied context. The course is designed for empiricists looking for the necessary tools to incorporate essential game theory concepts in their empirical work. Students will learn to set up and solve fundamental game theory models and then use them as a framework for empirical estimation. By enhancing their skills in building, solving, and applying game theory models, students will be better equipped to interpret their empirical estimates and assess the pros and cons of the econometric frameworks they utilize.

Methodology: To achieve the above objective, we will work through and solve several major classes of game theory models in an applied context. We will also analyze how these models are utilized in several empirical (primarily industrial organization) papers.

Meeting Times: Tuesday and Thursday, 11:40-12:55.


Other Readings: Empirical papers listed below.

Evaluation: Students will be evaluated based on homework (40%) and a final examination (60%). The final examination will be designed to prepare students for the Core Qualifying exam for AEM students at the end of the academic year.

Final: The final will be on 3/15/10. It will be a two-hour exam to be completed at each student’s discretion during the time period of 9:00 – 4:30 that day. For example, a student may pick up the exam at 10:30, and then will have until 12:30 to complete it and turn it in. Students are free to use their notes or other materials but may not discuss the final with others until all are turned in. Students who foresee a problem with taking the exam on that date should bring this to the instructor’s attention immediately.
**Expected Preparation:** Upon entering this course, it is expected that students are familiar with the definitions of: a game (static and dynamic, and in extensive and normal form), a strategy (pure and mixed), Nash equilibrium, strictly dominant and strictly dominated strategies, weakly dominant and weakly dominated strategies. They should also be familiar with the concept of iterated deletion of dominated strategies and equilibrium. Students who have read, and feel confident in, the material on pgs. 1-14 in Gibbons will be properly prepared for the course. It will be expected that all students know the topics covered on those pages at the beginning of the course.

**Course Outline:**

I. Lectures 1-4: Static Games of Complete Information (Gibbons Ch. 1, Tirole Ch. 5, and static problems from Tirole Ch. 7)
   a. Cournot & Bertrand games
   b. Capacity constraints
   c. The Problem of the Commons
   d. Mixed Strategies
   e. Spatial Competition
   f. Empirical Applications
      i. Game Theory and NEIO
         2. Burnstein (2005)
      ii. Spatial Competition

II. Lectures 5-9: Dynamic Games of Complete Information (Gibbons Ch. 2, Tirole Ch. 6, and dynamic problems from Tirole Ch. 7 & 8)
   a. Backward induction
   b. Stackelberg games
   c. Subgame perfection
   d. Repeated games and collusion
   e. Dynamic games in empirical work
      i. Porter (1983)
      ii. Borenstein & Shepard (1996)
      iii. Evans & Kessides (1994)
III. Lectures 10-13: Games with Incomplete Information (Gibbons Ch. 3 & 4.1, Tirole Ch. 9 & 2.3)
   a. Cournot competition under asymmetric information
   b. Auctions
   c. Adverse Selection
   d. Moral Hazard
   e. Games with incomplete information in empirical work
      i. P. Chiappori, F. Durand, and P. Geoffard (1998)

IV. Lecture 14: Cooperative Games

Empirical Papers to be Discussed in Class (Please Read in Advance of Lecture):


*For those seeking further empirical IO readings, see the syllabus for my graduate IO course (on my website).