

Economics 420: Game Theory with Applications

Fall 2012

Prof. Chris Kingston (cgkingston@amherst.edu)

Class: MWF at 10am in Chapin 201.

Office Hours: Monday 1–3pm or by appointment in Converse 314.

“Game Theory” is a set of modeling tools used to analyze strategic situations: situations in which multiple players interact and attempt to pursue their goals while taking account of their interdependence. Game theory has been applied to study strategic conflict and cooperation in a wide variety of settings in economics, political science, biology, law, and elsewhere. Such situations can include, for example: interactions between firms in imperfectly competitive markets; auctions; bargaining situations; arms races; political parties or candidates competing for votes; competition for mates; ethnic conflict; warfare; and chess.

This course will provide an introduction to the tools and insights of game theory. Though mathematically rigorous, emphasis will be on learning to apply these tools rather than on formal theory. Intermediate micro (Econ 300/301 or equivalent) is a prerequisite. Exceptions may be possible, but please see me as soon as possible if you have not already taken intermediate micro.

Readings

We will not stick closely to any one textbook. *Game Theory for Applied Economists* by Robert Gibbons is a clear and concise, but somewhat dry and technical exposition of the main themes of the course. For a more readable treatment, I also recommend Martin Osborne’s *An Introduction to Game Theory*. *Strategies and Games: Theory and Practice* by Dutta is worth a look if you don’t mind algebra. *Games of Strategy*, by Dixit & Skeath is a gentle introduction but somewhat below the level of this course. If you’re feeling ambitious, the best graduate-level textbook (above the level of this course) is *Game Theory* by Fudenberg and Tirole. Copies of the Gibbons and Osborne books are on reserve at the library.

Grading

There will be a 3-hour final exam, worth 45% of your course grade, and a 2-hour midterm worth 25% of your grade, some evening during the weekend of Friday 19th – Sunday 21st October. There will also be six problem sets at 2-week intervals during the semester, each worth 5%. These will be handed out on Fridays, and due by 9am the following Tuesday morning. You can hand in one problem set up to 48 hours late without penalty; after that, problem sets handed in late will be penalized. I encourage you to work together in groups as you tackle the problem sets, but the work you ultimately hand in *must be your own*. Solving problems is the only way to really learn Game Theory, so it is vital that you understand what you turn in on the problem sets.

Course Outline

Week 1	Introduction	Gibbons, chapters 1.1, 2.1A Osborne, chapters 1, 2, 5 Dutta, chapters 1, 2
Week 2	Equilibria in Strategic Form games	Gibbons, chapters 1.1–1.2 Osborne, chapters 2, 3 Dutta, chapters 3, 4, 5, 6
Weeks 3-4	Strategic form games with – Continuous strategies –Mixed Strategies	Gibbons, chapters 1.2–1.3 Osborne, chapters 3, 4 Dutta, chapters 7, 8
Weeks 4-5	Extensive form games Bargaining	Gibbons, chapters 2.1–2.4 Osborne, chapter 5, 6, 7, 16 Dutta, chapters 11, 13
Weeks 6-7	Repeated Games	Gibbons, chapter 2.3 Osborne, chapter 14, 15 Dutta, chapters 14, 15
<i>(Midterm)</i>		
Weeks 8-9	Evolutionary Game theory	Osborne, chapter 13
Weeks 9-10	Moral Hazard (The Principal-Agent model)	Dutta, chapter 19
Weeks 11-12	Games of incomplete information (Bayesian Nash equilibrium)	Gibbons, chapters 3.1–3.2 Osborne, chapter 9 Dutta, chapter 20
Weeks 12-13	Adverse Selection Signalling (Perfect Bayesian equilibrium)	Gibbons, chapters 4.1–4.3 Osborne, chapter 10 Dutta, chapter 24
Week 14	Experimental evidence on rationality and game theory	Goeree & Holt, “Ten little treasures of Game Theory and ten intuitive contradictions”, <i>American Economic Review</i> , Dec. 2001.