Introduction to Game Theory

ICPSR First Session, 2013

Scott Ainsworth, Instructor
sainswor@uga.edu

Kate Morris, Assistant
morri536@msu.edu

Course Purpose and Design:
Strategic concerns are an important element to many social and political settings. As such, a basic understanding of strategic choices enhances one’s understanding of social interactions and politics. This course introduces many of the fundamental concepts and tools for understanding basic game theory.

The formal analysis inherent to game theory methods is deductively structured and logically based. However, no mathematical background beyond simple arithmetic is presumed for this course. Those students with some familiarity with game theoretic tools will have a chance to refine those tools.

The course has three goals. Our first goal is to learn some basics. Our second goal is to understand the application of game theory tools to various aspects of politics. Our third goal is to begin the development of our own applications of the tools and techniques discussed. The careful application of formal work will be a prominent concern throughout the course.

Key Concepts Covered in the Course Include:
At the broadest level: Cooperative game theory, noncooperative game theory, equilibrium concepts
At more refined levels: pure and mixed strategies, complete and incomplete information, perfect and imperfect information, subgame perfection, beliefs

Reading Material:
The main text is Joel Watson’s Strategy: An Introduction to Game Theory, 2nd Edition. A new edition was released this summer, but we can all save a bit of money by sticking with the 2nd edition. Other readings will be available electronically. Generally, the electronic articles apply game theoretic tools. Our discussion of the substance will be limited and I will not vouch for the meaningfulness of substantive applications. Instead, we will focus on the development of the game theoretic model.
**Lecture Style:**
I will use some powerpoints but there is considerable board time.

**Grading:**
Grades are based on homework (@50%) and a final (@50%). Homework will be assigned toward the middle of the week (T, W, Th). T & W homework will be due on Friday. Th homework will be due on Monday.

For those of you new to ICPSR, the pace is intensive for students, TAs, and instructors.

**Syllabus and Course Structure**
This course has @18 days. We will not meet on the 4th of July. The final will be on the last day. We are left with @17 two-hour days. This syllabus is my best estimate of what we’ll cover and when we’ll cover it.

*ata=as time allows

I will try to use Fridays for catching up with material, discussing some homework problems, and handling other questions.

**Day 1:**
**How do we understand people?**
Introduction, preferences, utility

Watson Ch. 1

**Day 2:**
**What features of a social or political situation create a game?**
Extensive and Normal Form Game Forms

Watson Ch. 2, 3

Figuring out those payoffs…

Days 3 & 4:
**Bargaining, Part I**
The Nash Bargaining Solution and Cooperative Games

Watson Ch. 18


Day 5
Flex Day – Yes, we meet for class.

Day 6
**Back to the Present: Normal Form Games**

Watson Ch. 4 & 5

Day 7
**Strategies and Equilibrium Concepts**

Watson Ch. 6, 7 & 12

Day 8
**Strategies and Equilibrium Concepts, cont.ed**

Watson Ch. 8, 9, 10 & 11

Day 9
**Simple Games to Introduce Preferred to Sets and Win Sets**


Day 10
**A Comprehensive Overview of Models of Legislatures**


Days 11 & 12
Subgame Perfection and Subgame Perfection Examples

Watson Ch. 14 & 15


Day 13
Another look at bargaining

Watson Ch. 19


Day 14
Repeated Games


Watson Ch. 22

Day 15
Games of Incomplete Information

Watson Ch. 24, 26 & 28

Day 16
Introducing Signals


Day 17
Flex Day – Yes, we meet for class.

Day 18
Final

By the end of this course, the following concepts and jargon will have been introduced.

backward induction, bayes theorem, beliefs, Cartesian product, complete information, cooperative game, core, coordination, directed graph, dominance, dominate, edge, extensive form game, focal point, incomplete information, information set, iterated dominance, mapping, mixed strategy, mixed strategy equilibrium, Nash Bargaining Solution (NBS), Nash equilibrium, nature, node (initial & terminal), non-cooperative game, normal form game, pareto, player, preferred to sets, rationalizable, repeated game, strategic form game, strategy, subgame, subgame perfection, tree, types, utility, v-set, win sets, zero sum

There are many very good game theory references. The following is a woefully incomplete list in alphabetical order.

Austen-Smith and Banks have a two volume set. The first volume explores the connections between social choice theory and game theory. Friedman is an economic historian who also studied duopoly theory and game theory. Kreps has an extensive micro econ text that has excellent game theory presentations. Luce and Raiffa’s *Game and Decisions* is a classic. McCarty and Meirowitz are political scientists who wrote a game theory text that is a notch more advanced than Watson’s. This is one of the most recent game theory texts written for political scientists. Myerson wrote a very nice text back in the 1990s. Subsequently, he received a Nobel Prize for his work on mechanism design. Osborne has several game theory texts that are fairly commonly used. Niou and Ordeshook have a new intermediate text coming out soon.