

# Introduction to Game Theory

ICPSR First Session, 2012

Scott Ainsworth, Instructor

[sainswor@uga.edu](mailto:sainswor@uga.edu)

Austin Clemens, TA

[austincl@uga.edu](mailto:austincl@uga.edu)

## **Course Purpose and Design:**

This course introduces many of the fundamental concepts and tools for understanding basic game theory.

Strategic concerns are an important element to many social or political decisions. Therefore, a basic understanding of strategic choices will enhance one's understanding of social interactions and politics.

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 levels: 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*, 2<sup>nd</sup> Edition. Other readings will be available electronically. Generally, the electronic

articles apply game theoretic tools. We will not discuss and I will not vouch for the substantive applications themselves.

**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.

**Syllabus and Course Structure**

This course is has 20 days. We will not meet on the 13<sup>th</sup> day, which is the 4<sup>th</sup> of July. The final will be on the 20<sup>th</sup> day. We are left with 18 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...

Geddes. 1991. "A Game Theoretic Model of Reform in Latin American Democracies." *American Political Science Review* 85:371–392.

**Days 3 & 4:**

**Bargaining, Part I**

The Nash Bargaining Solution and Cooperative Games

Watson Ch. 18

Weingast. 1979. "A Rational Choice Perspective on Congressional Norms." *American Journal of Political Science* 23:245-262.

Ainsworth. 1997. "Representation and Institutional Stability." *Journal of Theoretical Politics* 9:146-159.

\*notes on Coase.

\*ata Farrell. 1987. "Information and the Coase Theorem." *Economic Perspectives* 1:113-129.

**Day 5**

**First Friday**

**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**

Bonneau, Hammond, Maltzman, Wahlbeck. 2007. "Agenda Control, the Median Justice, and the Majority Opinion on the U.S. Supreme Court." *American Journal of Political Science* 51:890-905.

Kiewiet and McCubbins. 1988. "Presidential Influence on Congressional Appropriations Decisions." *American Journal of Political Science* 32:713-36.

**Day 10**  
**Second Friday**

A Comprehensive Overview of Models of Legislatures

Krehbiel. 1988. "Spatial Models of Legislative Choice." *Legislative Studies Quarterly* 13:259–319.

**Days 11 & 12**  
**Subgame Perfection and Subgame Perfection Examples**

Watson Ch. 14 & 15

Ferejohn and Shipan. 1990. "Congressional Influence on Bureaucracy." *Journal of Law Economics and Organization* 6:1-20.

\*ata Gailmard and Hammond. 2011. "Intercameral Bargaining and Intracameral Organization in Legislatures." *Journal of Politics* 73:535-546.

\*ata Woon. 2008. Bill Sponsorship in Congress: The Moderating Effect of Agenda Positions on Legislative Proposals. *Journal of Politics* 70:201-16.

**Day 13**

No Class! It's your independence day!

**Day 14**  
**Another look at bargaining**

Watson Ch. 19

Bohnet, Frey, Huck. 2001. "More Order with Less Law: On Contract Enforcement, Trust, and Crowding." *American Political Science Review* 95:131-144.

**Day 15**  
**Third Friday**

Repeated games

Axelrod. 1981. "The Emergence of Cooperation among Egoists." *American Political Science Review* 75:306-318.

Watson Ch. 22

**Day 16**  
**Games of Incomplete Information**

Watson Ch. 24, 26 & 28

## Day 17

### Introducing Signals

Appendix A in Bohnet, Frey, Huck. 2001. "More Order with Less Law: On Contract Enforcement, Trust, and Crowding." *American Political Science Review* 95:131-144.

Ainsworth. 1993. "Regulating Lobbyists and Interest Group Influence." *Journal of Politics* 55:41-56.

Cho and Kreps. 1987. "Signaling Games and Stable Equilibria." *Quarterly Journal of Economics* 102:179-221.

## Day 18

## Day 19

### Review

## Day 20

### Final

By the end of this course, the following list of 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.

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.

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.