## Political Science 4553H/7681. Spring 2018. OSU

WeFr 12:45PM-2:05PM, Evans Lab 2001

# Honors Game Theory for Political Scientists/Formal Theories of Politics I

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Office hours: Th 1:00PM-3:00PM (*or at any pre-arranged time),* Derby 2068.

Game theory is a set of mathematical tools used to study strategic decision-making. Strategic decision-making is used in situations where the outcome depends on the actions of more than one actor (i.e., a “game”), and hence each actor, in choosing his or her optimal course of action, must take into account the expected behavior of the other actors. Such situations arise in all areas of politics, from legislators considering what legislation to introduce and how to vote on it (keeping in mind how they expect other legislators to vote, and whether or not the president will veto it), to candidates for political office deciding which policy positions to choose (keeping in mind how they expect voters to vote based on their policy preferences), and nations deciding whether or not to attack other nations (keeping in mind how their own and the other side's allies will react). Because analyzing such situations can become complicated, verbal reasoning can easily lead to mistakes and the use of mathematics becomes very helpful. The course requires basic (7th grade) algebra. No prior knowledge of calculus or probability theory is required. I will explain all notations as we go along.

Substantively, this course will focus on the key questions of comparative and international politics: why do states go to war, how can they deter nuclear war, how to curb nuclear proliferation, why do dictatorships exist, how democracies emerge, what makes democracy stable, what is the political rationale for terrorism, and so forth. You will read excerpts from classical texts (Thucydides' *History of the Peloponnesian War*, Thomas Hobbes' *Leviathan*, Thomas Schelling’s *Arms and Influence*, and Carl Von Clausewitz's *On War*)—to be posted on Carmen-- and be shown how to turn them into simple mathematical models that can be rigorously solved.

You will also work on a textbook by Joseph E. **Harrington**, Jr. 2015 (second edition), entitled *Games, Strategies, and Decision Making* (New York: Worth Publishers). The book is really nice for a game theory text because it is very explanatory and yet rigorous enough. It also has tons of examples, including many from political science, which is rare for a game theory text. Used and new copies should be available at the local bookstores or from Worth Publishers or Amazon.

Were you to have questions that cannot be asked during class or would you need individualized help, I am available at my office in Derby 2068 during office hours or at any pre-arranged time.

*Attendance:*

Attendance is mandatory. The roll will be taken at the beginning of each class. Unmotivated absence will be sanctioned by point losses (see “course requirements and grading standards” below). More than 10 unmotivated absence means you will be barred from taking the final.

*Course requirements and grading standards:*

The class grade will have five weighted components:

* 10% for attendance; each absence takes a 1% point off (11 absence and you are out).
* 10% class participation.
* 20% for 6 Quizzes. Each quiz will have to be completed through Carmen by the beginning of the class on the due date. Each quiz will be posted at least two days before it is due, feature a list of short-answer questions (sometimes multiple choice) destined to test your understanding of the readings assigned for that day, including substantively relevant past readings. Each quiz must be your own work.
* 30% for 5 Problem Sets. Each problem set will be distributed at least two days before it is due; your answers will be typed (with possibly handwritten graphs, tables, or formulas), printed on paper, and handed in at the beginning of the class on the due date. Problem sets will feature a few substantive exercises. Each problem set must be your own work.
* 30% for a final exam. The final exam will have a format similar to the problem sets, except that it will take place in class and have a closed-book format.

*Class Format:*

The class will alternate between lectures using PowerPointTM (13), exercise and review sessions using the chalkboard (9), and correction sessions using the chalkboard (5). Lecture notes will be posted on Carmen after every lecture.

*Classroom Etiquette*

Learning is maximized in the classroom when distractions are minimized. Therefore, any use of cell phones, iPads or other similar electronic devices is forbidden. Laptop users may get an exemption if they can prove that they are unable to take notes otherwise and if they agree to sit in the first two rows.

*Academic Misconduct*

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (<http://studentaffairs.osu.edu/resource_csc.asp>).

*Disability Services*

### Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; [**http://www.ods.ohio-state.edu/**](http://www.ods.ohio-state.edu/).

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### 1/10. Presentation. **The Epistemic Foundations of Game Theory**

Harrington CH 2 and 3.

### 1/12. *lecture 1.* **The State of Nature** (pure strategy Nash equilibrium)

Hobbes, posted material

Harrington CH 4

QUIZZ 1 on CH 2 and 4 due before class.

### 1/17. *exercises from CH 4 and 5*

Harrington CH 5.

### 1/19. *lecture 2.* **Nuclear Deterrence** (mixed strategy Nash)

Schelling, posted material

Harrington CH 7.

### 1/24. *lecture 3.* **Civil War** (mixed strategy Nash)

QUIZZ 2 on CH 7 due at midnight the night before.

### 1/26. *exercises from CH 7*

Distribution of the 1st problem set.

1/31. *correction of 1st problem set*

1st PROBLEM set due at beginning of class.

2/2. *lecture 4.* **The** **Social Contract** (repeated PD)

Harrington CH 13.

### 2/7. *lecture 5.* **Democratic Stability** (repeated game)

Harrington CH 14

QUIZZ 3 on CH 13 and 14 due at midnight the night before.

### 2/9. *exercises from CH 13 and 14*

Distribution of the 2nd problem set.

### 2/14. *correction of 2nd problem set*

2nd PROBLEM set due at beginning of class.

### 2/16. *lecture 6.* **War as Commitment Problem** (subgame perfection)

Thucydides, posted material

Harrington CH 8.

### 2/21. *lecture 7.* **Terrorism** (subgame perfection)

 Harrington CH 9

QUIZZ 4 on CH 8 and 9 due at midnight the night before.

2/23. *exercises from CH 8 and 9*

Distribution of the 3rd problem set.

### 2/28. *correction of 3rd problem set*

3rd PROBLEM set due at beginning of class.

### 3/2. *lecture 8.* **Nuclear Non-Proliferation: The NPT** (Bayesian)

Harrington CH 10.

### 3/7*.* *lecture 9.* **Elections as Control Mechanism** (Bayesian)

QUIZZ 5 on CH 10 due at midnight the night before.

### 3/9. *lecture 10.* **Nuclear Non-Proliferation: Bush v. Saddam** (Bayesian)

### 3/21. *lecture 11.* **War as a Result of Incomplete Information** (Bayesian)

### 3/23. *exercises from CH 10*

Distribution of 4th problem set.

### 3/28. *correction of 4th problem set*

4th PROBLEM set due at beginning of class.

### 3/30. *exercises from CH 11*

### 4/4. *lecture 12.* **Elections as Selection Mechanism** (Perfect Bayesian Nash

Harrington CH 11

QUIZZ 6 on CH 11 due at midnight the night before.

### 4/6*.* *lecture 13.* **Massive Retaliation and Flexible Response** (Perfect Bayesian Nash)

Clausewitz, posted material.

### 4/11. *exercises*

Distribution of 5th problem set.

### 4/13. *correction of 5th problem set*

5th PROBLEM set due at beginning of class.

### 4/18*. review*

### 4/20. *More review*

4/26. 12:00-1:45: *final examination*