



## ECON 461: **Game Theory**

Professor Clara E. Jace (jace@cua.edu)

Fall 2020

*“It is just as foolish to complain that people are selfish and treacherous as it is to complain that the magnetic field does not increase unless the electric field has a curl. Both are laws of nature.” – John Von Neumann*

**Credit hours:** 3

**Prerequisites:** The class requires successful completion of ECON 242. While the emphasis of this class will be on the practical, a solid understanding of game theory requires some mathematical sophistication. The student should have experience with basic probability theory and calculus.

**Class schedule:** Monday, 5:30-8:00pm (online)

**Office hours:** Tuesdays 2-4pm (online) or by appointment

### 1 **Course Description**

Choices are never made in a vacuum. In choosing, we take into account not only our actions, but the actions of others and their effects. Game theory is the systematic study of interdependent choices—strategies—from the economic point of view.

Using microeconomic foundations, this course studies the theory of games and strategic decisions. It also explores empirical uses in simulation and computer modeling. The mathematical structure allows us to trace the logical implications of our assumptions and then test our predictions against the real world. The study of game theory emphasizes the role of competition, timing, information, and cooperation in determining outcomes. It is used widely by economists and increasingly in other sciences such as political science, psychology, sociology, and biology.

## 2 Course and Student Goals

At the end of the course, students should be able to:

- Understand, evaluate, and analyze the basic ideas of game theory
- Understand the nature and limitations of strategic games
- Apply game theory to real-world situations
- Communicate game theoretic concepts to a broader audience

## 3 Required Texts

The following books are required for this course:

1. Dixit, A. K., Skeath, S., Reiley, D. (2015). *Games of Strategy: Fourth Edition*. WW Norton Company.
2. Schelling, T. C. (2006). *Micromotives and macrobehavior*. WW Norton Company.

All other readings will be provided on Blackboard.

## 4 Course Requirements

The final grade for this course will be based on the following items and corresponding weights:

Assignment	Weight
Midterm Exam	30%
Final Exam	30%
Reflection Papers	20%
Book Review	20%

- **Reflection papers:** Before midnight each Sunday (so I can read them prior to our class), I ask that you submit a 1-page paper through Blackboard on the readings that we will cover in class that week. These papers may discuss topics that stood out to you, provide a summary of the readings, or especially, contain questions that arise. Late assignments will not be accepted.
- **Book Review:** The book review will consist of a 5pg. summary and reflection on Nobel Laureate Thomas Shelling's (2006) book, *Micromotives and Macrobehavior*. Though the review will not be due until the end of the semester, you are most welcome to complete and turn it in earlier.

You are expected to participate in every virtual class with your video on. Students who do miss an occasional class are responsible for getting the notes and finding out what they missed, including any pertinent announcements and/or homework assignments.

## 5 Academic Policies

### 5.1 Academic Honesty

The university's policies and procedures for academic integrity may be found here:

<http://policies.cua.edu/academicundergrad/integrityfull.cfm>

<http://policies.cua.edu/academicundergrad/integrityprocedures.cfm>

The policy states: "The following are the major categories of academic dishonesty:

A. Plagiarism is the act of presenting the work or methodology of another as if it were one's own. It includes quoting, paraphrasing, summarizing or utilizing the published work of others without proper acknowledgment, and, where appropriate, quotation marks. Most frequently, it involves the unacknowledged use of published books or articles in periodicals, magazines, newspapers and electronic media. However, any unacknowledged use of another's words, ideas or electronic processes constitutes plagiarism, including the use of papers written by other students, oral presentations, interviews, radio or TV broadcasts, any published or unpublished materials (including Web-based materials, letters, pamphlets, leaflets, notes or other electronic or print documents), and any unauthorized or inadequately credited use of foreign language, scientific and/or mathematical calculation and/or modeling programs or online services.

B. Improper use of one's own work is the unauthorized act of submitting work for a course that includes work done for previous courses and/or projects as though the work in question were newly done for the present course/project.

C. Fabrication is the act of artificially contriving or making up material, data or other information and submitting this as fact.

D. Cheating is the act of deceiving, which includes such acts as receiving or communicating or receiving information from another during an examination, looking at another's examination (during the exam), using notes when prohibited during examinations, using electronic equipment to receive or communicate information during examinations, using any unauthorized electronic equipment during examinations, obtaining information about the questions or answers for an examination prior to the administering of the examination or whatever else is deemed contrary to the rules of fairness, including special rules designated by the professor in the course.

E. Attempts to engage in any of the conduct described above or the facilitation of any of this conduct by another individual will be treated as conduct constituting academic dishonesty for purposes of this policy."

## 5.2 Make-Up Policy

Students will not be allowed to take an exam in advance of its scheduled date. A student who misses a test will be allowed to write a make-up test only if s/he provides a relevant medical certificate. Late assignments will not be accepted, no extensions are granted.

## 5.3 Campus Resources for Student Support

Any student who feels she/he may need an accommodation based on the impact of a disability should contact the instructor privately to discuss specific needs. Please contact Disability Support Services (202-319-5211, Room 207 Pryzbyla Center) to coordinate reasonable accommodations for students with documented disabilities. To read about the services and policies, please visit the website: <http://disabilitysupport.cua.edu>.

## 6 Health Protocol

In the event of my becoming ill, the weekly course readings and Blackboard paper submissions will continue as planned. All lecture slides will be posted online before the first day of the course, so students will be able to access them as needed. Insofar as I am able, I will continue discussion for the course virtually. If I do become too sick to teach the material in any meaningful way, online lectures from the Open Yale course on Game Theory will be assigned to substitute and grades will be assessed with an awareness of this fact.

## 7 Assessment

The grading applied to this class is as follows:

A: 96-100	C+: 71-75
A-: 91-95	C: 66-70
B+: 90-86	C-: 60-65
B: 81-85	D: 55-59
B-: 76-80	F: 54-0

## Course Outline and Readings

Week	Dates and Topics	Readings for the Week
1	<b>Aug. 24:</b> What is a game?	<ul style="list-style-type: none"> <li>• Shelling: Chapter 1</li> <li>• “Pascal’s Wager” (<i>Stanford Encyclopedia of Philosophy</i>)</li> </ul>
2	<b>Aug. 31:</b> What is strategy?	<ul style="list-style-type: none"> <li>• Dixit: Chapters 1-2</li> </ul>
	<b>Sept. 7:</b> Labor day (no class)	
3	<b>Sept. 14:</b> Sequential and simultaneous games	<ul style="list-style-type: none"> <li>• Dixit: Chapter 3-4</li> </ul>
4	<b>Sept. 21:</b> Nash equilibrium	<ul style="list-style-type: none"> <li>• Dixit: Chapter 5</li> </ul>
5	<b>Sept. 28:</b> Mixed strategies	<ul style="list-style-type: none"> <li>• Dixit: Chapter 7</li> </ul>
6	<b>Oct. 5:</b> Midterm	
	<b>Oct. 12:</b> Columbus Day (no class)	
7	<b>Oct. 19:</b> Uncertainty, risk, and information	<ul style="list-style-type: none"> <li>• Dixit: Chapter 8</li> </ul>
8	<b>Oct. 26:</b> The Prisoners’ Dilemma and repeated games	<ul style="list-style-type: none"> <li>• Dixit: Chapter 10</li> <li>• “A Cross-Discipline View of Trust” (Rousseau et al. 1998)</li> </ul>

9	<b>Nov. 2:</b> Evolutionary games	<ul style="list-style-type: none"> <li>• Dixit: Chapter 12</li> <li>• “Dictatorship, Democracy, and Development” (Olson 1993)</li> </ul>
10	<b>Nov. 9:</b> Strategy and voting	<ul style="list-style-type: none"> <li>• Dixit: Chapter 15</li> <li>• “How Much Benevolence is Benevolent Enough?” (Leeson 2006)</li> </ul>
11	<b>Nov. 16:</b> Bargaining games	<ul style="list-style-type: none"> <li>• Dixit: Chapter 17</li> <li>• “Noncooperative Bargaining Models of Marriage” (Lundberg and Pollak 1994)</li> </ul>
12	<b>Nov. 23:</b> Further applications of game theory	<ul style="list-style-type: none"> <li>• “An Introduction to Applicable Game Theory” (Gibbons 1997)</li> <li>• “The Infallibility of the Pope” (Ferrero 2011)</li> </ul>
13	<b>Nov. 30:</b> Review	Book Review due Dec. 4, by midnight
	<b>Dec. 8:</b> Feast of the Immaculate Conception	Holiday and Reading Day
	<b>Dec. 7-12</b>	Final Exams