Game Theory - ECO 379
Spring Quarter 2023
DePaul University, Driehaus College of Business

Hybrid
In-Person: Mondays, 5:45 - 7:15pm, 14 E Jackson Room 330
& Asynchronous

Instructor: Daniel Clark
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Office Hours:
  Mondays 7:15 - 8:15pm
  By-request (online)
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Course Description and Goals

Game Theory provides a framework for analyzing strategic interactions. This course aims to introduce the game-theoretic approach and its usefulness in understanding many strategic situations in economics, everyday life, and several other fields (business, politics, biology, computer science, etc.). Unlike other disciplines that rely on formal modeling, the emphasis is not on the specific answers one gets but on the problem formulation and solving process. The ultimate goal is to master the game-theoretic way of thinking and the game theory arguments' logic.

To accomplish this goal, we will introduce and discuss the building blocks of game theory that are both accessible and intuitive without using excessive mathematics. The more applied component of the class will highlight the power of game theory in making decisions by discussing many examples and participating in a variety of experiments. In the end, we hope that you walk away from this class with an enhanced ability to think about strategic problems and make strategic decisions in a more disciplined way.

Required Texts

Readings will be posted on D2L.

Summary of Assignments

Assignment	Quantity	Weighted Percentage
Class Participation & Experiments (Individual)	10	30%
Problem Set & Journals (Groups of Two-Four)	4	40%
Final Exam (Individual or Groups of Two-Four)	1	30%

Course Assignments

- **Class Participation & Experiments (30%) Individual**
  - We will cover a different topic each week as outlined in the course schedule. Our class will also perform in-class experiments. We will discuss the details of experiment participation in class. This course's success depends heavily on your reading of course texts and making thoughtful and respectful contributions to our collective learning experience as a classroom community.

  - During class time, you are required to refrain from using your computer and other digital devices for purposes other than coursework (e.g., checking personal or work e-mail, accessing social networking/media or other websites, etc.). Violations of this technology policy will be reflected in your class participation grade.

  - I also understand that planned or unforeseen events come up requiring you to miss class. After you miss one class, your overall grade will decrease by 3% for each additional class missed.

- **Problem Sets & Journals (40%) Groups of Two-Four**
  - There are four problem sets during the course. You must choose your partner(s), and you may choose a different partner(s) for each assignment if you'd like. Questions are based on the course schedule topics. The assignments will be available for download on D2L. These assignments require you to calculate, draw, and write responses to game-theoretical problems. You may turn in assignments by email or on D2L.

  - Within each problem set are journaling questions to document and reflect upon your own and group's learning process. For example, record your reflective reactions to class discussions and activities, explicitly connecting what we do in class to your thinking and experiences about the topic.

  - **!! You will receive a maximum grade of 50% if you turn in the problem set after the deadline —check D2L for specific due dates.**

- **Final Exam (30%) Individual or Groups of Two-Four**
  - You will work on a final (group) project, which will be due one week after the last day of class. The final paper, which I expect to be approximately 8-10 pages in length, will consist of applying the game theory frameworks to a topic of your choice. Throughout the term, we will learn and discuss several techniques and tools to analyze and make decisions in strategic situations. In the process, you will realize that game theory is a vibrant and versatile framework. I expect that your paper showcases your ability to apply this framework to an interesting topic. Any topic where strategic decision-making is involved is fair game. Topics may range from the analysis of strategic behavior in an industry or firm; to political campaigns and voting; to credible threats and promises in motion pictures or books; to contestant behavior in game shows; to strategic analysis of historical events; to negotiation analysis to divide an inheritance; to tactical analysis in volleyball and football. The tools you may choose to analyze your topic may or may not be formal or mathematical. This will depend on specific preferences and on whether mathematical modeling helps you make your point and build a better product or not. I am looking for a simple yet insightful and original application of

the game-theoretic way of thinking. An appropriate choice of the relevant frameworks and tools that best fit the issues you intend to analyze is likely the best strategy.

- **Extra Credit**
    - I will explain extra credit and recommended study methods during the first week of class.

Grades

Grading scale is based on department standards.
A = 93-100%; A- = 90-92.99%; B+ = 88-89.99%; B = 83-87.99%; B- = 80-82.99%; C+ = 78-79.99%; C = 73-77.99%; C - = 70-72.99%; D+ = 68-69.99%; D = 60-68.99%; failing < 59.99

Important information

Plagiarism: In conducting their work, students are always encouraged to consult appropriate references and to work with peer reviews on assignments. However, submitting any material by another person without proper acknowledgment is considered plagiarism. There is no such thing as the innocent submission of someone else's work. Students should be aware that a charge of plagiarism, if proven, could result in an automatic "F" for the assignment, failure of the course and/or additional disciplinary actions. If you're unsure of the policies regarding this matter, review the full description of plagiarism and sanctions in the DePaul Student Handbook.

!! DePaul <u>Academic Integrity Policies</u> and <u>Student Handbook Policies</u> apply to this course.

DePaul students seeking disability-related accommodations are required to register with *DePaul's Center for Students with Disabilities (CSD)*, enabling you to access accommodations and support services to assist your success. Two office locations for CSD can provide you with enrollment information or inquire via email at csd@depaul.edu.

DePaul University offers amazing programs and services available to you, including the <u>university library</u>, <u>counseling & psychological services</u>, <u>the Writing Center</u>, <u>Career Center</u>, and resources for basic needs, to name a few.

This course follows the university's policies related to COVID-19. For the latest news and resources, please visit <u>DePaul's response to COVID-19 page</u>.

Course Schedule

	Topic*
Week #1	Foundations
Week #2	Modeling
Week #3	Nash Equilibrium
Week #4	Randomization
Week #5	Information
Week #6	Repeated Interactions
Week #7	Application: Biology
Week #8	Application: Business
Week #9	Application: Political Science & Law
Week #10	Application: Neuroeconomics & Computer Science

* Assignment deadlines will be posted on D2L