

DePaul University – Kellstadt Graduate School of Business

ECO 525 – Game Theory and Strategy

Spring 2025

Instructor: Rafael A. Tenorio

E-mail: rtenorio@depaul.edu

Important: This syllabus is a live document. As the term progresses, we may need to make some adjustments to keep the course running smoothly and in a way that is manageable for all. I will make any adjustments clear to everyone.

Course Goals and Description

Game Theory provides a framework for analyzing strategic interactions of multiple decision-makers. The goal of this course is to introduce the game-theoretic way of thinking and show its usefulness in understanding a variety of strategic scenarios arising in business, economics, as well as many other fields and everyday life. Game Theory is a formal theory of decision-making, and therefore its tools are analytical in nature. As such many of the building blocks of the course will draw on analytical frameworks and some formal models. The class will introduce and discuss these analytical tools in a way that is intuitive, applicable, and thought-provoking without using a lot of math. In addition to discussing basic frameworks for strategic thinking, we will stress the power of game theory in making decisions. To accomplish this, we will rely on two applied components: (a) discussion of an assortment of short cases and real-life examples, and (b) participation in a variety of experiments that mimic some of the games discussed in class and other actual situations of strategic interdependence. In the end, the goal is that you complete this class with an enhanced ability to think about strategic problems and make decisions in a more disciplined way.

Course Format

We will conduct this course in an *Online Hybrid* format. This means that:

1. I will record my lectures asynchronously and post them on D2L.
2. Every week we will have a **required** Zoom session on Tuesdays from 5:45 p.m. to 7:30 p.m. During these sessions we will talk about supplementary materials, have group presentations and discussions, and study new applications of the topics covered in the lectures.

I will post my slides and video lectures at the latest every Friday of the previous week.

You can work through each week's lecture at your own pace but keep in mind that we may reference lecture materials during our Zoom sessions and that there will be weekly deadlines for discussion posts and experiments.

Please make sure to have the necessary technical resources to be able to access course materials and complete assignments. If you do not have access to the following resources, please let me know immediately so I can make accommodations for you:

- A computer with a web cam that connects to the internet
- A working DePaul email account. All class-related communication comes through DePaul email, so make sure to check this frequently. You can also forward your DePaul email to your preferred service if you prefer
- Access to Microsoft Office or similar software
- Ability to playback video files

Camera Use

You must keep your camera on during our Zoom meetings. This a graduate class that will greatly benefit from interaction and exchange of ideas and insights. It will be easier for us to feel connected as a group and build a sense of community if we can see and hear each other during our sessions. I will give you a camera break every session.

Office Hours

I will conduct office hours in two ways:

- Every Tuesday during our Zoom sessions we will have time to address any questions related to class content and administration.
- By appointment at a mutually convenient time. Please email me to make an appointment. I am responsive to email, and I do my best to reply quickly.

Books and Other Materials

Lecture Slides and Supplementary Readings, posted on D2L.

My lecture slides and videos are based on a variety of sources. They are extensive and are the primary source for the class. Please study these before reading any of the books or supplemental readings.

I also recommend the following books:

Games for Business and Economics, 2nd. ed., Roy Gardner, Wiley, 2003 (1st. edition is fine too). You can get a print copy from any online or brick and mortar bookstore, or an e-copy of selected chapters from *Vital Source* at:

<https://www.vitalsource.com/textbooks?term=9781119262336>

The Art of Strategy, Avinash Dixit and Barry Nalebuff, Norton, 2008.

<https://www.amazon.com/Art-Strategy-Theorists-Success-Business/dp/0393337170/>

Grading

I will determine your grade using the following components and weights:

Weekly Presentations (Individual/Group)	15%
Participation in Weekly Topic Discussion Boards (individual)	30%
Participation in Zoom Sessions (Individual)	15%
Experiments (Individual)	10%
Final Project (Group)	30%

Weekly Presentations (15%)

Starting on week 3, we will have a group-lead presentation/discussion during our Tuesday Zoom sessions. **You will work in groups of four or five students for presentation purposes** (see group formation policy below) and will have approximately 45-50 minutes to present an assigned topic (from one or more articles) and discuss it with the class. I will contact each group in advance to set the expectations about the presentation and offer tips and recommendations. One of the main goals here is to spark a productive exchange of ideas with your classmates, so try not to not spend too much time describing facts and instead build-in discussion questions and prompts as you go along. **I will grade your presentation based on your ability to (a) convey the main ideas of the article(s), (b) incorporate class material, and (c) conduct a fruitful exchange with your classmates** (if your classmates are not asking questions have your own questions ready and turn the tables on them). **Please manage your time well and make sure that all group members get comparable**

airtime (this will also be part of the grading criteria). If you are scheduled to present, prepare a slide deck, and send it to me for comments at least 24 hours before the session.

Group formation: You will work in groups of two or three students for the final project and I will merge two groups for presentation purposes. There is a class roster available on D2L under Classlist. If you know people in the class and would like to work with them, please contact them using the D2L Classlist feature. I will open group self-registration during week 1 and give you until Monday, April 7 to form your group. If you do not know anyone in the class or you do not feel comfortable reaching out to possible teammates, let me know and I will match you up with other students in the same situation. The first presentation will take place on April 15.

Participation in Weekly Topic D2L Discussion Boards (30%)

Participation in the discussion boards is vital in this class. Given our class goals and approach, we will maximize learning opportunities when we all share ideas and positions and when we pay attention to the comments of others and thoughtfully respond to them. Each week, there will be one discussion board. For each class topic there will be a prompt for discussion, debate, and reflection based on the video lecture, readings, and other content I will post in advance. These discussion boards will include both conceptual issues and applications of the material. **You are required to at a minimum make one weekly post, either a thread that you start, or a substantial response to a classmate's thread. That is one minimum required post per week** (feel free to exceed this minimum as you see fit).

Weekly topic discussion boards will close on Tuesdays at noon.

You are also required to make an Introduction post due on April 8 at 11:59 p.m.

Discussion Post Standards and Etiquette

- a. Posts demonstrate knowledge of the class concepts and are linked to evidence and/or course material.
- b. **Timely** -adhere to the time window set aside for each discussion, not posted at the last minute. Timely posting leads to productive discussions, in that it allows class members to respond to each other's comments. Your posts will garner less attention if they are consistently entered during the last hours the board is open.
- c. If your post is related to an existing thread, you must reply to that thread instead of creating a new one.
- d. Respectful -even when there is strong disagreement.
- e. Stimulate thinking. Do not be afraid to challenge existing comments.

- f. Encourage others to provide evidence and/or refer to course concepts to support their arguments.
- g. Stay away from emotional or unsupported arguments.
- h. Move the class understanding forward.
- i. Posts must add value. Stating “I agree”, “I was going to say the same thing”, or repackaging what a classmate said, will not be credited as discussion posts.
- j. Do not ramble or post just for the sake of meeting the requirement.
- k. Do not write in all CAPS. If you want to emphasize a word or phrase you may write it in bold, italics, underline it, or put an asterisk before and after the word or phrase.

I will monitor the discussion boards and participate when I see fit. I will keep track of the posting requirements and the quality of your comments.

I may also open some optional discussion boards throughout the quarter, where we will talk about miscellaneous topics and articles related to game theory and strategy.

Participation in Synchronous Zoom Sessions (15%)

Preparation and participation are vital in this class. We will spend a non-trivial amount of time during our Zoom meetings discussing class topics and applications, and also exchanging ideas about other economics, business, and other strategy and decision-making topics. I expect you to actively participate and contribute to these discussions. The more we all contribute, the more we will all benefit. Frequent absences will likely result in a reduced participation grade, so make it a point to be there for our sessions.

Experiments (10%)

We will conduct experiments regularly throughout the term. Each experiment will allow you to earn both participation and performance points (payoffs) that will count toward your grade. I will calculate your overall experimental score as the sum of all participation and performance payoffs you amass throughout the term. **I will alert the class via email every time I post an experiment (typically on Tuesday after class or Wednesday during the day) and you will have until the subsequent Monday at 11:59 p.m. to complete each experiment. Experiments are timed at 30 mins. each.**

Final Project (30%)

You will work (in groups of two or three) on a final project which will be due (in pdf form) in the D2L Submissions Box at **11:59 p.m. on Tuesday, June 10, 2025. The topic of the final paper is open-ended, but the goal is clear: You need to demonstrate that you can use the game-theoretic framework to analyze a problem of your choice.**

Throughout the term, we will introduce many models, techniques, and tools to analyze and make decisions in strategic situations. In the process, you will realize that Game

Theory is a very rich and versatile framework. I expect your paper to showcase your ability to apply the framework (and the specific tools you select) to a topic that is interesting to you. Topics chosen in the past have varied widely; from the analysis of strategic behavior in an industry or firm, to political campaigns and voting, to credible threats and promises in literary works and films, to contestant behavior in game shows, to strategic analysis of historical events, to negotiation analysis to divide an inheritance, to spread of misinformation in social media, to collective action to mitigate climate change, to tactical analysis in sports and other games. **The tools you choose to analyze your topic may or may not be mathematical.** This will depend on your preference and on whether the mathematical approach helps you make your point or not. What I am looking for is an insightful application of the game-theoretic way of thinking, and the relevance and fit of the specific tools you ultimately choose in your analysis. For real-life applications it will greatly help if you use data or any other quantitative evidence to help you make your point. I will also consider the originality of the topic you select. Although there is no hard guideline on length, I expect something around the 12 to 15-page mark, give and take. For additional details, please consult the posted guidelines on D2L. **There will be a proposal due on Friday, May 23 at 11:59 p.m.**

Academic Integrity

All work completed for this course must adhere to the University Academic Integrity Policy which you can review at <http://academicintegrity.depaul.edu>.

I may use *Turnitin* or other plagiarism detection technology for all written work submitted for this class to ensure the work is the student's own creation and is not in violation of DePaul University's Academic Integrity Policy. Submission of work for this course constitutes (i) a pledge that the work is the student's own original work and (ii) consent to have the work submitted to verify that fact.

You are welcome to use outside sources for your paper and discussion posts, but you must cite them properly. Proper citation includes using quotation marks if you paraphrase.

Generative AI is considered an external source for purposes of this class and thus must also be cited properly.

Course Organization

The learning unit in this course is the week. The term has 10 instructional weeks, and we will follow a weekly schedule that begins on Tuesday.

Course Outline

You are not required to read all the readings. Your primary responsibility is to study the posted lecture materials (videos and slides). The book and readings nicely supplement our lecture materials, and we will discuss some of these during the Zoom sessions and possibly on the D2L discussion boards.

Group presentation topics are in **bold**.

Week 1 – April 1

Lecture Topic: Introduction and Two-Person Games I

Readings: Harrington (2009), Introduction to Strategic Reasoning; Dixit and Nalebuff (D&N), Introduction and Chapter 1; Why Modeling Competition is Important (Atsmon, 2017; Courtney et al., 2009); How Management and Game Theory Understand Strategy (Shivakumar, 2020); Dear *Fast Company*, Game Theory is Useful for Business (Talwalkar, 2016); Time for Some Game Theory (Page, 2023).

Week 2 – April 8

Lecture Topic: Two-Person Games II

Readings: Gardner [G], Ch. 3; D&N, Ch. 4; **Stag Hunt and the Internet (Talwalkar, 2008; Skyrms, 2001, 2004; Cartwright, 2013; Case, 2016)**, Battle of the Sexes and Standard Wars (Murnighan, 1992; Shapiro and Varian, 1999); Coke vs. Pepsi (Greenwald and Kahn; 2005, Bhasin, 2013).

Introduction Post Due on April 8 at 11:59 p.m.

Week 3 – April 15

Presentation: Stag Hunt and the Internet (slides due on April 14)

Lecture Topic: Mixed Strategies

Readings: G. Ch. 4; D&N Ch. 5; Soccer, Tennis, and Cricket (D&N, 1991 and 2008; Walker and Wooders, 1998; Palacios-Huerta; Ahmed, 2003, Page 2023); **Everyday Low Prices vs. High-Low Prices (Gardner, pp. 92-94; Ellickson and Misra, 2008; Aparicio et. al., 2021)**; Randomness of Coin Flip vs. Human Guess ([Britcruise](#)); Can you beat an AI at Rock-Paper-Scissors? ([Essentially](#))

Week 4 – April 22

Presentation: Everyday Low Prices vs. High-Low Prices (Slides due on April 21)

Lecture Topic: N-Person Games

Readings: G. Ch. 5; **Climate Change (Mond, 2021; MacLellan, 2022; Dyke, 2016; Spierre, 2013; Highfield, 2018; Snower, 2022)**; Social Dilemmas (Glance and Huberman, 1994; Dawes, 1980; Dawes and Messick, 2000); Tragedy of the Commons (Battersby, 2017; O’Gorman, 2010).

Week 5 – April 29

Presentation: Climate Change (Slides due on April 28)

Lecture Topic: Sequential Games and Credibility

Readings: G. Ch. 7; D&N Ch. 2, 6-7; Cuban Missile Crisis (Zagare, 2014; Brams, 1985); **Ultimatums (Camerer, 2003; Thaler, 1988; Sanfey et al., 2003; List et. al., 2011, Gabay et. al., 2014; Oosterbreek et. al., 2004; Kirk et.al., 2011)**; Field Centipedes (Palacios-Huerta & Volij, 2009); Oppenheimer and Nuclear Deterrence (Detsch, 2023; Huessy, 2023; De Witte, 2023).

Week 6 – May 6

Presentation: Ultimatums (Slides due on May 5)

Lecture Topic: Repeated Games

Readings: G. Ch. 8; D&N Ch. 3 & 9; **Corporate Culture (Kreps, 1990; Camerer and Vepsalainen, 1988; Zingales et. al., 2013; Carpenter et. al., 2021)**; Infinite Games (Sinek, 2019, [Video](#); Carse, 1986); Computer Tournaments and Live and Let Live (Axelrod, 1984; Tobin, 2019; Kopelman, 2020); Reputation (Page, 2024-1 and 2024-2); Coordination in Organizations (Camerer and Knez, 1996).

Week 7 – May 13

Presentation: Corporate Culture (Slides due on May 12)

Lecture Topic: Evolutionary Games and Learning

Readings: G. Ch. 9; **Agent-Based Models (Rauch, 2002; Card et.al., 2008; Sandholm et. al., 2019, [Interactive](#); Auchincloss and Garcia, 2015)**; Cheating (Frank, 1988); Collective Decision-Making (Kudesia et. al., 2020; [Podcast](#)); Evolution of Cooperation (Nowak, 2006; Nowak-Rand, 2013; Singer, 2015); Social Tipping Points (Andreoni et. al. 2021).

Week 8 – May 20

Presentation: Agent-Based Models (Slides due on May 19)

Lecture Topic: Asymmetric Information and Signaling Games

Readings: G. Ch. 10; D&N Ch.8; **Gifts (Camerer, 1988; Ward-Broniarczyk, 2016; Gupta, 2019; Brooks, 2022)**; Adverse Selection in Health Insurance (Cutler and Zeckhauser, 1998; NAIC, 2011; Chernew, 2017); Signaling Games (Sobel, 2007).

Final Paper Proposal due on May 23.

Week 9 – May 27

Presentation: Gifts (Slides due on May 26)

Lecture Topic: Auctions and Bidding

Readings: Rasmusen (2006-parts); D&N, Ch. 10; **Winner's Curse and Hubris Hypothesis (Thaler, 1992; Decision Lab, 2021; Roll, 1986; Liu et. al., 2022; Arroyabe-Hussinger, 2024)**; The Bidder's Curse (Lee and Malmendier, 2007, 2016; Schneider, 2016).

Week 10 – June 3

Presentation: Winner's Curse (Slides due on June 2)

Final Paper due on June 10 at 11:59 p.m.