

Game Theory and Strategy

ITBA Economics and Business – 2nd Semester 2023

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Introduction and Objectives

Decision-making is at the heart of business and people's lives, often under pressure, with limited information and uncertainty. In this course, we will focus on Game Theory as a tool for making better decisions.

Game Theory is the discipline that studies strategic interaction, identifying the best course of action in every circumstance. It pursues two interrelated purposes: (i) to advise the involved parties about the best course of action in situations of strategic interaction, and (ii) to predict the outcome of such interaction.

Thinking and analyzing everyday situations - such as driving a vehicle, deciding which bar to have a coffee in, or whether to attend a tennis match - or significant issues - like diplomacy, war, or business - in a strategic way, will allow us to better understand the world around us and act more efficiently, minimizing mistakes.

Game Theory is an applied course. Our goal is to provide you with the tools of the theory and identify real-life situations in which these tools could be useful to us. We will present the theoretical tools in an abstract way, but they will be accompanied by case studies, examples, and practical experiments, emphasizing their application in the real world.

Course Policy

Evaluation

To pass the course, students must comply with the university's attendance requirements and pass both mid-term exams with 50% or more of the points.

The final course grade will be composed as follows:

- 40% mid-term exam,
- 40% group project, and
- 20% class participation.

The exam dates and the due date for the group project will be defined as we progress through the course. Unless for reasons of force majeure, properly proven to the university authorities, the date will not be changed (trips are not considered "force majeure").

On the exam day, the student will not be able to have any electronic device (cell phone, digital watches, etc.) on their person. The only exception is a scientific calculator. Backpacks should be left at the front of the classroom and students cannot have any of their own sheets with them.

Classes

There will be one class per week and there is no separation between theory and practice; theoretical and practical aspects will be provided simultaneously as the topics are developed.

There will be multiple exercise guides, and it is the student's responsibility to complete all the exercises. Questions about the exercises should be sent 48 hours before class so that the professor can prepare an appropriate answer for the student and the course.

Class Participation

Class participation is a central component of this course, reflected in the grade (20%). We seek to encourage the participation of all students, through comments, doubts, and questions. Attendance will not be formally taken, but it will be reflected in the participation grade.

Always respect the contributions of your peers and ideally, raise your hand to participate.

Plagiarism and Cheating

This course demands strict adherence to the standards of intellectual honesty. The existence of plagiarism constitutes a serious dishonor, improper of university life. Plagiarism is identified not only by literal copying in face-to-face exams, but also any time there is abusive use of another person's intellectual effort. The University's Code of Ethics considers punishable the appropriation of another person's intellectual work, so adherence to generally accepted academic formats (MLA, APA, Chicago, etc.) for quotations and bibliographic references (including online formats) is recommended. The alleged violation of these rules may lead to notifying the university authorities who, depending on the seriousness of the offense, may recommend disciplinary sanctions ranging from a warning to expulsion. In case of doubt consult the professor and/or the university authorities.

Course Syllabus

Game Theory Foundations

1. Introduction to Game Theory:
What is a game? Examples and basic ideas. Game classification. Terminology and underlying assumptions.
2. Sequential Games:
Decision trees. Multiple players and moves. Backward induction.
3. Simultaneous Games:
Discrete and continuous strategies. Representation of a simultaneous game. Nash equilibrium. Dominance. Best responses. Multiple equilibriums.
4. Subgame Perfect Equilibrium:
Changes in the order of moves. Subgame perfect equilibrium.
5. Strategic Moves:
Conditional and unconditional moves. Credibility and commitment. Threats and promises.

6. Mixed Strategies:
Uncertain actions. Zero-sum games and non-zero-sum games. Nash equilibrium and beliefs.
7. Repeated Games:
The prisoner's dilemma. Repeated games. Reputation. Penalties and rewards. Leadership. Real-world dilemmas.

Game Theory Topics

8. Uncertainty and Information:
Asymmetric information. "Cheap talk". Signaling. Screening. Incentives. Control and manipulation of risk.
9. Signaling Games:
Perfect Bayesian Equilibrium. Signaling and Reputation.
10. Mechanism Design:
Price discrimination. Information revealing mechanisms. Effort incentives.
11. Auctions:
Types of auctions. Winner's curse. Auction strategies. Bids. Internet auctions. Spectrum auctions.
12. Negotiation:
Cooperative Nash Equilibrium. Efficiency frontier. Value destruction. Impatience. Information manipulation.

Bibliography

The course does not follow a single text, but two books will be intensively used to teach the course.

- Dixit, Avinash K. (2015). Games of strategy. Fourth Edition. New York: W.W. Norton & Company.
- Watson, Joel. (2013). Strategy: an introduction to game theory. Third Edition New York: W. W. Norton & Company.
- Haeringer, Guillaume. (2017) Market Design: Auctions and Matching. MIT Press.

Other suggested texts, which students can consult, are:

- Gibbons, Robert (1993). A Primer in Game Theory. Antoni Bosch.
- Avinash Dixit and Barry Nalebuff (2008), The Art of Strategy, W.W. Norton & Company, Inc.
- Dixit, Avinash and Nalebuff, Barry (1992), Thinking Strategically, Antoni Bosch.
- Nalebuff, Barry (2022). Split the Pie: a radical new way to negotiate. Harper Collins,

Additionally, case studies, newspaper articles, and other readings will be provided by the professor.

Professors

Marcos M. Orteu (<https://marcosorteu.ar/>) is a Managing Partner of Dynamics, a consulting firm specializing in sustainability and digital economy. His areas of expertise are strategy, regulation, competition defense, and digital markets.

In addition, he is a professor at Universidad Torcuato Di Tella, at ITBA, and at UCEMAx, where he teaches a variety of courses on digital platforms, industrial organization, and applied microeconomics.

He received his degree and master's in economics from the Universidad de San Andrés (Arg.) and has an LLM in law and economics from the Universidad Torcuato Di Tella (Arg.).

Andrés de la Cruz is senior counsel at Cleary Gottlieb, a firm where he was an active partner until 12/31/2021, having worked in its offices in Brussels, New York, Frankfurt, and Buenos Aires. Specializing in providing legal advice on financial issues to private and public actors, he specialized in financing issues and government debt restructuring.

He participated in Ecuador's Brady operation (1995) and the 1999 restructuring, advised Uruguay from 1993 to 2021, including the operation of reprofiling 100% of the debt stock in 2003, allowing Uruguay to regain market access while Argentina handled the consequences of the 2001 default, participated in various energy project financing operations in Mexico and in all of Paraguay's financing operations since its debut in the capital markets in 2011, was Chile's lawyer in its financing operations in the international capital market, including the first ESG bond placement, advised the Argentine government on the adoption of the new documentation standards for sovereigns and their use in the 2020 restructuring, as well as the provinces of Buenos Aires, Neuquén, and Santa Fe in various operations in the capital market, participated in the restructuring of Iraq's debt (2006/8), and co-led the legal team that assisted Greece in its 2012 restructuring.

He graduated from the UBA Law School (1985), obtained his LLM at the University of Michigan, Ann Arbor (1987), and a diploma in international finance from SAIS-Johns Hopkins University (1988). As a university teacher, he focuses on topics that help students reflect on the concepts acquired from a practical perspective.