Introduction to Game Theory

ECTS : 6

Enseignant responsable : David ETTINGER (https://dauphine.psl.eu/recherche/cvtheque/ettinger-david)

Langue du cours : Français

Volume horaire : 36

Description du contenu de l'enseignement :

This course provides an introduction to game theory, the study of strategic interactions among rational decision-makers. Students will learn how to model situations in which individuals, firms, or institutions make decisions that mutually affect one another, and how to predict the outcomes of these interactions using core solution concepts. The course covers strategic games, extensive-form games, mixed strategies, Nash equilibrium, subgame perfection, and games with imperfect or private information. Throughout the sessions, theoretical tools are complemented by examples and applications drawn from economics, social sciences, and real-world strategic behavior. By the end of the course, students will have a solid foundation in game-theoretic reasoning and its practical relevance for analyzing conflict, cooperation, negotiation, competition, and decision-making under strategic uncertainty. This course is on Moodle. **1** Introduction to strategic reasoning **2** Building a model of strategic interaction **3** Solving a game when rationality is common knowledge **4** Nash equilibria in discrete game with 2 or 3 players **5** Nash equilibria with n players **6** Nash equilibria with n players **7 Intermediary Exam 8** Randomized strategies **9** Sequential games with perfect information **10** Sequential games with imperfect information **11** Games with private informon **12 Final Exam**

Compétences à acquérir :

By the end of the course, students will be able to:

- Model strategic interactions using the standard tools of game theory;
- Apply key solution concepts--dominance, Nash equilibrium, mixed strategies, and subgame perfection--to a variety of games;
- Analyze sequential, imperfect-information, and signaling games using appropriate reasoning methods;
- Evaluate situations involving private information and strategic uncertainty;
- Interpret strategic behavior in economic, social, and behavioral contexts using game-theoretic frameworks.

Pré-requis obligatoires

Basic knowledge of microeconomics (consumer preferences, introduction to the firm) mathematics andprobabilities (the notion of probability, independent events).

Mode de contrôle des connaissances :

The final grade is the average of the grades of the **mid-term exam** and the **final exam**. The numerical grade distribution will dictate the final grade. The passing grade for a course is 10/20. **Attendance** Attendance is mandatory. Students are expected to attend all classes, arrive on time, and stay for the entire session. Repeated absences or lateness may affect the final grade. **Class Participation** Active participation is encouraged, as it contributes to making classes more engaging and instructive. Students are expected to come prepared and contribute thoughtfully to discussions. When participation is part of the course assessment, it is evaluated based on the quality of contributions rather than their quantity. **Exam Policy** Students are not allowed to bring any materials into exams, except those explicitly authorized by the instructor. Unexcused absences from exams or failure to submit assigned cases will result in a grade of zero when calculating final averages. All exams must be submitted at the end of the examination period. **Communication and Grading** All questions or concerns regarding grading or course policies must follow the official procedures. No direct negotiation with instructors about grades or assessments is permitted. Be aware of the rules in Université Paris Dauphine about plagiarism and cheating during exams. All work turned in for this course must be your own work, or that of your own group. Working as part of a group implies that you are an active participant and fully contributed to the output produced by that group.

Bibliographie, lectures recommandées :

- An Introduction to Game Theory, Joseph Harrington, Worth Publisher 2015;
- An Introduction to Game Theory, Martin Osborne, Oxford University Press, 2004.

After studying management (HEC), **David Ettinger** completed a thesis in economics in the field of game theory focusing on

allocation mechanisms and auctions. He began his academic career in 2003 at the University of Cergy-Pontoise, where he was director of studies and head of the economics department. He then joined Paris Dauphine-PSL University in 2010 as a professor of economics. There, he served as director of the economics laboratory, head of the graduate economics program, and head of scientific integrity. David Ettinger has taught at the University of Cergy-Pontoise, Paris Dauphine-PSL University, the Ecole Nationale des Ponts et Chaussées, ENSAE, MAP, and other institutions.