COURSE DATA

DATA SUBJECT

Code: 44958
Name: Game Theory and Economics of Information
Cycle: Master's Degree
ECTS Credits: 5
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2242 - Master's Degree in Economics	Facultat d'Economia	1	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2242 - Master's Degree in Economics	Materia analítico-conceptual	ELECTIVES

COORDINATION

URBANO SALVADOR MARIA AMPARO

ALVENTOSA BAÑOS ADRIANA

SUMMARY

Game theory is the study of multiperson decision problems where there is a strategic conflict. That is, where participants are aware that the result or payoff they obtain depends not only on their own decisions but also on the decisions of other participants. Society in general, and the economy in particular, is plenty of these strategic interactions.

The first part of the course (*Game Theory*) covers the equilibria of strategic games with complete information and incomplete information, sequential games with complete information, bargaining and repeated games. Sequential games with incomplete information close the first part of the course.

In the second part (*Economics of Information*), the course studies canonical models of moral hazard and adverse selection. More specifically, we will look at how to design optimal contracts in the presence of asymmetric information. Contract theory is an important branch of applied microeconomic theory, and its tools are increasingly being used in labour and development economics, as well as industrial organisation. Thus, the course is of potential interest to those outside pure microeconomic theory.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

COMPETENCES / LEARNING OUTCOMES

2242 - Master's Degree in Economics

Acquire linguistic and technological skills: ability to use English in the scientific field of economics and to use ICT in the field of economic study and research.

Acquire social skills to work in a team: capacity to coordinate activities, ethical and responsible commitment, leadership and mobilisation capacity, all of which are important for economic and team management.

Communicate orally and in writing using an inclusive and egalitarian language.

Desarrollar la capacidad crítica, impulsar la inquietud y el interés investigador en el ámbito de la economía, especializarse en el manejo de material bibliográfico, en la utilización de bases de datos económicas y programas matemáticos y estadísticoeconométricos, así como aprender a transmitir de forma adecuada los resultados de investigadora a través de artículos científicos y
ponencias en congresos.

Develop time management skills for learning: skills for organisation, planning and decision making in the process of learning advanced economics.

Gain the capacities of abstraction and logical reasoning that are essential for the creation of economic models: ability to express oneself using formal, graphic and symbolic languages, to apply analytical and mathematical methods to economics, and to relate and manipulate concepts according to a purpose.

Know how to analyse the models of imperfect competition in the markets, both under certainty and under imperfect and incomplete information.

Know how to identify the relevant market and the competition model that is best suited to the strategic behaviour of the agents in the market.

Know how to promote, in academic and professional contexts, technological, social or cultural progress in a knowledge-based society that is founded on the respect for: (a) fundamental rights and the principles of equal opportunities for men and women, which involves using an inclusive and egalitarian language that promotes the visibility of women; (b) the principles of equal opportunities and universal accessibility for people with disabilities, and (c) the distinctive values of a culture of peace and democratic values.

Know the regulation of markets and the implementation of microeconomic policies

Know the role of the state in the analysis of markets and institutions.

Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of

study, including multidisciplinary scenarios.

Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.

Students should demonstrate self-directed learning skills for continued academic growth.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

DESCRIPTION OF CONTENTS

1. BASIC IDEAS

1.1. What is a game?
1.2. What does Game Theory study?
1.3. Strategic thinking: some examples.
1.4. Game Theory and Economics.
1.5. Our strategy for studying games.

2. SIMULTANEOUS-MOVE GAMES

2.1. The strategic form of a game.
2.2. Dominant strategies: the prisoners' dilemma. Efficiency.
2.3. The best-response function of a player.
2.4. Mutual anticipation: successive elimination of dominated strategies.
2.5. Applications: Private provision of a public good, effort incentives in a production team, second-price auctions.

3. NASH EQUILIBRIUM

3.1. The equilibrium of a game: definition and examples.
3.2. Some simple properties of the equilibrium.
3.3. The problem of multiplicity.
3.4. Incentives in a team.
3.5. Applications: Incentives and coordination in a production team, first-price auctions, duopoly and price competition, product differentiation.

4. SEQUENTIAL GAMES WITH PERFECT INFORMATION

4.1. The decision tree of a sequential game.
4.2. Strategies and complete plans of actions.
4.3. Sequential rationality and credible threats.
4.4. Backward induction and perfect Nash equilibrium.
4.5. Strategic moves: commitments, threats and promises.

5. REPEATED GAMES

5.1. Intertemporal preferences.
5.2. Cooperation in a repeated prisoners' dilemma with infinite horizon.
5.3. Finite repetition.
5.4. The Folk Theorem.

6. STATIC GAMES WITH PRIVATE INFORMATION. BAYESIAN GAMES

6.1. Simultaneous games with private information.
6.2. Types of players and private information.
6.3. Bayesian Games and Bayesian Nash equilibrium.
6.4. Applications.

7. DYNAMIC GAMES WITH INCOMPLETE INFORMATION

7.1. Dynamic games with asymmetric information.
7.2. Beliefs and Bayesian updating.
7.3. Behavioural strategies and consistency.
7.4. Separating and pooling equilibria.
7.5. Perfect Bayesian equilibrium and sequential equilibrium.
7.6. Signaling game.
7.7. Applications.

8. MORAL HAZARD

8.1. The Principal-Agent model. Symmetric information. The optimal risk-sharing.
8.2. The Principal-Agent model. Asymmetric information: incentives for a risk-averse agent.
8.3. Extensions: risk neutrality, contracts based on severe punishments, limited liability, two levels of effort and n results.

9.1. Adverse selection in markets with private information of quality.
9.2. Reducing information asymmetries: Screening.

9. ADVERSE SELECTION

9.1. Adverse selection in markets with private information of quality.
9.3. Reducing information asymmetries: Spence's job-market signalling model.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	40,00
Classroom practices	10,00
Total hours	**50,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	75,00
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	**75,00**

TEACHING METHODOLOGY

EVALUATION

The course consists of two blocks: Block I, "Game Theory" whose weight on the final grade will be 60%; and Block II, "Economics of Information", whose weight on the final grade will be 40%. It will be necessary to pass both blocks to pass the subject.

Within each block, the evaluation system will be as follows:

1. Final exam: 70% of the final grade of the block. This exam will consist of theoretical questions and practical problem solving. It is an essential requirement to pass the final exam to pass the block.

2. Continuous assessment: 30% of the final grade of the block. This assessment is based on classroom interventions, individual problem solving, and discussion of practical exercises in the classroom. This is a non-recoverable activity and the grade of the Continuous Assessment will be saved for the second call.

Therefore, the maximum 10 points that a student can obtain in his/her final grade of the subject will be distributed as follows: 4.2 points for the final exam of Block I "Game Theory"; 1.8 points for the continuous evaluation of Block I "Game Theory", 2.8 points for the final exam of Block II "Economics of Information"; and 1.2 points for the continuous evaluation of Block II "Economics of Information".

REFERENCES

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- Gibbons,R. (1992): Game Theory for Applied Economica, Princeton Paperback. Traducción: Gibbons, R. (1992): Un primer curso de Teoría de Juegos, Antoni Bosch.
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- Macho, I. y Pérez Castrillo, D., Introducción a la Economía de la Información, Ariel, 2005.
- Fudenberg and Tirole (1991), Game Theory, MIT Press.