COURSE DATA

DATA SUBJECT

Code: 36125
Name: Game theory and strategic behaviour
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1316 - Degree in Economics	Facultat d'Economia	2	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1316 - Degree in Economics	Microeconomics	COMPULSORY

COORDINATION

ALVENTOSA BAÑOS ADRIANA

SUMMARY

This course is part of *Microeconomics*, a *compulsory* course taught in the first semester of the second year of the *Bachelor's Degree in Economics*.

It is a course that introduces game theory as a method for the decision making of individuals (or organisations) in an environment of strategic interdependence, that is, in an environment in which agents interact knowing that the results obtained by each and every one depend not only on their own decisions but also on the decisions of everybody. Knowledge of game theory is necessary for the analysis of economic situations such as the static and dynamic functioning of markets in imperfect competition, auctions, bilateral bargaining in an economic exchange, the design of incentives for effort and contracts, decision making in contexts of imperfect and asymmetric information... The tools used can be applicable to decisions in the goods, labour and credit markets, for example, or to any strategic situation in everyday life.

The program begins with an introductory topic in which a series of basic concepts about the elements that characterise a game (a strategic situation involving two or more individuals or organisations) are presented. Topics 2 and 3 analyse games characterised by a pointwise strategic interaction, where agents make decisions simultaneously, without knowing their opponent's decision, but where there is complete information about other types of opponent's characteristics. Solution concepts for this type of strategic situations such as Nash equilibrium are introduced and applied. Both selfish preferences and social

preferences will be considered to study the effect of ethical behaviours on agents' strategies and the outcomes they obtain.

Subsequently (topic 4), the program analyses strategic situations in which agents make decisions sequentially, knowing the decision of their rival (sequential or dynamic games), paying special attention to the credibility of the strategic moves that may occur in a framework of perfect information.

The program continues in topic 5 with the study of decisions in strategic situations that are repeated in a stationary way (repeated games) over time.

The program includes the analysis of games with private information (topic 6). In these games, a detailed analysis of dynamic games is carried out, but when there is incomplete or imperfect information about some important aspect of the game, studying the incentives that agents must hide or signal information they possess.

Finally, the program presents the topic of choice under uncertainty is the (topic 7).

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

To successfully tackle the course, it is desirable that the student has a reasonable knowledge of basic aspects of consumer and firm behaviour, that is, of market demand and supply. No particular mathematical requirement is needed to take this course that was not studied during the first year.

COMPETENCES / LEARNING OUTCOMES

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Apply the principles of economic analysis (rational decision) to the diagnosis and resolution of problems.

Be able to learn autonomously.

Have decision-making skills and be able to apply knowledge to practice.

Know and understand the functioning of labour markets and the determinants of unemployment and wages.

Know and understand the main market failures (public goods and externalities), their private and public solutions and their influence on the environment and natural resources.

Recognise strategic conflicts and know how to use basic strategic principles to obtain cooperation and coordination in incentive problems.

Show critical thinking skills.

Understand and apply the scientific method, which involves formulating hypotheses, deducing verifiable results and contrasting them with empirical and experimental evidence.

Understand the effects of different market structures on efficiency and equity and the influence of regulatory policies.

Understand the effects of the existence of private information in relation to quality and productivity on the functioning and performance of markets and enterprises, as well as their possible private and public solutions.

Understand the keys to the functioning of market economy, the difference between normative and positive reasoning and between the concepts of equity and efficiency.

DESCRIPTION OF CONTENTS

1. INTRODUCTION

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.

[F: Introduction] and notes from the instructor.

2. DOMINANT AND DOMINATED STRATEGIES

2.1. The strategic form of a game and its matrix representation.
2.2. Dominant strategies: the Prisoner's Dilemma.
2.3. Efficiency: the cooperation problem.
2.4. The best-response function of a player.
2.5. Succesive elimination of dominated actions.

[F: Chap. 2, 1.5] and notes from the instructor.

3. NASH EQUILIBRIUM: THE COORDINATION PROBLEM

3.1. The Nash equilibria of a game.
3.2. Simple properties of the Nash equilibium.

3.3. Equilibria multiplicity.
3.4. Social preferences and incentives in a production team.

[F: Chap. 2] and notes from the instructor.

4. REPEATED GAMES AND TACIT COOPERATION

4.1. Intertemporal preferences.
4.2. Punishment threat and cooperation.

[F: Chap. 7] and notes from the instructor.

5. SEQUENTIAL GAMES WITH PERFECT INFORMATION

5.1. The decision tree of a game.
5.2. Strategies and plans of action.
5.3. Strategic moves.
5.4. Commitments, threats and credible promises: the sequential rationality principle.
5.5. Backward induction and the perfect Nash equilibrium.
5.6. Finitely repeated games.

[F: Chap. 4] and notes from the instructor.

6. GAMES WITH PRIVATE INFORMATION

6.1. The adverse selection problem: the market for used cars.
6.2. Signaling in the market: warranties, advertising and education.
6.3. Screening

[F: Chap. 8, 9] and notes from the instructor.

7. CHOICE UNDER UNCERTAINTY

7.1. Expected value.
7.2. The expected utility hypothesis.
7.3. Risk attitudes.

[F: Chap. 6.3] and notes from the instructor.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Classroom practices	30,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	9,00
Independent study and work	41,00
Preparation of lessons	20,00
Preparation for assessment activities	20,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

The methodology for teaching the Game Theory course, both in theoretical and practical classes, will be oriented towards combining the capacity for individual work with that of teamwork. More precisely, this methodology can be described as follows:

- Face-to-face classes, both theoretical and practical, where the teacher will explain the most interesting concepts and develop the most complex instruments for the course. Attendance is essential because it guarantees the correct transmission of knowledge and serves as a guide for students in their personal work.
- For the practical classes, students will previously prepare a set of exercises that will be worked on in the classroom. On the one hand, each student must prepare these tasks individually and, on the other hand, students will be asked (either individually or in groups) to solve and present some of these tasks in the classroom for the rest of their classmates. The aim is for students to develop their ability to organise forms of group work, to solve problems, to communicate orally and in writing. The assigned tasks, whether individual or joint, may give rise to "deliverables" to be assessed by the instructor

EVALUATION

The total assessment of the subject is broken down as follows: 40% of the overall grade corresponds to the continuous assessment tasks and 60% of the overall grade corresponds to the final exam.

- Continuous assessment will consist of individual tests in the classroom, solving exercises and problems, handing in activities, carrying out individual and group tests, active participation in class, ...
- The final exam is compulsory and passing it is an essential condition to pass the subject; it is considered passed when the grade is equal to or greater than 50%.

The final grade will be obtained as the sum of the grade of the continuous assessment and the final exam. The subject will be considered passed if the student obtains 5 points out of 10 in their final grade (50%).

In the first call, the student will not have the option of waiving their grade from the continuous assessment. In other words, the final exam will have a maximum score of 6 points and, in case of not participating in the continuous assessment, the student will need to obtain at least 5 points out of 6 in such exam to pass the subject. Passing the exam is an essential requirement to pass the subject. In the event that the student does not obtain at least 50% in the final exam and cannot pass the subject, the final grade that will appear in the student's record will be formed by adding the points of the final exam with those of the continuous evaluation up to a maximum of 4.5 points, with the grade being a failure.

In the second call, the student will have the option of waiving or maintaining their grade from the continuous assessment. It is considered that 25% of continuous assessment is non-recoverable (class attendance, participation, meeting deadlines, group activities, etc...). This implies that in the second call, the student has two options (to be indicated in the exam):

- Waive the grade of the continuous assessment and the final exam will be graded on a maximum of 9 points (being necessary to obtain 5 points to pass the subject); or
- Maintain the grade of the continuous evaluation and the final exam will be graded on a maximum of 6 points, to which the grade of the continuous evaluation will be added. In this case, as in the first call, the student must obtain at least 3 points in the final exam and the sum of the continuous assessment, and the final exam must be equal to or greater than 5 points.

Link to the Evaluation Regulations of the University:

https://www.uv.es/graus/normatives/2017_108_Reglament_avaluacio_qualificacio.pdf.

REFERENCES

Basic

- Olcina, G., Calabuig, V. y Rodriguez-Lara,I., Introducción a la Teoría de Juegos y la Conducta Estratégica, 2018, E. Pearson. [OCRL]
- Ferreira, J.L., Game Theory: An applied introduction , Palgrave Macmillan, 2019. [F]

Additional

- Pindyck, R. S. y D. L. Rubinfeld, Microeconomía, 7ª ed., 2009. Pearson Educación. [PR]
- Dixit, A. and Skeath, S., Games of Strategy, 2004, Norton.
- Gibbons, R., Un primer curso de teoría de juegos, 1992, Antoni Bosch Editor.