VNIVERSITAT ĠΦ ID VALÈNCIA

COURSE DATA

Data Subject	
Code	36788
Name	Game theory and strategic behaviour
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)			
Degree	**Center**	**Acad. year**	**Period**
1933 - D.D. in Law-Economics 2022	Doubles Studies Faculty of Law - Faculty of Economics	2	First term

Subject-matter		
Degree	**Subject-matter**	**Character**
1933 - D.D. in Law-Economics 2022	2 - Asignaturas de segundo curso	Obligatory

Coordination	
Name	**Department**
ALVENTOSA BAÑOS, ADRIANA	10 - Economic Analysis

SUMMARY

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

Finally, 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.

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.

OUTCOMES

LEARNING OUTCOMES

- Ability to analyse a strategic, economic and/or social situation, with the tools provided by game theory, obtaining a prediction on the behaviour of the agents participating in the game, and the ability to make decisions in these situations.
- To convert an informal description of a strategic situation into a formal game theory problem that can be analysed using game theory tools.
- Determine the key variables that determine the behaviour of agents in the market.
- Analyse the strategic behaviour of the agents participating in the game, anticipating the strategies of each player.
- Apply the solution concepts in such situations as well as evaluate the feasibility and efficiency of the proposed solution.

- Analyse the robustness of the proposed solution to changes in the behaviour, motivation or other variables of the agents or the strategic situation.

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

ACTIVITY	Hours	% To be attended
Theoretical and practical classes	60,00	100
Development of group work	3,00	0
Development of individual work	5,00	0
Study and independent work	40,00	0
Preparation of evaluation activities	20,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	12,00	0
TOTAL	150,00	

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 assessment of the course is based on a set of continuous evaluation activities and a final exam. The total assessment is broken down as follows: **40%** of the overall mark corresponds to the **continuous evaluation** tasks and **60%** of the overall mark corresponds to the **final exam**. The final exam is compulsory and passing it is an essential condition for passing the course; it is considered passed when the mark is equal to or higher than 3 points out of 6.

The continuous evaluation will consist of individual tests in the classroom, solving exercises and problems, handing in questionnaires, active participation in class, surveys, etc.

The final grade will be obtained as the sum of the final exam score plus the continuous evaluation score.

The course will be considered passed if the student obtains 5 points out of 10 in the sum of the final exam and the continuous evaluation

In the first call, in case of not doing the continuous evaluation tasks, the student will only be able to obtain the points of the final exam (6 maximum), and would need to obtain a 5 out of 6 in the final exam to pass the course. In case the final exam does not exceed 3 points and the student cannot pass the course, the final mark that will be included in the final grade will be computed by adding the points of the final exam with those of the continuous evaluation up to a maximum of 4.5 points, and the grade will be a fail.

It is considered that **50% of the continuous evaluation is not recoverable** (class attendance, participation, attitude, willingness to assume tasks and responsibilities, meeting deadlines, etc...). This means that in the **second and subsequent examinations,** the student has two options:

(i) *give up the continuous evaluation mark* (indicating it in the exam) and the final exam will be graded out of a maximum of 8 points (5 points are necessary to pass the subject); or

(ii) *keep the continuous evaluation mark* and the final exam will be graded out of a maximum of 6 points.

Link to the University's Assessment Regulations:

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.lL., Game Theory: An applied introduction , Palgrave Macmillan, 2019

Additional

- Pindyck, R. S. y D. L. Rubinfeld, Microeconomía, 7a ed., 2009. Pearson Educación, [PR]
- Gardner, R., Juegos para empresarios y economistas, 1999, Antoni Bosch Editor
- Dixit, A. and Skeath, S., Games of Strategy, 2004, Norton
- Gibbons, R., Un primer curso de teoría de juegos, 1992, Antoni Bosch Editor