

Game Theory

2014/2015

Code: 102477
ECTS Credits: 6

Degree	Type	Year	Semester
2501572 Administració i Direcció d'Empreses	OT	4	0
2501573 Economia	OB	3	2

Contact

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Use of languages

Principal working language: català (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: Yes

Prerequisites

Introduction to Economics

Microeconomics I

Mathematics I and II

Objectives and Contextualisation

To learn the basic elements of game theory and to develop an understanding of its applications to economic analysis.

To understand the constraints involved in bargaining processes.

Non-cooperative games: games of perfect, imperfect and incomplete information, zero sum games.

Solution concepts: Dominance, Nash equilibrium, subgame perfect Nash equilibrium, Bayesian equilibrium.

Applications: Oligopoly models, auctions

Cooperative games: Games in coalitional form, bilateral bargaining, cost sharing, matching.

Skills

Economia

- Capacity for adapting to changing environments.
- Demonstrate initiative and work individually when the situation requires it.
- Demonstrate understanding of the basic element of game theory and develop the habit of understanding its application in the solution of problems of economic analysis.
- Lead multidisciplinary and multicultural teams, implementing new projects and coordinating, negotiating and managing conflicts.
- Organise the work in terms of good time management, organisation and planning.
- Select and generate the information necessary for each problem, analyse it and take decisions based on that information.
- Take decisions in situations of uncertainty, demonstrating an entrepreneurial and innovative attitude.

- Understand the restrictions involved in negotiations process and how to arbitrate them.
- Use of the available information technology and adaptation to new technological environments.
- Value ethical commitment in professional practice.

Learning outcomes

1. A capacity of oral and written communication in Catalan, Spanish and English, which allows them to summarise and present the work conducted both orally and in writing.
2. Analyse the distribution of costs in view of the implementation of a new shared service.
3. Analyse the strategic interactions between participants and the effects of their actions on third-party decisions.
4. Apply the game theory to economic and business decisions.
5. Apply the game theory to the case of agents in a negotiation, in auctions and in macroeconomic matters.
6. Assess ethical commitment in professional activity.
7. Assess the consequences of changing a particular representation system for another.
8. Assess the different proposals of implementing public goods in terms of social welfare.
9. Capacity to adapt to changing environments.
10. Demonstrate initiative and work independently when required.
11. Lead multidisciplinary and multicultural teams, implement new projects, coordinate, negotiate and manage conflicts.
12. Make decisions in situations of uncertainty and show an enterprising and innovative spirit.
13. Organise work, in terms of good time management and organisation and planning.
14. Select and generate the information needed for each problem, analyse it and make decisions based on this information.
15. Understand the different voting systems and the consequences of each of these.
16. Use available information technology and be able to adapt to new technological settings.

Content

Module 1. Choice under uncertainty: expected utility

- Choice and uncertainty: Lotteries
- Compound lotteries
- Expected value and the Bernoulli paradox
- Expected utility theory
- Critical assessment of behavioral assumptions
- Direct estimation of the utility function
- Graphical representation of expected utility

Module 2. Risk aversion, decision trees, and the value of information

- Risk aversion
- Certain equivalent
- Measures of risk aversion
- Applications: Insurance and portfolio diversification
- Decision trees
- Valuation of consequences: payoff functions

- Dominated strategies and backward induction.
- The value of information
- Bayes theorem and the value of partial information

Module 3. Finite Games: Backward induction and Nash equilibrium

- Players, rules, outcomes and payoffs
- Extensive form representation
- Strategies
- Backward induction
- conflict and cooperation
- Efficiency
- Imperfect information
- Normal form representation
- Equilibria in dominant strategies
- Iterative deletion of dominated strategies
- Rationalizable strategies
- Nash equilibria
- Games with n players

Module 4. Sequential games and infinite games

- Games with infinite strategy spaces: Best response correspondences and Nash equilibria
- Applications: Oligopoly and public goods
- Symmetric games
- Mixed strategies
- Sequential games: Credibility and subgame perfect Nash equilibria
- Credible threats and promises
- Games with incomplete information: Bayesian equilibrium
- Applications

Module 5: Introduction to Cooperative game theory

- Nash bargaining solution
- The Core
- The Shapley Value
- Games in coalitional form

- Bargaining
- Cost Sharing.
- Matching.

Evaluation

There will be a continuous assessment of student progress by way of a partial exam, quizzes, problem sets and a final exam. Final grades will be computed according to the following weights: 40% Final exam, 30% partial exam 30% problem set and quizzes.

The minimum passing grade is 5. If a student obtains a grade lower than 4 he or she will have to retake the course. Those students that obtain a grade between 4 and 5 are eligible for re-evaluation. The details of the re-evaluation will be published along with the final grades, and it will take place at the time and date established in the faculty's calendar. If a student obtains a passing grade in the re-evaluation he or she will obtain 5 as a final grade, and otherwise will retain his or her original grade. No examinations will be offered at different dates from the ones established for each group.

A student will only be eligible to the "unsubmitted" status if he or she has not taken part in any of the assessments.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Exercises	30%	3	0.12	2, 3, 4, 5, 1, 15, 13, 14, 7, 8
Final exam	40%	3	0.12	2, 3, 4, 5, 1, 15, 7, 8
Partial exam	30%	2	0.08	2, 3, 4, 5, 1, 15, 14, 7, 8

Bibliography

Basic bibliography

Prajit Dutta, Strategies and games, The MIT Press, 1996.

Robert Gibbons A primer in game theory, Antoni Bosch, 1994.

Howard Raiffa, Decision analysis, Addison-Wesley, 1970.

Vicente Salas, Economía de la empresa, Ariel, 1987.

Hal Varian, Intermediate Microeconomics, 3rd edition, W. W. Norton & Company, 2014.

Intermediate level bibliography

Andreu Mas-Colell, Michael D. Whinston i Jerry R. Green, Microeconomic theory, Oxford University Press, 1995.

Fernando Vega Redondo, Economía y juegos, Antoni Bosch, 2000.

Andrew Schotter, Microeconomics, 3rd edition, Addison-Wesley, 2001.