Game Theory 2015/2016

Code: 102477
ECTS Credits: 6

Degree	Type	Year	Semester
2501572 Business Administration and Management	OT	4	0
2501573 Economics	OB	3	2

Contact

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Use of languages

Principal working language: spanish (spa)

Teachers

Francesco Cerigioni

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

Economics

- 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. Review of the Theory of decision under uncertainty: Expected Utility

- Decisions and uncertainty: the concept of lottery
- Compound lotteries
- Expected value and the Bernoulli paradox
- The theory of expected utility
- Estimated direct utility function
- Graphical representation of expected utility

Module 2. Static games with complete information

- Basic definitions
- Dominance. Iterated deletion of dominated strategies
- Rationalizable strategies and Nash equilibrium
- Nash equilibrium in pure strategies and applications
- Nash equilibrium in mixed strategies

Module 3. Dynamic games with complete information

- Backwards induction
- Dynamic zero-sum games
- Dynamic games without perfect information: Subgame perfect equilibrium

Module 4. Applications and repeated games

Module 5: Introduction to cooperative games

- Bilateral bargaining
- Games in characteristic form and cost sharing
- The core
- The Shapley value
- Mathicng

Methodology

This course combines lectures with ICT support, along with more applied sessions devoted to the resolution of problem sets and exercises.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Exercises and group discussions	15	0.6	2, 3, 4, 5, 15, 7, 8
Lectures	30	1.2	2, 3, 4, 5, 15, 7, 8
Type: Supervised			
Tutorials	15	0.6	2, 3, 4, 5, 9, 1, 15, 10, 11, 13, 12, 14, 16, 6, 7, 8
Type: Autonomous			
Readings	15	0.6	9, 1, 10, 11, 13, 12, 14, 16, 6
Study. Preparation of exercises and discussions	67	2.68	2, 3, 4, 5, 9, 1, 15, 10, 11, 13, 12, 14, 16, 6, 7, 8

Evaluation

There will be a continuous assessment of student progress by way of two partial exams and a final exam.

Final grades will be computed according to the following weights: 60% Final exam, 20% each partial exam.

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 "not evaluable" status if he or she has not taken part in any of the assesments.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Final exam	60%	3	0.12	2, 3, 4, 5, 1, 15, 7, 8

Partial exams	40%	5	0.2	2, 3, 4, 5, 1, 15, 14, 7, 8

Bibliography

Class notes will be the basic reference materials
Other recomended readings are:

Basic bibliography

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

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

Howard Raia, 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

Gilboa, Itzhak, Theory of Decission Under Uncertainty. Cambridge University Press. 2009.

Osborne, Martin J., Rubinstein, Ariel. A Course in Game Theory. The MIT Press. 1994.

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.