

Syllabus

Subject

Subject / Group	20609 - Games and Strategic Decisions / 30
Degree	Double Degree in Economics and Tourism (2015) - Third year Double Degree in Economics and Tourism - Second year Degree in Mathematics - Fourth year Degree in Economics - Second year
Credits	6
Period	1st semester
Language of instruction	English

Professors

Lecturers	Office hours for students					
	Starting time	Finishing time	Day	Start date	End date	Office / Building
Antoni Rubí Barceló <i>Responsible</i> antoni.rubi@uib.eu	15:30	16:30	Wednesday	09/09/2019	31/01/2020	DB214/ Jovellanos

Context

The aim of the course is to provide a methodology for analyzing and solving decision problems in the presence of uncertainty, either when this stems from the randomness of the fundamentals underlying the choice problem (Decision Theory) or when the uncertainty is strategic (Game Theory). Game Theory is a method for analyzing how to make choices whose results are affected by others' decisions. This methodology has numerous applications in the most common problems of individual decision (insurances, investments, pricing, trading markets, cooperation and location of companies among others) and is part of the basic instruments of Economic Theory (Microeconomics, Economics of Organizations) and all the fields of Applied Economics (Industrial Organization, Public Economics, etc.). Game Theory was initially developed as a tool for understanding economic behavior and it experienced substantial growth and was formalized for the first time by John von Neumann and Oskar Morgenstern, before and during the Cold War, mainly because of its applications to the military strategy. Since the seventies, Game Theory has been applied to the study of animal behavior (including development of species by natural selection) as well as political science, ethics, philosophy or computer science, artificial intelligence and cybernetics.

Requirements

This course explores the work already begun in Microeconomics and Economic Environment, modeling specific economic situations in order to make an objective and rigorous theoretical analysis. The prior knowledge necessary to follow this course is divided into two groups:

Essential

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Basic mathematical skills: Algebra, function analysis, optimization, probabilities. Much of these are basic skills that students acquired before entering university. The others are obtained, and the first consolidated, during the first year of the Degree in Economics.

Recommended

Economic knowledge: Although this is not essential, basic knowledge on Economics acquired in Microeconomics constitutes a useful background. In Microeconomics the student formalizes economic phenomena for the first time. The present course extends this type of analysis to situations of strategic interaction.

Skills

Specific

- * CE3 Degree in Economics. Making well-reasoned analysis and descriptions of any aspect of the economic reality
- * CE4 Degree in Economics. Weighting up the consequences of alternative courses of action and choosing the best one, depending on the objectives to be achieved
- * CE8 Degree in Economics. Identifying the economic information sources and their content
- * CE12 Degree in Economics. Contextualizing economic problems through the use of formal models. Knowing how to incorporate extensions and variations in the initial assumptions of basic models so that they hold the basic hypotheses. Being aware of their potential and limitations

Generic

- * CG1 Degree in Economics. Using information and communication technologies in the professional tasks
- * CG5 Degree in Economics. Analyzing problems critically, in an unbiased way, with accuracy and academic rigor

Basic

- * You may consult the basic competencies students will have to achieve by the end of the degree at the following address: <http://www.uib.eu/study/grau/Basic-Competences-In-Bachelors-Degree-Studies/>

Content

Range of topics

A. Introduction to Decision Theory and Game Theory

Unit 1. Introduction and Decision Theory

- * Introduction
- * Decision Theory: Choice under uncertainty
- * Applications: Risky assets and insurances

B. Static games under complete information

Unit 2. Strategic interaction

- * Introduction
- * Iterated strict dominance

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- * Rationalizable strategies
- * Nash Equilibrium
- * Applications

Unit 3. Mixed strategies

- * Introduction
- * Mixed strategies Nash Equilibrium
- * Nash Theorem
- * Applications

C. Dynamic games under complete information

Unit 4. Dynamic games under complete information

- * Introduction
- * Equilibrium concept in dynamic games under complete information
- * Complete and perfect information
- * Complete and imperfect information
- * Existence of the Subgame Perfect Nash Equilibrium
- * Applications

Unit 5. Repeated Games

- * Introduction
- * Finitely repeated games
- * Unfinitely repeated games

D. Games under incomplete information

Unit 6. Static games under incomplete information

- * Introduction and examples
- * Bayesian games
- * Bayesian Nash Equilibrium
- * More general bayesian games

Teaching methodology

In order to develop and evaluate the competencies stated above, this section describes the work activities in class and at home to follow up the subject.

The course will be taught through lectures, both theoretical and practical that will allow to apply the tools studied to real problems. Additionally, students will perform practical exercises. No written notes will be delivered by the professor. Students can take their notes in class and must complement them with the literature that the professor will recommend for each subject and/or the complementary material.

In-class work activities (1.88 credits, 47 hours)

Modality	Name	Typ. Grp.	Description	Hours
Theory classes	Theory classes	Large group (G)	The professor will establish the theoretical fundamentals, as well as the practical examples to complement them. In addition, he provides information about the recommended working method and complementary materials to be used to complete the individual and autonomous learning by the students. The aim is to develop a theoretical knowledge appropriate with the support of exercises so that the student	22.5

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Modality	Name	Typ. Grp.	Description	Hours
			is able to model a situation of interaction through a strategic game and apply the learned equilibrium concepts.	
Practical classes	Practical classes	Medium group (M)	Periodically, a set of exercises will be uploaded to the webpage of the subject in Campus Extens to be solved by the students. These exercises will be related to the topics seen both in the practical and theoretical sessions. The student must submit the solution and may have to present this solution during the practical sessions to the rest of their peers and the professor. By solving exercises and problems, students will implement the knowledge presented in the theoretical sessions. The aim is to develop technical skills through problem solving and communication skills through the presentation in class.	21
Assessment	Midterm exam	Large group (G)	There will be a partial exam. The aim is to encourage periodic and constant work during the course and to assess the students activity in the middle of the course.	1.5
Assessment	Final Exam	Large group (G)	There will be a general exam. This evaluation will assess whether the student knows and correctly applies the concepts that constitute the subject. The final exam will last 2 hours.	2
Assessment	Midterm	Large group (G)	There will be a partial exam. The aim is to encourage periodic and constant work during the course and to assess the students activity in the middle of the course.	

At the beginning of the semester a schedule of the subject will be made available to students through the UIBdigital platform. The schedule shall at least include the dates when the continuing assessment tests will be conducted and the hand-in dates for the assignments. In addition, the lecturer shall inform students as to whether the subject work plan will be carried out through the schedule or through another way included in the Aula Digital platform.

Distance education tasks (4.12 credits, 103 hours)

Modality	Name	Description	Hours
Individual self-study	Problems resolution	After each topic the student must solve the list of exercises published by the professor. The solution of these exercises must be submitted in digital format for possible presentation to the rest of students during the practical sessions. The aim is to encourage regular and constant work of the students and to allow them to practice the type of exercises they will find in the midterm and final exams.	45
Individual self-study	Study of the theoretical contents	After the theoretical sessions, students have to delve into the subject. To facilitate this task, the professor will indicate the main references that can be checked. In addition, through the Moodle platform (Campus Extens) the professor might periodically upload supplementary teaching materials, especially with regard to applications. Students will review these applications as a preparation for the theoretical or practical sessions.	58

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Specific risks and protective measures

The learning activities of this course do not entail specific health or safety risks for the students and therefore no special protective measures are needed.

Student learning assessment

The skills established in the course will be assessed by applying a series of procedures. The table in this section describes each evaluation procedure, the type (recoverable only in extraordinary evaluation period: R not recoverable: NR), evaluation criteria and their weight in the rating of the course evaluation depending on the itinerary. The student will get a numerical rating for each activity evaluation, which will be weighted according to their weight, to obtain the overall grade for the course. To pass the course, students must obtain at least 5 points out of 10 by the weighted sum of all activities.

The absence in any evaluation activity will be considered to be justified only in the following three cases: (1) a public unavoidable obligation, (2) death of a relative up to second degree, (3) hospitalization of the students themselves and (4) participation in competitions by high performance athletes. In that cases, the student will have the right to be qualified in another date. Absences for reasons other than that or not adequately justified involve a grade of 0 in the evaluation activity in question.

Students who are officially recognized and certified as part-time students have the possibility of choosing pathway B. This pathway may also be chosen by students who got a positive grade in this course in some previous academic year. Students who want to be assigned to this pathway must notify their decision to the teacher during the first two weeks of the course.

The grade of "not taken" can only be obtained if the student does not show up at a number of evaluation activities that represent more than 33% of the final mark.

Frau en elements d'avaluació

In accordance with article 33 of Regulation of academic studies, "regardless of the disciplinary procedure that may be followed against the offending student, the demonstrably fraudulent performance of any of the evaluation elements included in the teaching guides of the subjects will lead, at the discretion of the teacher, a undervaluation in the qualification that may involve the qualification of "suspense 0" in the annual evaluation of the subject".

Practical classes

Modality	Practical classes
Technique	Papers and projects (non-retrievable)
Description	Periodically, a set of exercises will be uploaded to the webpage of the subject in Campus Extens to be solved by the students. These exercises will be related to the topics seen both in the practical and theoretical sessions. The student must submit the solution and may have to present this solution during the practical sessions to the rest of their peers and the professor. By solving exercises and problems, students will implement the knowledge presented in the theoretical sessions. The aim is to develop technical skills through problem solving and communication skills through the presentation in class.
Assessment criteria	It will be graded the delivering of exercises and the solutions of those presented in the practical sessions. In this aspect it will be evaluated the proposed solution, the procedure and the outcome. It will be also assessed the

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exposure in public in two aspects: digital presentation and speaking. Additionally, the participation in discussion forums of the solutions of exercises will be evaluated. These forums will be posted in the webpage of the subject.

Final grade percentage: 15% for pathway A

Final grade percentage: 0% for pathway B

Midterm exam

Modality	Assessment
Technique	Objective tests (non-retrievable)
Description	There will be a partial exam. The aim is to encourage periodic and constant work during the course and to assess the students activity in the middle of the course.
Assessment criteria	Exam format: Problems resolution. The numerical value of each question will be attached to the statement of the problems. The valuation criteria are: suitability of the procedures used, accuracy of results, interpretations and conclusions based on these results.

Final grade percentage: 35% for pathway A

Final grade percentage: 0% for pathway B

Final Exam

Modality	Assessment
Technique	Objective tests (retrievable)
Description	There will be a general exam. This evaluation will assess whether the student knows and correctly applies the concepts that constitute the subject. The final exam will last 2 hours.
Assessment criteria	Exam format: Problems resolution. The numerical value of each question will be attached to the statement of the problems. The evaluation criteria are: suitability of the procedures used, accuracy of results, interpretations and conclusions based on these results.

Final grade percentage: 50% for pathway A

Final grade percentage: 50% for pathway B

Midterm

Modality	Assessment
Technique	Objective tests (retrievable)
Description	There will be a partial exam. The aim is to encourage periodic and constant work during the course and to assess the students activity in the middle of the course.
Assessment criteria	Exam format: Problems resolution. The numerical value of each question will be attached to the statement of the problems. The evaluation criteria are: suitability of the procedures used, accuracy of results, interpretations and conclusions based on these results.

Final grade percentage: 0% for pathway A

Final grade percentage: 50% for pathway B

Resources, bibliography and additional documentation

Basic bibliography

Gibbons, R. A primer in Game Theory, Pearson, 1992





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Gardner, R. Games for business and economists, Wiley, 1996

Complementary bibliography

Sydsaeter, K. and Hammond, P. Essential Mathematics for Economic Analysis, Pearson, 1996

Gravelle, H. and Rees, R. Microeconomics, Pearson-Prentice Hall, 2006

Binmore, k. Fun and Games, McGraw-Hill, 1994.

Avinash K. Dixit y Barry J. Nalebuff, Thinking strategically, W W Norton, 1993

Vega, F. Game Theory and Economic Applications. Cambridge University Press, 2001

