

27435 - Decisions and Games

Syllabus Information

Academic Year: 2022/23

Subject: 27435 - Decisions and Games

Faculty / School: 109 - Facultad de Economía y Empresa

Degree: 417 - Degree in Economics

ECTS: 6.0

Year: 3

Semester: Second semester

Subject Type: Optional

Module:

1. General information

1.1. Aims of the course

This subject is aimed to enhance the skills of students in economics to make decisions in economical environments which are often characterized by the fulfilment of certain constraints and opposite interests among individuals. This approach is carried out in three different frameworks; namely, competition, bargaining and cooperation.

These aims are in accordance with the following Sustainable Development Goals (SDG) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the learning outcomes obtained in the subject provide both capability and competence to help its achievement.

Goals 1-17 (in all them mathematics modelling can be applied).

1.2. Context and importance of this course in the degree

The course means a further step when analyzing the classical models of consumption and production seen in micro and macroeconomics. Also, it offers a nice scenario for the application of the mathematical concepts and tools of optimization shown in Mathematics I and II. Game theory is the basis for a great variety of applications in different fields such as finance, industrial organization, social choice, etc. In addition, it provides a strong theoretical support that allows for new developments in economics and business.

1.3. Recommendations to take this course

There are no particular previous requirements to follow this course. The fact that the students are familiarized with the basics of algebra and calculus will help understanding the subject.

2. Learning goals

2.1. Competences

Particular competences

E2. To understand the economic strategies and their implications in both economics and management. E8. To offer a rationale when modeling economic reality. E9. To evaluate the consequences of the actions taken as well as to identify goals. E18. To describe in a precise way the decision making processes.

Overall competences

G8. To promote the work in team. G11. To improve the ability for bargaining. G13. To improve the skills that allow for a better adaptation to dynamical environments.

2.2. Learning goals

To overcome this course students should show to have gained a good insight of the main topics covered such as how to

apply the distinct decision criteria and to recognize the difference among the various kinds of solutions in conflicts and games. Learning goals will be checked through assessment activities given later on.

2.3. Importance of learning goals

Learning goals are of vital importance for the future of an economists because they will help her/him to better developing of professional job. In the short term, they will help understanding a lot of different disciplines taught in the degree of economics.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

There are two ways to overcome this course. The first one consists in two written exams together with the fulfilment of certain activities such as delivering special problems proposed in class and making the computing tasks addressed to resolve games and conflicts. The two written exams means the 60% of the final score while the other activities just mentioned are the remaining 40%. Participating in classes and regular attendance (not less than 85%) are necessary conditions for the student to pursue this kind of assessment. In addition, students must carry out all proposed activities which be defined as mandatory.

Alternatively, the course can be overcome by means of a global final exam which worth 10 points. To pass the exam means to get, at least, 5 points. The rate of each part will be the same as that in the former procedure.

The previous remarks just refers to the first call, the global final exam being the only possibility to overcome the course in the second call.

The assessment will be prepared to be carried out as face-to-face examination, but if health circumstances do not allow it, they will be carried out by doing it entirely online or in a blended way. In the case of online exams, it is important to highlight that, the student may be recorded, and he or she can exercise his or her rights by the procedure indicated in.

https://protecciondatos.unizar.es/sites/protecciondatos.unizar.es/files/users/lopd/gdocencia_reducida.pdf

The necessary software will be used to check the possibility of plagiarism. The detection of plagiarism or copying in an activity will imply that the activity or exam will be marked 0/10.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process of the course is based on the following items:

1. Lectures and interactive regular school class.
2. Active learning which involves reading, writing, discussion, and engagement in solving problems, analysis, synthesis, and evaluation. The teacher also favors any cooperative learning.
3. Weekly tutorial activities.
4. Introduction to programming and using software to solve games.

4.2. Learning tasks

This course is organized as follows:

Type 1 activities Lectures (1.2 ECTS: 30 hours). At the same time, some exercises will be solved with the participation of the students to help them understand the theoretical concepts presented. These classes are face-to-face and will be taught to the whole group.

Type 2 activities Practice sessions in classroom (1.2 ECTS: 30 hours). The students will apply the theoretical contents in order to solve, with the teacher's help, more complex exercises, and problems of an economic nature. Problem sheets will be available for the students and the teacher will announce in advance the problems that will be solved in each practice session so that the students can prepare them beforehand. These classes are face-to-face and will be taught separately to each subgroup.

Type 7 activities Autonomous work and study (84 hours).

Type 8 activities Assessment. Final exam and midterm exams: (6 hours)

Total: 150 hours (6 credits ECTS)

The teaching methodology is planned for face-to-face classes. However, if necessary for health reasons, teaching could be delivered on line or in a blended way.

4.3. Syllabus

1. Decision analysis

- 1.1. General framework: preferences and orderings.
- 1.2. Ordinal utility theory.
- 1.3. Utility under risk.
- 1.4. Utility under uncertainty.
- 1.5. Applications: optimal decisions.

2. Noncooperative static games with complete information

- 2.1. Brief introduction to game theory.
- 2.2. Basic definitions and representations.
- 2.3. A pool of different games. Zero-sum games.
- 2.4. Solution concepts: Dominance, Nash equilibrium and Prudent strategies.
- 2.5. Finite two-person games with mixed strategies. Symmetric games. The minimax theorem

3. Sequential games

- 3.1 Sequential games with complete information.
- 3.2 Subgame perfect equilibrium and the backward induction algorithm
- 3.3 Repeated games.
- 3.4 Bayesian games: The Harsanyi approach.

4. Bargaining and cooperation

- 4.1 Bargaining games.
- 4.2 Two solution concepts: Nash and Kalai-Smorodinsky.
- 4.3 Cooperative games.
- 4.4 The core and the Shapley value.

4.4. Course planning and calendar

The timing schedule for lectures, regular school classes and global final exams is established by the Faculty of Economics and Business. It usually is published in May or June. It should be noted that, for those students who decide to pursue the first alternative to pass the course, both the schedule for the two exams and delivering of the other activities will be announced in classroom at due time.

Tutorial calendar will be announced at starting academic year in October

The course starts in the second half of February and ends in late May, with an approximate duration of 15 weeks. The contents will be a temporary development similar to the order shown in the program.

The topics covered in chapters 1 and 4 will take approximately 2weeks each. The two other will take about 5weeks each.