

Academic Year: ( 2024 / 2025 )

Review date: 23-04-2024

Department assigned to the subject: Economics Department

Coordinating teacher: ROMERO MEDINA, ANTONIO

Type: Electives ECTS Credits : 6.0

Year : Semester :

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Mathematics for economists, Game Theory and Microeconomic theory (or Microeconomics).

## OBJECTIVES

### ADVANCED MICROECONOMICS: MARKET DESIGN.

This course aims to introduce the theory of market design, the most advanced tools, and its current applications. We will discuss the application of these tools to well-known problems and new areas with recent developments. In particular, the course includes:

1. An introduction to auction theory and Matching Theory.
2. The study of real markets from an allocative and strategic point of view.
3. The application of market design tools to redesign specific markets.

#### Capacities

1. At the end of the course, the student will be able to analyze and redesign specific markets by applying the tools presented.

#### Attitudes

1. Rigorous analysis.
2. Critical thinking.
3. Autonomous Learning.

## DESCRIPTION OF CONTENTS: PROGRAMME

Students in Economics or Business learn a great deal about the markets: where supply and demand come from, how to compute equilibrium prices, and what happens if some parameter changes. Other problems have at least a straightforward analysis in the curriculum. For example, the way we determine price matters, and there are markets where prices have no role to play.

Market design is the discipline that has arisen from the considerations of these problems. If the role of a market is to decide who gets what, market design is the area of economics that is interested in how who gets what is decided. The standard way to determine who gets what is using prices, but when the number of objects to be allocated is small and, perhaps not homogeneous, Auctions are the tools we use to allocate objects when prices are used. We will study them in this course.

In addition, monetary exchanges are often out of the question. Think about school placement, course allocation, university admissions, and organ donation. In this case, the market design also has a well-defined set of tools called matching models.

Chapter 1. Introduction: Market and market design.

Chapter 2. Simple Auctions.

Chapter 3. The Vickrey-Clarke-Groves Auction.

- Chapter 4. Analysis of eBay and keyword auctions.
- Chapter 5. Spectrum Auctions.
- Chapter 6. The basic matching models.
- Chapter 7. Design of labor markets: National Resident Matching Program (NRMP).
- Chapter 8. Assignment problems.
- Chapter 9. School choice: basic theory and recent developments.
- Chapter 10. Course Allocation.
- Chapter 11. Kidney exchange.
- Chapter 12. Matching with complex preferences.

## LEARNING ACTIVITIES AND METHODOLOGY

The course will give priority to the intuitive presentation of the problems. Emphasis will be placed on how the techniques presented are motivated by the nature of the economic problem. Likewise, the final objective of generating assignments with good properties.

The course will be taught through:

1. Masterclasses. To facilitate the follow-up of the theoretical lessons, students will have basic reference texts and papers as well as additional readings.
2. Practical classes: Students must solve some problems throughout the course related to the models studied.
3. Original research projects: The main task for this course is to write a final work of approximately 15 pages. The work will be individual or in groups of up to three people. The document should study an existing organized market or an environment with the potential to become an organized market. At least one-third of the document should describe the specific market design questions relevant to the chosen environment and outline a plan on how to answer them; Outstanding papers will also carry out a preliminary analysis of these answers (for example, preliminary data collection/analysis or the resolution of a simple model). Up to two-thirds of the document may be a review of existing literature relevant to your environment and questions.
4. Presentations: They will take place in the last 3-4 weeks. Depending on the number of students, the presentations will be individual or in groups of up to three people, chosen by the students themselves. They must present the original research project carried out or published work.
5. Flipped Classroom.

A weekly regime of office hours will be established at the beginning of the course.

## ASSESSMENT SYSTEM

<b>% end-of-term-examination:</b>	25
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	75

## GRADING

- 50% Research paper and presentation.
- 25% Midterm Exam.
- 25% Final Exam.

Each failure to sign the attendance sheet will be penalized with a point out of ten in the final grade.

## BASIC BIBLIOGRAPHY

- Guillaume Haeringer Market Design: Auctions and Matching, MIT press, 2017.

## ADDITIONAL BIBLIOGRAPHY

- Klemperer, Paul Auctions: Theory and Practice, Princeton University Press, 2004
- Roth, Alvin and Marilda Sotomayor Two-Sided Matching: a Study in Game-Theoretic Modeling and Analysis, Cambridge University Press , 1990

