Theory of Individual and Strategic Decisions

Course manual

Course manual EBC4197
Academic year 2025 – 2026
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Department of Microeconomics and Public Economics
Maastricht University
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1 Disclaimers

1. The coordinator reserves the right to make changes during the teaching period to deal with unforeseen circumstances. Any such changes will be clearly communicated to the students.

2. Students are allowed to use AI tools during their own self-study. However, it is mandatory that in each tutorial students report the tasks for which they used the assistance of an AI tool (see Section 3.1 below).

2 Introduction

2.1 Aim of the course

The aim of the course is to provide an overview of the standard analytical tools that are used for modelling decision making. There are two distinct broad areas of (micro)economics that study decision-making:

- Decision Theory focuses on individual decision problems, and the general purpose is twofold. On the one hand, it provides us with a framework within which individual traits and parameters can be identified. For example, it allows us to formally define and measure risk attitudes, to pin down subjective beliefs about events of interest, to elicit individual attitudes towards norms in specific settings, etc.

- Game Theory, which in turn focuses on decisions in environments with strategic interactions among several agents. Understanding Game Theory is needed for instance in order to design mechanisms that incentivize people to behave in a socially desired way.

The course mainly focuses on theories of rational agents. However, we also touch upon modern theories from behavioral and experimental economics that relax the rationality assumption.

2.2 Prerequisites

It is expected that the students who take this course have a minimum level of familiarity with undergraduate mathematics and statistics. As an indication, students are expected to be familiar with the concepts discussed in Chapter 19 (Mathematical Appendix) of *Game Theory: An Introduction* by Steven Tadelis, and in the online Appendix A of *Rational Choice* by Itzhak Gilboa. Although no prior knowledge in microeconomic theory or game theory is necessary, as the course is self-contained, it is recommended (especially for students with no background in economics) to read Chapters 1–3 of *Economics* by Daron Acemoglu, David Laibson and John List, in order to get an idea of the high level purposes and the methological underpinnings of economics research.

2.3 Expectations

Though the course is demanding, it is structured in a way such that a student can be successful by regularly attending the scheduled meetings, and studying according to the recommendations below. A rough estimate of the *self-study time* needed for the course is approximately 16 hours per week (for an average student to master the material at an average level). In order to pass the course, the students will need to complete certain tasks (final exam, participation). Some of these tasks will be undertaken in groups.

3 Course structure

3.1 Description

The course consists of 14 meetings (7 lectures and 7 tutorials). Additional online material (online lectures, technical notes, exercises) can be provided upon request for the ambitious students throughout the course. This additional material will not be part of the course's assessment and will not be discussed in class.

- **Lectures:** They take place once a week, every Monday. During the meeting, the instructor will provide an overview of that week's topics. We will roughly cover one chapter of the main textbook per week. Although participation in the lectures is not formally mandatory, it is still strongly advised.
- **Tutorials:** They take place once a week, every Thursday. There are different types of tasks for each tutorial, i.e., in some tutorials we will discuss the literature, in some tutorials we will discuss questions that you have already worked at home, in some tutorials we will discuss questions that we will give you during the tutorial, or some combination of the above. During the tutorial, you will be mostly working in small groups of 3-4 students. For the tasks that you have already worked at home it is mandatory to report whether you have used an AI tool to assist you during your self study.
- **Self-study:** As mentioned above, it is extremely important that you come prepared to class. While the average recommended self-study time is 16 hours, this may vary depending on the previous knowledge that you have on the subject. The important thing to remember is that the course's objective is to understand few central topics in depth. In this sense, superficial treatment of the material will not suffice.

3.2 Schedule

The precise schedule (for the seven weeks of the course) is as follows:

1. **Preferences and utility**

   READINGS: Osborne & Rubinstein (Ch. 1)

2. **Choice theory**

   READINGS: Osborne & Rubinstein (Ch. 2)

3. **Decisions under risk**

   READINGS: Osborne & Rubinstein (Ch. 3)

4. **Strategic games**

   READINGS: Osborne & Rubinstein (Ch. 15)

5. **Extensive games**

   READINGS: Osborne & Rubinstein (Ch. 16)

6. **Mechanism design**

   READINGS: Osborne & Rubinstein (Ch. 17)

7. **Matching**

   READINGS: Osborne & Rubinstein (Ch. 18)

3.3 Literature

The main textbooks is:

- OSBORNE, M. & RUBINSTEIN, A. (2020). *Models in Microeconomic Theory*. Open access textbook (free download).

The textbook is somewhere between upper undergraduate and lower graduate level, meaning that it is exactly at the level that this course and this program is supposed to deliver. It is a textbook which is used widely in many courses at this level, and in this sense it is well calibrated and tested.

Please note that students without previous knowledge of economic theory may find the style and the language challenging at first. This is because in economics we tend to write much more densely than, for instance, in psychology. So, do not be fooled by the short length of the chapters. You will typically need to read the text multiple times in order to understand it.

Additional textbooks that the students may find useful include:

- BONANNO, G. (2015). *Game Theory*. Open access textbook (free download).
- BONANNO, G. (2017). *Decision Making*. Open access textbook (free download).
- GILBOA, I. (2011). *Making better decisions: Decision Theory in pratice*. Wiley.

Note that these textbooks partially cover the material of the main textbook. They are meant to be used as alternative ways to explain the same topics. In this sense, they should not be seen as replacements, but rather as supplements of what we discuss in class. In general, for graduate courses, it is always highly recommended that you read from multiple sources.

4 Performance assessment

The final grade will be calculated based on the performance in the following tasks (with the corresponding points of each task in parenthesis):

- **Participation (pass/fail):** You need to be present in at least 5 tutorials to pass the participation requirement. If you are late more than 15 minutes for the tutorial, it counts as an absence, but nonetheless you are free to participate in the meeting. You can replace the minimum participation requirement with a course assignment. However, this is not advised unless absolutely necessary. The length of the course assignment depends on how many tutorials you missed. For instance, people who missed 7 tutorial meetings will have to do much more work than those who missed 3 tutorial meetings. But in either case, be advised that if you have to do the course assignment, the work load in the last weeks of the course will be very intense.
- **Final exam (100 points):** The final exam will be a 2-hour exam (using testvision in MECC) and it will contain a mix of conceptual questions and quantitative problems. You will receive more information on the exact structure of the exam once the course has started.

The final grade will be on a scale $1-10$. It is calculated by taking the total number of points divided by 10 and rounded to the nearest half point. To pass the course one needs to be present in at least 5 of the 7 tutorials, and to collect at least 55 points in total. That is, 53 points and 54 points are downgraded to 5 and therefore do not suffice to pass the course.

For the students who collect less than 55 points, there will be a resit exam. Note that partial grades obtained in this course remain valid for a period of three years, i.e., the academic year in which the grades were obtained plus two subsequent academic years.

4.1 Fraud and plagiarism

In order to protect the reputation of our degrees and the integrity of our school, instances of fraud or plagiarism are treated very seriously. Fraud is understood as a student's act or failure to act that makes it partially or fully impossible to correctly assess his/her knowledge, insight or skills. An example of fraud is cheating during an exam. Plagiarism is understood as the presentation of someone else's ideas or words as your own without proper reference to the source. An example of plagiarism is copying from someone else's paper, or copying from a textbook or an online source without explicitly mentioning where this was taken from.

If the board of examiners concludes that any offense related to plagiarism or fraud has been committed, they will initiate the procedures for imposing sanctions in accordance to the school's policies.

5 Contact information

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