

# GAME THEORY: BASIC CONCEPTS AND APPLICATIONS

Course manual

EBC2036

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Period 6: June, 2025

Coordinators: Elias Tsakas (MPE) & Anna Zseleva (KE)

# 1 Introduction

This course is an introduction to some basic concepts of Game Theory. The aim of the course is twofold, viz., on the one hand, to provide a brief overview of the standard analytical tools that are used for modeling strategic interaction and predicting its outcome, and on the other hand to introduce the main methodological tools used to test these predictions.

The course is structured in a way such that a student can be successful by attending all scheduled meetings, and studying according to the schedule described below. In order to pass the course, the students will need to complete certain tasks (participation, problem sets, papers, presentations). These tasks will be submitted in groups that will be formed at the beginning of the first lecture. There will be four working groups per tutorial group.

## 2 Course structure

The course consists of two lectures and four tutorial meetings. All the meetings will take place during the first week of the course. The second week will be devoted to the students writing their term paper.

The topics to be covered are solution concepts for static games and dynamic games. The structure of the first week is as follows:

1. **Lectures** (Monday). The basic concepts will be presented in two consecutive courses: one on static games (taught by Elias Tsakas) and one on dynamic games (taught by Anna Zseleva). Even if you have heard these topics previously in your studies, it is important to follow the lectures. At the end of the lecture the students will be handed a problem set. Moreover, paper topics will be assigned to two of the four groups (the ones responsible for presenting that week).
2. **Exercise sessions** (Tuesday/Wednesday). In each of the two days, there is a 2-hour tutorial. On Tuesday the tutorial is devoted on static games, and on Wednesday it is devoted on dynamic games. For each of the tutorials the students are expected to have solved the problem set before the exercise session. During the session students are asked randomly to present their solution on the whiteboard.
3. **Paper sessions** (Thursday/Friday). In each of the two days, there is a 2-hour tutorial. On Thursday the tutorial is devoted on static games, and on Friday it is devoted on dynamic games. Each tutorial consists of two presentations (by the two working groups that have been assigned the corresponding topics). Each presentation is expected to last approximately 45-minutes, with a 15-minutes break in between. The topics of the four presentations are the following:
  - (a) Traveller's dilemma (Main reference: Goeree and Holt, 2001; Section I.A)
  - (b) Matching pennies (Main reference: Goeree and Holt, 2001; Section I.B)
  - (c) Trust in others' rationality/Belief in non-credible threat (Main reference: Goeree and Holt, 2001; Sections II.A-II.B)
  - (d) Two-stage bargaining (Main reference: Goeree and Holt, 2001; Section II.C)

Each of the previous topics focuses on experimentally testing one game-theoretic solution concept, among the ones that have been discussed in the preceding lecture. The paper and the presentation should be structured as follows: the students should briefly (i) present the underlying game, (ii) describe – when relevant – the behavioral phenomenon that we model with this game, (iii) solve the game using the solution concept that is applied in the main reference in order to obtain the theoretical

predictions, (iv) present the experimental results from the main reference, and relate them with the theoretical predictions, (v) present a moderate literature review (not more than two paragraphs) on other experimental and/or theoretical work on this game.

During the second week of the course, students are expected to submit a paper on the same topic they already presented during the first week. Papers are individually written, and submitted through canvas, by Friday 17:00 of the second week. A paper is expected to be 8-10 pages long (excluding references). The use of ChatGPT is not permitted.

## 2.1 Content

The research article needed for the course:

GOEREE, J. & HOLT, C. (2001). Ten little treasures of game theory and ten intuitive contradictions. *American Economic Review* 91, 1402–1422.

Additional material will be provided by the course coordinator in the first meeting.

The topics that will be covered during the meetings of the respective week are the ones below.

1. **Static games** (Iterated elimination of dominated strategies; Nash equilibrium)
2. **Dynamic games** (Nash equilibrium; Subgame perfect equilibrium)

## 2.2 Performance assessment

Each student will receive a pass/fail grade. In order to pass the course, a student must fulfil the following requirements (no substitutions allowed):

- **Participation:** The student needs to be present in 3 out of 4 tutorial meetings. Moreover, in order to pass participation, students must be prepared to solve a problem on the board during the exercise sessions.
- **Paper:** The paper must receive a pass grade.
- **Presentation:** The presentation must receive a pass grade.

In addition the following apply:

- **(Possible) additional oral exam:** The coordinators reserve the right to carry out a follow up examination of selected students on their papers. If this is the case, this will be done online via Teams.
- **Course assignment:** Students who fail participation will have the opportunity to take assignment to compensate. However, it is highly recommended that you use this option only if it absolutely necessary, as it will involve substantial work load, on top of your paper.

## 3 Contact information

For any further information regarding the course, please contact:

- Elias Tsakas (first week; [e.tsakas@maastrichtuniversity.nl](mailto:e.tsakas@maastrichtuniversity.nl); office: A1.13)
- Anna Zseleva (second week; [anna.zseleva@maastrichtuniversity.nl](mailto:anna.zseleva@maastrichtuniversity.nl); office: A3.21A)