MGT-300

Game theory and strategic decisions

Perazzi Elena

Cursus	Sem.	Type
Humanities and Social Sciences	BA5	Obl.

Language of teaching	English
Credits	2
Session	Winter
Semester	Fall
Exam	During the semester
Workload	60h
Weeks	14
Hours	**2 weekly**
Courses	2 weekly
Number of positions	**80**

Summary

Game theory studies the strategic interactions between rational agents. It has a myriad of applications in politics, business, sports. A special branch of Game Theory, Auction Theory, has recently guided the development of Ebay, Google advertising auctions, and of the Wireless spectrum auctions.

Content

The course will be organized around three big themes:

- Introduction to the main solution concepts in Game Theory: dominance, iterated deletion of dominated strategies, Nash equilibrium, backward induction, subgame perfect equilibrium. Special emphasis will be given to real-life examples, such as: how to shoot penalties; why companies cluster in some locations; the Cuban missile crisis.
- Auction theory: How to optimally bid in an auction? How to optimally design an auction? We will cover first and second-price auctions; the revelation principle; common-value auctions with imperfect information (the winner's curse). Applications to **Ebay auctions**, **Google advertising auctions** and the **Wireless spectrum auctions**.
- Evolutionary game theory: an application of game theory to biology. It explores (through an extensive use of simulation tools) how cooperative behavior emerged from Darwinian competition through repeated interactions.

Keywords

Games, Auctions, Nash equilibrium, cooperation

Learning Prerequisites

Required courses

none

Recommended courses

none

Important concepts to start the course

none

Learning Outcomes

By the end of the course, the student must be able to:

- Compute the Nash equilibria of simple games in normal form

- Compute the Nash equilibria of simple games in extensive form and be able to determine which of these equilibria are subgame perfect
- Compute mixed-strategy equilibria of simple games.
- Analyze first and second-price auctions.
- Model how a cooperative equilibrium can be sustained with infinitely-repeated games.
- Compute the fixed point of optimal best responses.
- Model real-life situations as games and find the equilibria.
- Solve dynamic games through backward induction.

Transversal skills

- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Use a work methodology appropriate to the task.
- Continue to work through difficulties or initial failure to find optimal solutions.

Teaching methods

Lectures; homeworks; case studies.

Expected student activities

Attend lectures;Complete homeworks in groups; Participate in class

Assessment methods

Assignments, completed in groups during the semester. Assignments may be qualitative, quantitative, or real-word case studies

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

Resources

Virtual desktop infrastructure (VDI)

No

Notes/Handbook

Lecture notes will be provided for each lecture.