

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
<b>Hours</b>	<b>2 weekly</b>
Courses	2 weekly
<b>Number of positions</b>	<b>80</b>

**Remark**

Une seule inscription à un cours SHS+MGT autorisée. En cas d'inscriptions multiples elles seront toutes supprimées sans notification

**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.