I. General description

The course is divided into two parts. The first part is dedicated to a general introduction to non-cooperative and cooperative game theory. The second part is devoted to applications of game theory in supply chain management, marketing and public policy related to environmental problems. For each application area, the topic and the main issues are first introduced, and some specific problems are next discussed.

II. Objectives

The objectives of the course are the following:

- Introduce the students to the different concepts of game theory;
- Learn about applications of game theory in different areas;
- Give the students the necessary background to access the ever-growing game theory literature in management science and engineering;
- Help the students develop a critical thinking with respect to the role played by game theory in our understanding and solving managerial problems.

III. Pedagogical material

Book chapters and articles

IV. Grading

(i) Three assignments 30 points
(ii) Mid-term exam 30 points
(ii) Final exam 40 points
V. Sessions

Sessions 1-4: A general introduction to the theory of non-cooperative games

Readings:


Additional readings:


Session 5: Introduction to repeated games

Reading:


Additional reading:


Sessions 6-7: Cooperative games and bargaining solutions

Readings:

Parilina, E., Reddy, V. and Zaccour, G., A Refresher on Cooperative Games, mimeo.


Session 8: Mid-term exam
Sessions 9-11: Applications of game theory to supply chain management

- Main issues in coordination of supply chains
- Price coordination mechanism
  - Wholesale price contract
  - Revenue sharing
  - Price discount and two-part tariffs
- Non-price coordination mechanisms
  - Cooperative advertising
  - Marketing services
- Coordination of closed-loop supply chains
  - Importance of closing the loop (recycling, remanufacturing, etc.)
  - Responsibilities (manufacturers, retailers and third parties)

Readings:


Additional readings:


Session 12: Applications of game theory in marketing

- Competitive pricing decisions
- Advertising competition
- Franchising systems

Reading:


Additional reading:


Sessions 13-14: Game theory in environmental economics and management

Readings:

Cioni, L., Game Theory as a Tool for the Management of Environmental Problems and Agreements, mimeo.


Additional reading: