

## Faculty of Economic, Social and Political Sciences



### ECGE1225 Game theory and decision analysis

[30h] 4 credits

**Teacher(s):** Pierre Dehez  
**Language:** French  
**Level:** First cycle

#### Aims

What is Game theory? Games start as soon as people interact. If you take part in an auction sale, you are playing a game with the other bidders. When the manager of a supermarket determines the price of a packet of French beans, he is playing a game both with his customers and his competitors. When the owners of a company negotiate the wage contracts for the year to come with the trade unions, they are playing a game. The Counsel for the Prosecution and Defence are playing a game when they choose the arguments to use in their final summing-up. Game theory is the description of what occurs in such situations when people interact rationally. In fact, the aim of Game theory is to discover how rational agents could be expected to interact when they have conflicting interests.

By the end of the course, students should master the main concepts of Games theory taught in class and be able to apply them in the analysis and formalisation of relevant economic problems.

#### Main themes

The first part of the course deals with games of perfect information and related resolution concepts: the Nash equilibrium, retrospective induction. Each concept will be illuminated with numerous illustrations: Cournot and Bertrand competition, Stackelberg competition, bidding, decision under ultimatum, strategic voting, choice of political platform, etc. The second part deals with games of imperfect information where players are not fully aware of their opponents' characteristics. The third part expands on a number of different themes: individual rationality and its limits, repeated games, and negotiation theory.

#### Content and teaching methods

Introduction: History of Game theory; rational choice theory.

First Part: Games of perfect information

1. Nash equilibrium: Theory
2. Nash equilibrium: Illustrations
3. equilibrium in mixed strategies and illustrations
4. extensive games with perfect information: Theory
5. extensive games with perfect information: Illustrations
6. coalitional games: the core and illustrations

Second Part: Games of imperfect information

1. Bayesian games
2. extensive games with imperfect information

Third Part: Extensions

1. rationalisability
2. evolutionary games
3. repeated games
4. negotiation

Method:

Lecture course (30 hours) + personal work (equivalent to 10 hours).

**Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)**

Course Materials : Martin J. Osborne, An Introduction to Game Theory, Oxford University Press, 2004

Prajit K. Dutta, Strategies and Games : Theory and Practice, MIT Press, 1999

Ken Binmore, Jeux et théorie des jeux, De Boeck Université, 1999

**Other credits in programs**

<b>FSA12BA</b>	Deuxième année de bachelier en sciences de l'ingénieur, orientation ingénieur civil	(4 credits)	
<b>INGE12BA</b>	Deuxième année de bachelier en ingénieur de gestion	(4 credits)	Mandatory