Game Theory
Teoría de Juegos e Información Asimétrica (14700002)
Universidad del Rosario - Facultad de Economía
Semestre 2014 - I

Syllabus

Instructor: Çağatay Kayı.

Class Hours: Mondays & Wednesdays: 15:00 - 17:00.

Lecture Hall: Auditorio I, Pedro Fermin.

Email: kayi.cagatay@urosario.edu.co, cagatay.kayi@gmail.com.

Office: Pedro Fermin 3-15 Ext. 626.

Office Hours: Mondays and Wednesdays: 14:00 - 15:00. Otherwise, please e-mail me to arrange a mutually convenient time.

Teaching Assistant: Carlos Arturo Salamanca Malagón **Email:** carlos.salamanca91@gmail.com.

Problem Sessions: TBA.

Objectives: This course is aimed for students in the Master of Economics. The purpose of the course is to provide some basic concepts in *game theory* which is a systematic study of strategic interaction among rational individuals. In this course we study the basic elements of game theory. The foundation of game theory was laid in an article by John von Neumann (1928). The theory received widespread attention only after publication of the fundamental book of von Neumann and Morgenstern (1944, p.31), where the aim of Game Theory is described as follows:

> "[W]e wish to find the mathematically complete principles which define "rational behavior" for the participants in a social economy, and to derive from them the general characteristics of that behavior. And while the principles ought to be perfectly general—i.e., valid in all situations—we may be satisfied if we can find solutions, for the moment, only in some characteristic special cases."

Informally, game theory is a mathematical discipline that analyzes conflict situations. A conflict situation—the game—is a situation in which a certain number of individuals—the players—interact and thereby jointly determine the outcome. Each participating player has partial control over the situation, but never full control. Each player is endowed with certain individual preferences over the set of possible outcomes and strives to obtain the outcome that is most profitable to him. The aim of game theory is to prescribe which strategy each player in a game should play such that his partial influence on the situation is exploited in order to promote his interest optimally.

Requirements: There are lectures (twice a week) and a problem session (every two weeks, starting from second week). Evaluation is based on two partial exams (32.5% each) and a final exam (35%). The final is cumulative. There are problem sets that you do not have to hand them in but these problems are good preparation for the exams. There is an objection period after each exam for a week. If a student misses an exam, we follow the regular procedure determined by the academic regulations. There are NO make-up exams without documented medical evidence that should be presented within one week of the exam. Failure to do so results in a score of zero on the missed exam. After the final, there is no rounding for grades and the grades are not subject to change unless there exists a well-founded claim.

The schedule is as follows:

- *First day of classes:* 20 January 2014, Monday.
- *First exam:* TBA.
- No classes on March 19, 24, and 26, April 14 and 16 (Semana Santa).
- *Second exam:* TBA.
- *Last day of classes:* 14 May 2014, Wednesday.
- *Final:* 21 May 2014, Wednesday.

Course Outline:

1. Introduction.

   (a) Theory of Choice.
   (b) Decision-making under Uncertainty.
   (c) Attitudes towards Risk.

2. Strategic Form Games under Complete Information.

   (a) Dominant and Dominated Strategies.
   (b) Iterative Elimination of Dominated Strategies.
   (c) Nash Equilibrium and Applications.
   (d) Mixed-strategy Nash Equilibrium.
   (e) Rationalizability.
   (f) Trembling Hand and Correlated Equilibria.

3. Extensive Form Games under Complete Information.

   (a) Backward Induction.
   (b) Subgame Perfect Nash Equilibrium.
   (c) Forward Induction.
   (d) Sequential Bargaining.

4. Repeated Games.

5. Strategic Form Games under Incomplete Information.

   (a) Bayesian Nash Equilibrium.

6. Extensive Form Games under Incomplete Information.

   (a) Weak Perfect Bayesian Nash Equilibrium.
   (b) Perfect Bayesian Nash Equilibrium.
   (c) Signalling Games.

7. Coalitional Games.

   (a) Nucleolus.
   (b) Shapley Value.
   (c) Nash Solution.

Suggested Readings:

- Fudenberg, D. and Tirole, J. (1991) Game Theory, MIT Press.

- Mas-Colell, A. Whinston, M.D. and Green, J. (1995) Microeconomic Theory, Oxford University Press.

- Osborne, M. (2003) An Introduction to Game Theory, Oxford University Press.

- Osborne, M. and Rubinstein, A. (1994) A Course in Game Theory, MIT Press.

- Vega-Redondo, F. (2003) Economics and the Theory of Games, Cambridge University Press.