Game Theory

2011/2012

Professor: **José Luis Ferreira**

Compulsory
ECTS credits: 5
Course: 1 º
Semester: 1 º

STUDENTS ARE EXPECTED TO HAVE COMPLETED:

No prerequisites.

COMPETENCES AND SKILLS THAT WILL BE ACQUIRED AND LEARNING RESULTS:

The aim of this course is to provide the students with basic knowledge of game theory, that is to give them the tools to understand and criticize the main contribution in this field as well as the economic applications. The course requires no more than a basic understanding of probability and real analysis. However an appreciation for mathematical modelling in social sciences is greatly necessary.

The course is divided in 10 sections. The professor will cover the first six and, then, let the students chose the sections to cover in the last classes among the remaining 4.

DESCRIPTION OF CONTENTS. PROGRAMME:

1. Introduction and basic models
   From Economic Theory to Game Theory. Rationality, intelligence and common knowledge. Games in normal and extensive form. Zermelo's theorem. Domination.

2. The Nash equilibrium
   Two-person zero-sum games. The Minimax theorem. Mixed strategies. Nash equilibrium. Existence theorems. Significance of Nash equilibria.

3. Refinements of Nash equilibrium I
   Why refinements. Refinements in the extensive form (subgame perfect, sequential, perfect equilibria.)

4. Refinements of Nash equilibrium II
   Refinements in the normal form (trembling hand perfect equilibrium.)

5. Repeated games
   Finite and infinite repetition. The Folk Theorem.

6. Bayesian games

Incomplete information. Harsanyi's theory. Signaling games.

7. Evolutionary game theory

A new perspective: from the phenotype to the genotype. The selection of the best fitted vs. rationality. Evolutionary stable strategy. Relation to refinements.

8. Bargaining

Bargaining games in axiomatic and extensive forms. Solutions. The Nash's program.

9. Cooperative games I

The model of coalitional games. The core. Convex games. Von Neumann and Morgenstern's solution.

10. Cooperative games II

The Shapley value. Other solutions. Games with nontransferable utility.

LEARNING ACTIVITIES AND METHODOLOGY:

Exercises.

ASSESSMENT SYSTEM:

Homeworks. (15%)
Quizzes. (15%)
Final exam. (70%)