

ECON310 - GAME THEORY - SPRING 2011
SABANCI UNIVERSITY, FACULTY OF ARTS AND SOCIAL SCIENCES

COURSE INFORMATION

Instructor: Mehmet Barlo
Office/Phone: 1024 FASS; (90) 216 483 9284
Office Hours: by appointment
email: barlo@sabanciuniv.edu
web-page: SU Course and <http://www.sabanciuniv.edu/ssbf/economics/eng/>
Class: M 11:40 am - 1:30 pm, FASS 1099; T 9:40 am - 10:30 am, FASS 1099
Teaching Assistant: Korhan Koçak

COURSE OBJECTIVES

The goal of this course is to further knowledge of applications and theories in the area of games of normal form and extensive form. This is a serious course in which you will learn how to do game theory, including its technical side. We are going to derive most of the results from primitives, and will not take any formulae as given. After learning some equilibrium concepts we will solve many games from economics, business, sports, politics, gambling, and etc.

I hope that by the end of this course, your point of view (not only the one towards economics but also towards many fields of social sciences) will be refined.

BACKGROUND

You are expected to be familiar and fluent with introductory calculus, ECON201 and ECON 204. In the course we are going to read and write some proofs of selected theorems. I may review some aspects of writing proofs if I see fit.

It is important to point out that you are **not** required to have taken a Mathematical Analysis course (*MATH 301*). Even though the level of analytical abilities would not be low, the mathematics that I will be using involves only elementary operations (used in concise and elaborate analytical steps).

TEXTS

I will not follow a particular book word for word, yet, the below listed books do cover the same material with lots of examples.

- *Game Theory for Applied Economists*, Robert Gibbons, *recommended*, the author is a famous game theorist, and the book is very well organized. That is a very good book that you want to keep for your own library. I will put important parts of it to the reserve at the library, if needed.
- *Game Theory and Economic Modeling*, David Kreps, Oxford University Press, 1991; *recommended*, it is a very famous book by a well-known game theorist offering a solid introduction to the subject. That is a very good book that you want to keep for your own library. I will put important parts of it to the reserve at the library, if needed.
- *A course in Game Theory*, Martin Osborne and Ariel Rubinstein, MIT Press, 1994; *recommended*, this too is a very famous book by two well-known game theorists. It is an introductory game theory textbook for graduate level game theory. That is a very good book that you want to keep for your own library. I will put important parts of it to the reserve at the library, if needed.
- Homework answer keys at our website.

GRADING

Homeworks: (%10 of grade) 4 homeworks, and the answer key will be posted in the webpage.

Quizzes: (%10 of grade) There will be some number of short quizzes done in the lecture. The instructor keeps the right of administering a quiz each lecture.

Midterms: (%40 of grade) There will be two midterms in class.

Final: (%40 of grade) The final will be comprehensive.

COURSE CONTENT

The following list gives the list of topics to be covered. You will be responsible for the lecture material, hence, **attendance is essential**. The lecture material will be in the same line as Gibbons' book, sometimes skipping topics, on other times offering more material in greater detail. You will be responsible only for the parts of the book that are covered in the lecture. And now the list:

I. Games of normal form under perfect information

- Definition, and modeling strategic situations of one-shot nature,
- The expected utility theorem, and mixed strategies,
- Rationality considerations: Strict domination, Iterated elimination of strictly dominated strategies, weak domination, and rationalizability,
- Nash equilibrium, and its existence,
- Examples and applications in industrial organization:
 - Cournot, and Bertrand equilibria,
 - Bargaining,
 - Wars of attrition, games of timing,
 - Other examples,
- Non-stability of Nash equilibrium, refinements, (trembling hand) perfect equilibrium,

II. Games of extensive form

- Definition, modeling of strategic interactions involving a sequence of moves
- Behavioral strategies,
- Subgame perfect equilibrium,
- Repeated Games,
- Examples and applications in industrial organization.
 - Von Stackelberg competition,
 - Repeated Cournot oligopoly,
 - Repeated Bargaining.

III. Normal form games with imperfect information

- Definition, and modeling one-shot strategic interaction under imperfect information,
- Bayesian Nash equilibrium,
- Moral hazard, adverse selection,
- Auctions.

IV. Extensive form games with imperfect information

- Definition, and modeling sequential strategic interaction under imperfect information,
- Perfect Bayesian and Sequential equilibria,
- Examples, and applications in industrial organization
 - Signalling games,
 - Entry deterrence games.

V. Cooperative Games

- Definitions, and modeling strategic interaction of cooperative nature,
- Transferable utility versus non-transferable utility cooperative games,
- games in coalitional form, convex games, balanced games,
- Core,
- Shapley Value,
- Bargaining, coalition formation and cooperation,
- Noncooperative justification for coalition formation, Correlated Equilibrium.

POLICIES

Homeworks and Quizzes:

1. Homeworks should be turned in at the beginning of class on the assigned date. As I will be posting the answer key to the web shortly after lecture on the assigned date, *no late homeworks will be accepted.*
2. All homeworks should be typed, except for mathematical formulas, computations, algebra, which must be neatly and clearly written. The grader is the final judge of what is legible and may request specific students to type their work.
3. Collective and cooperative work on homeworks is strongly encouraged. However, any homework **must** be written up separately by the owner of it. Additionally, any homework **must** contain the list of the fellow students with whom the work was done.
4. A student who is not present in the lecture in which a quiz is administered will be given a grade of 0 for that corresponding quiz. If you have a good reason for not attending a particular quiz, please produce relevant (and formal) documentation for your absence and talk to me.
5. Make-up exams are granted only in case of a valid and documented reason. Absence in exams without any valid documented reason will result in a 0 from that exam. In case of an illness, the student is required to produce a formal doctor's note from a hospital. (A doctor's note taken from a doctor's private practice does not count as formal.) In case of private hospitals, the doctor's note has to be verified by the university health service within five business days. Finally, all documentation has to be submitted in 10 business days after the expiration of the excuse.

Scholarly Conduct:

1. The definition for scholastic dishonesty is given in the rules and regulations of the Sabancı University.
2. In the case of scholastic dishonesty, no credits will be given for that particular work. Cheating during written work will result in an F for the course. All incidents of scholastic dishonesty will be reported to FASS.