Economics 461 Prof. H. Ofek
Fall 2009 TA: TBA

GAME THEORY
Syllabus

Description and learning objectives: Introduction to the theory of games and related applications in economics and beyond. Primary attention is paid to game theoretic analysis facilitating better understanding of stable states of economic equilibrium in the absence of markets, as well as better understanding of various forms of strategic interaction under imperfect competition (e.g., under oligopoly) or imperfect information (under conditions of risk and uncertainty). Considerable time is also devoted to evolutionary game theory. Theoretical topics to be covered range from pure to mixed strategies, from zero-sum games and the minimax theorem to variable-sum games and Nash equilibrium, and from rationlizable strategic moves to evolutionary stable (ESS) ones. Occasional applications to politics and international conflicts will also be discussed. Prerequisites: Grade of C or better in ECON 360; also grades of C or better in college level statistics and calculus (A- required from 2-year school).

OFFICE HOURS (in LT1011): Monday 11:00 – 12:00; Friday 2:20 – 3:20; or by appointment.

PRIMARY TEXT: (available from the bookstore)

Avinash Dixit & Susan Skeath, Games of Strategy, 3rd edition. (Norton, 2004).

SUPPLEMENTARY TEXT: (on reserve)

Ken Binmore, Fun and Games: A Text on Game Theory, (Heath and Company, 1992).

MICROECONOMIC BACKGROUND:

Any standard intermediate microeconomic text such as J. M. Perloff, Microeconomics (on reserve), or equivalent.

COURSE WEBSITE: *http://bingweb.binghamton.edu/~hofek/e461f9/frame.html*

Your primary source for course materials, this site will be updated continuously as the course progresses. So, you should check it on a regular basis (at least twice a week).

LECTURES, READINGS, AND HANDOUTS:

You are responsible for everything that transpires in class (or on its Web site) and for obtaining any written material that is distributed. The lectures will discuss parts of the readings in detail, or will provide additional material not contained in the texts. Note that the problem sets and the exams may cover portions of the readings not discussed in class. Hence, neither the lectures nor the readings can be substituted for one another.

HOMEWORK ASSIGNMENTS:

In order to learn the material it is absolutely essential to do the problem sets.

Weekly take-home problem set will be made available through the class webpage (in PDF format). To allow for unexpected emergencies or bad luck, the grade on your lowest submitted problem set will be omitted. So you may miss one assignment without penalty – but no make-ups or late submissions will be accepted.

EXAMS:

Two midterm and a final examination (dates TBA).

Note: There will be no make-up midterm exams!

(For make-up final exams, see addendum at the bottom of this document)

GRADES:

Your final grade will be based on the final exam (40%), two mid-term exams (20% each), and home assignments (20%). Active class participation may slightly improve your grade (up to 5%).

Approximate Outline and Tentative Reading List

(additional readings may be added when course is in progress)

Note: (*) = recommended, not required.

I. Introduction and preliminary concepts.
. . . . . Dixit & Skeath: Chaps. 1, 2; *(Binmore: pp. 3 - 21, 131-135).

II. Pure strategy equilibrium in sequential-move games
. . . . . Dixit & Skeath: Chap. 3; *(Binmore pp. 25-38).

(1) Sequential-move games.
(2) Backward induction.
(3) Extensive and strategic forms.
(4) Simultaneous-move games.

III. Pure strategy equilibrium in simultaneous-move games
. . . . . Dixit & Skeath: Chap. 4, 5; *(Binmore pp. 146 - 153, 131-135.

(1) Nash equilibrium.
(2) Cell-by-cell inspection.
(3) Dominance solvability.
(4) Best response.

IV. Mixed strategy equilibrium
. . . . . Dixit & Skeath: Chaps. 7, 8; *(Binmore pp. 219 - 237, 277 - 286).

(1) Probabilistic choice and expected utility.
(2) The algebraic representation of a game.
(3) Mixed strategy Nash equilibrium.
(4) Nash theorem.

V. Rfinements . . . . . Dixit & Skeath: Chap. 6, 10.

(1) Subgame perfection.
(2) First look at ESS.
(3) Trembling-hand perfection.
(4) Maximin (security) strategies.

VI. Zero-sum games . . . . . Dixit & Skeath: Chap. 11; *(Binmore pp. 237-245, 252-261).

(1) Strictly competitive games.
(2) Saddle point solutions,
(3) The minimax theorem.

VII. Oligopolistic competition . . . . . Perloff: Chap. 13; *(Binmore pp. 286-295, 398-401).

(1) Cournot's model of oligopoly.
(2) Bertrand's model of oligopoly.
(3) Stackelberg's model of duopoly.

VIII. Repeated Games . . . . . Dixit & Skeath: Chaps. 11; *(Binmore pp. 304-319 and Chap. 8).

(1) Stage games of multiple rounds.
(2) Nash equilibrium in repeated play.
(3) Repeated Prisoners' Dilemma and the Folk theorem.

IX. Evolutionary game theory . . . . . Dixit & Skeath: Chap. 13; *(Binmore pp. 414-434).

(1) The *Hawk-Dove* game.
(2) Evolutionarily stable strategies (ESS).
(3) Pure strategy (monomorphic) ESS.
(4) Mixed strategy (polymorphic) ESS.

X. Further applications (as time permits)

ADDENDUM

ECONOMICS DEPARTMENT POLICY REGARDING MAKE-UP FINAL EXAMS

ALL make-up final exams in Economics will be given **Friday, December 18 from 8:00 to 10:00 AM.** All officially scheduled final exams are linked from the BU Brain – check **NOW** for conflicts. If a conflict exists you may request a make-up exam from the instructor of **ANY** of the conflicting courses. If you choose to request a make-up exam for an economics course, a sign-up list to request the make-up exam will be available in class after the add/drop deadline – ask the instructor. Students ***MUST*** make their request for a make-up exam in economics **NO LATER THAN FRIDAY, October 9.**

It is **the student's responsibility** to learn from the instructor if the request has been approved. Only students who are approved may take a make-up final exam. Students who have not requested a make-up exam in an economics course by October 9 will be required to resolve conflicting exams with the instructor in one of their other courses.

Make-up exams are approved **ONLY** for the following conditions:

1. Conflicts with the **OFFICIAL** final exam schedule (e.g. exams at the same time or more than two exams within 24 hours).
2. **DOCUMENTED** personal illness or family emergency.