

ECONOMICS 0200
GAME THEORY PRINCIPLES
TIME: 11:00AM-12:15PM TUTH
LOCATION: 823 BENEDUM HALL
PHONE: 412-648-7088
EMAIL: ABLUME@PITT.EDU

INSTRUCTOR: ANDREAS BLUME
OFFICE: 4932 POSVAR HALL
OFFICE HOURS: TH 12:30PM-2:30PM
TA: WOORYOUNG LIM
WOORYOUNG'S OFFICE HOURS: TBA
WOORYOUNG'S OFFICE: 4518 POSVAR HALL

A. Course Objective

This course introduces the basic concepts of game theory. The emphasis is on the unifying perspective that game theory offers to questions in economics, other disciplines, and everyday life. The course draws on a wide range of substantive and intellectually stimulating applications of game theory across areas in economics, other disciplines, and beyond. It will enable students to view social interactions as strategic games, to use game theoretic concepts to predict behavior in these interactions and to conceive of ways in which altering the game affects social outcomes.

B. Organization of Course Content

Week 1 INTRODUCTION: Examples of games, classroom experiments on *nim*, the *guessing game* and the *astronaut game*. Concepts: Agents, objectives, rules, strategies, conflict, cooperation, coordination. Tools: game trees, backward induction.

Week 2 GAME THEORY IN ECONOMICS 1: Adam Smith, gains from trade vs. the prisoners' dilemma, games that promote efficient outcomes vs. games that discourage efficiency. Concepts: Rationality, efficiency, utility maximization, strategic domination, best response, Nash equilibrium. Tools: game matrices.

Week 3: GAME THEORY IN LITERATURE: Poe, Conan Doyle, Faulkner, Philip K. Dick, (see Brams in GEB 6), games with pure conflict, the minmax theorem. Concepts: best responses, mixed strategies. Tools: basic probability, expected value, expected utility.

Week 4: GAME THEORY IN POLITICAL SCIENCE 1: Voting, the median voter theorem.

Week 5: GAME THEORY IN POLITICAL SCIENCE 2: Lobbying, Condorcet jury theorem, war of attrition, cheap talk. Conditional probability and Bayes' rule. Concepts: Private information, Bayesian inference. Tools: Conditional Probability, Bayes's rule.

Week 6: GAME THEORY IN PHILOSOPHY: Ethics, norms, the *stag hunt game* principles of justice, <http://plato.stanford.edu/entries/game-ethics/>, knowledge, common knowledge, awareness.

Week 7: GAME THEORY IN BIOLOGY 1: The peacock's tail, costly signaling. Concepts: Private Information, Bayesian inference.

Week 8: GAME THEORY IN BIOLOGY 2: Evolutionary game theory. Concepts: Maximization of reproductive success, Evolutionarily Stable Strategy (ESS).

Week 9: GAME THEORY AND PSYCHOLOGY: Behavioral biases, Behavioral game theory.

Week 10: GAME THEORY AND THE LAW: Liability rules, out-of court settlements.

Week 12: GAME THEORY IN SOCIOLOGY: Neighborhood segregation, collective action. Concepts: Coordination.

Week 13: GAME THEORY, MATHEMATICS, AND PHYSICS: Search games, coordination, symmetry, "solving" the prisoners' dilemma, quantum games, http://arxiv.org/PS_cache/quant-ph/pdf/0004/0004076.pdf

Week 14: GAME THEORY IN COMPUTER SCIENCE: Selfish routing, public goods problems.

Week 15: GAME THEORY IN ECONOMICS 2: Auctions, market design.

Final Exam: Monday, December 10, 10:00 a.m.–11:50 a.m.

C. Course Requirements: The recommended text for this course is *Games of Strategy* by Avinash Dixit and Susan Skeath, W.W. Norton and Company. Required reading: *Solar Lottery: A Novel* by Philip K. Dick, New York: Vintage Books.

Weekly assignments will be handed out at the beginning of each week. They are due at the beginning of class on the first day of lecture the following week.

There will be two midterm exams at the end of the fourth and the eighth week, and a final exam.

D. Grading Policy:

Weekly Homework: 20%

Midterm 1: 25%

Midterm 2: 25%

Final: 30%

There will be no make-up exams.

E. If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Office of Disability Resources and Services, 216 William Pitt Union (412) 624-7890 as early as possible in the term.

F. Academic Integrity Policy: Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity, noted below, will be required to participate in the outlined procedural process as initiated by the instructor. A minimum sanction of a zero score for the quiz, exam or paper will be imposed.

The integrity of the academic process requires fair and impartial evaluation on the part of faculty and honest academic conduct on the part of students. To this end, students are expected to conduct themselves at a high level of responsibility in the fulfillment of the course of their study. It is the corresponding responsibility of faculty to make clear to students those standards by which students will be evaluated, and the resources permissible for use by students during the course of their study and evaluation. The educational process is perceived as a joint faculty-student enterprise which will involve professional judgment by faculty and may involve - without penalty-reasoned exception by students to the data or views offered by faculty. Senate Committee on Tenure and Academic Freedom, February 1974