University of Pennsylvania Department of Economics

Econ 13 / PPE 311: Strategic Reasoning

Spring 2020

Lectures Monday & Wednesday 3:30-4:50 (MCNB 286-287).

Instructor **Deniz Selman** (denizs@econ.upenn.edu)
Office Hours: Tuesday 10:45-11:45 and by appointment (PCPE 541).

TA **Isaac Rabbani** (irabbani@sas.upenn.edu)
Office Hours: Monday 10:30-11:30 & Friday 10:30-11:30 (PCPE 500).

Description This course is about strategically interdependent decisions. In such situations, the outcome of your actions depends also on the actions of others. When making your choice, you have to consider the choices of others, who in turn are considering what you will be choosing. Game Theory offers several concepts and insights for understanding such situations, and for making better strategic choices. This course will introduce and develop some basic ideas from game theory, using illustrations, applications, and cases drawn from business, economics, politics, and sports. Some interactive games will be played in class.

Prerequisite Econ 1. There will be little formal theory, so some high school algebra is the only math required. However, general numeracy (facility interpreting and doing numerical graphs, tables, and arithmetic calculations) is very important.
NOTE: This course will be accepted by the Economics Department to be counted toward a Minor in Economics or as an Economics elective.

Textbook Dixit, A., S. Skeath and D.H. Reiley, ***Games of Strategy***, Norton, 4th edition, 2014.
The textbook is available in the Penn bookstore. You may also purchase the ebook version (which works on all mobile devices including tablets and smart phones) for $55 directly at https://digital.wwnorton.com/gamesofstrategy4.

Lectures I will primarily teach using lecture slides to which I will add figures and other material during lectures. I will also write on the blackboard at times. Students should attend and participate in class. In order to discourage classroom distractions, ***the use of laptops and other electronic devices is not permitted during lectures apart from times that we are playing electronic games together as a class.*** If you have a special condition which makes this a difficulty for you, please let me know.

Problem Sets There will be six problem sets assigned and collected for grading during the semester. Problem sets will be posted on Canvas one week before the due date and due at the ***beginning of lecture*** on these dates:
(1) Wed 5 Feb. (2) Wed 19 Feb. (3) Mon 23 Mar. (4) Mon 6 Apr. (5) Mon 20 Apr. (6) Wed 29 Apr.
No late problem sets will be accepted. Your lowest problem set grade will be dropped and the average of the others will constitute the problem set portion of your grade.
NOTE: Working on problem sets diligently is the most effective way to prepare you for exams. I recommend you first work on your own and then meet to discuss the problems in groups. However, each student must turn in his or her own answers. Please write legibly and state which classmates you worked with on your submitted copy.

Quizzes There will be three in-class quizzes held on these dates: **(1) Mon 10 Feb. (2) Wed 25 Mar. (3) Wed 22 Apr.**
NO MAKE-UP QUIZZES: You will receive a zero for any quiz that you miss for any reason. To accommodate students who must miss a quiz, your lowest quiz grade will be dropped and the average of the other two quizzes will constitute the quiz portion of your grade.

Exams ***First Midterm Exam: Wednesday 26 February (in class, beginning at 3:35 pm sharp).***
Second Midterm Exam: Wednesday 8 April (in class, beginning at 3:35 pm sharp).
Final Exam: Tuesday 5 May (9:00 am - 11:00 am).
NO MAKE-UP EXAMS: Students who contact me *before* a Midterm Exam *and* provide a written valid excuse will have their grades calculated based on a reweighting of the other exams. Please see the departmental policies link below for a list of valid excuses. Students who miss an exam and do not satisfy the above conditions will receive a grade of zero on that exam.
RE-GRADING POLICY: Students have one week from the day in which exams, quizzes and problem sets are returned to report errors in grading and/or to request that problems be re-graded. All such requests must be made in writing. If a student submits his/her exam for re-grading, then the student's entire exam will be re-graded with no guarantee of a higher total score.
OTHER POLICIES & PROCEDURES: Apart from these stated specifics regarding the policy for missed exams and re-grading, this course complies with all departmental policies as posted on the departmental website at:
http://economics.sas.upenn.edu/undergraduate-program/course-information/guidelines/policies.

Grading Best Five Problem Sets (15%), Best Two Quizzes (12%), Two Midterm Exams (21% each), Final Exam (31%).

Course Outline *(subject to minor changes)*

	DSR
INTRODUCTION AND MOTIVATION	**Ch. 1-2**
Decisions	
Strategic games	
Terminology and background assumptions of strategic games	
SEQUENTIAL GAMES WITH COMPLETE INFORMATION	**Ch. 3, Ch. 17 (Sec 3-6)**
Game trees	
Backward induction	
Rollback Equilibrium	
Bargaining	
SIMULTANEOUS GAMES WITH COMPLETE INFORMATION	**Ch. 4-6**
Dominant and dominated strategies	
Iterated deletion of strictly dominated strategies	
Nash Equilibrium	
RANDOMIZATION	**Ch. 7**
Mixed strategies	
The distinct roles of mixed strategies in zero-sum and non-zero sum games	
Revisiting dominance under mixed strategies	
REPEATED GAMES	**Ch. 10**
Finitely repeated games	
Subgame Perfect Equilibrium	
Infinitely repeated games: grim trigger, tit-for-tat	
SIMULTANEOUS GAMES WITH INCOMPLETE INFORMATION	**Ch. 8**
Players with uncertain preferences	
"Nature" and its role	
Bayesian Nash Equilibrium	
Application: The Market for Lemons (Akerlof)	
SEQUENTIAL GAMES WITH INCOMPLETE INFORMATION	**Ch. 13**
Pooling and separating strategies	
Beliefs and signaling	
Perfect Bayesian Equilibrium	
Application: Job Market Signaling (Spence)	