

University of Pennsylvania Department of Economics  
**Econ 0120 / PPE 3001: Strategic Reasoning**  
Spring 2023

<b>Lectures</b>	Monday & Wednesday 3:30pm-5:00pm (PCPE 200).
<b>Instructor</b>	<b>Deniz Selman</b> ( <a href="mailto:denizs@econ.upenn.edu">denizs@econ.upenn.edu</a> ) <i>Office Hours:</i> Weekly time TBA and by appointment.
<b>TA</b>	<b>Lucienne Disch</b> ( <a href="mailto:brunnerl@sas.upenn.edu">brunnerl@sas.upenn.edu</a> ) <i>Office Hours:</i> TBA.
<b>Description</b>	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.
<b>Prerequisite</b>	Econ 0100. 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.
<b>Textbook</b>	Dixit, A., S. Skeath and D. McAdams, <i>Games of Strategy</i> , Norton, 5th edition, 2020. 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) directly at <a href="https://digital.wwnorton.com/gamesofstrategy5">https://digital.wwnorton.com/gamesofstrategy5</a> . <i>Older versions (authors were then Dixit, Skeath, Reiley) are also fine!</i>
<b>Lectures</b>	It is important that you come to class prepared to participate. Looking over the slides and watching class recordings is not a substitute for attending and participating in class. <b><i>Use of laptops is not allowed during lectures.</i></b> <b><i>There will be no class on Monday 13 March. (Enjoy an extended spring break!)</i></b>
<b>Problem Sets</b>	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 <b><i>beginning of lecture</i></b> on these dates: <b>(1) Wed 30 Jan. (2) Mon 13 Feb. (3) Mon 20 Mar. (4) Mon 3 Apr. (5) Mon 17 Apr. (6) Wed 26 Apr.</b> <i>No late problem sets will be accepted.</i> 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 their own answers. Please write legibly and state which classmates you worked with on your submitted copy.
<b>Quizzes</b>	There will be three in-class quizzes held on these dates: <b>(1) Wed 1 Feb. (2) Wed 22 Mar. (3) Wed 19 Apr.</b> 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.
<b>Exams</b>	<b>First Midterm Exam: Monday 20 February (in class).</b> <b>Second Midterm Exam: Wednesday 5 April (in class).</b> <b>Final Exam: Date/time TBA by Registrar's Office.</b> NO MAKE-UP EXAMS: Students who contact me <i>before</i> a Midterm Exam <i>and</i> 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 their 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: <a href="http://economics.sas.upenn.edu/undergraduate-program/course-information/guidelines/policies">http://economics.sas.upenn.edu/undergraduate-program/course-information/guidelines/policies</a> .
<b>Grading</b>	Best Five Problem Sets (15%), Best Two Quizzes (12%), Two Midterm Exams (21% each), Final Exam (31%).

## Course Outline *(subject to minor changes)*

### Dixit et al chapters

#### INTRODUCTION AND MOTIVATION

Decisions  
Strategic games  
Terminology and background assumptions of strategic games

Ch. 1-2

#### SEQUENTIAL GAMES WITH COMPLETE INFORMATION

Game trees  
Backward induction  
***Rollback Equilibrium***  
Bargaining

Ch. 3, Ch. 17 (Sec 3-6)

#### SIMULTANEOUS GAMES WITH COMPLETE INFORMATION

Dominant and dominated strategies  
Iterated deletion of strictly dominated strategies  
***Nash Equilibrium***

Ch. 4-6

#### RANDOMIZATION

Mixed strategies  
The distinct roles of mixed strategies in zero-sum and non-zero sum games  
Revisiting dominance under mixed strategies

Ch. 7

#### REPEATED GAMES

Finitely repeated games  
***Subgame Perfect Equilibrium***  
Infinitely repeated games: grim trigger, tit-for-tat

Ch. 10

#### SIMULTANEOUS GAMES WITH INCOMPLETE INFORMATION

Players with uncertain preferences  
“Nature” and its role  
***Bayesian Nash Equilibrium***  
*Application: The Market for Lemons (Akerlof)*

Ch. 8

#### SEQUENTIAL GAMES WITH INCOMPLETE INFORMATION

Pooling and separating strategies  
Beliefs and signaling  
***Perfect Bayesian Equilibrium***  
*Application: Job Market Signaling (Spence)*

Ch. 13