API 303
Game Theory and Strategic Decisions

Course Syllabus
Spring 2016

Faculty  Pınar Doğan
pınar_dogan@hks.harvard.edu
Office: L-215  Phone: 617 496 5865

Faculty Assistant  Ashley Davis
ashley_davis@hks.harvard.edu
Office: L-376A  Phone: 617 495 0879

Teaching Fellow  Cuicui Chen
cuicuichen@fas.harvard.edu

Class Assistant  Jack Gao
jack_gao@hks16.harvard.edu

Weekly Schedule

<table>
<thead>
<tr>
<th></th>
<th>Lecture</th>
<th>Review Section</th>
<th>Office Hours*</th>
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<tbody>
<tr>
<td>Tuesday</td>
<td>11:45 - 1:00 p.m.</td>
<td>L-130</td>
<td>2:00 - 4:00 p.m.</td>
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<tr>
<td>Thursday</td>
<td>11:45 - 1:00 p.m.</td>
<td>L-130</td>
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<tr>
<td>Friday</td>
<td>11:45 - 1:00 p.m.</td>
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*Please sign up through the online system at http://is.gd/dogan_officehours. If you are unable to attend my office hours or they are full, please contact me for a different time.

Course Description  This course uses game theory to study incentives and strategic behavior in practical situations of inter-dependent decision making. The course will develop basic theoretical concepts in tandem with applications from a variety of areas, including bargaining, competition, and strategic voting.

Prerequisites  No formal prerequisites. The lectures emphasize conceptual rather than technical material; however, comfort with algebra and basic probability will be assumed.

Auditing Policy  Auditors are not accepted for this course. Exceptions can be made for those who commit to satisfy all the requirements of the course (assignments and exams). Please contact the instructor.

Grading  Grades for the course will be assigned based on

- Problem set assignments  20%
- Midterm exam (in class)  20%
- Group assignment  30%
- Final exam (in class)  30%
Main Textbook


Recommended Books  We will read from three other books, which you might consider purchasing. They are also available on reserve in the HKS Library.


Other Books


Readings  Textbook readings are marked with a [T]. These readings are optional, but recommended if you are finding the conceptual or theoretical material for a given class especially challenging. Required readings are marked as [R]. Remaining readings are recommended. Supplemental readings will almost always be available online for free on the Canvas course page or in books reserved in the library. One way to reach articles published in both academic journals and newspapers is through the Harvard Library/Google Scholar interface. Use the following link to access the system: http://scholar.google.com.ezp1.harvard.edu/ You will be prompted to enter your Harvard ID and library PIN. Search for the article using keywords, and use the “Find It@Harvard” link to access the electronic version of the paper.

Group Assignment  The group assignment will require you to apply game theoretical concepts to an area of your special interest, e.g. business, politics, or society, and write a 2-3 page essay. You will also be asked to make a short presentation of the issue you chose and of your analysis during class. The group assignment—with equal weights on essay and presentation—will count for 20% of the grade. Each group member will anonymously rate the contribution of his/her group members for each component of the assignment, which will be used as an input for each student’s grading.

Problem Sets  There will be eight short problem sets, which will be graded. Problem sets count as 20% of the grade (2.5% each). Small groups of students—no more than four—are encouraged to work together on the problem sets. Problem solutions must be written independently by each of the students in the small group and no student should share his or her write-ups with others (also meaning, no text, table, diagram, or equation should be copied verbatim in the process). Each submitted problem set must indicate the name of the students in the group.

All problem sets are due at class time. Answers to the problem sets will be posted on the class website shortly after they are turned in. Problem sets turned in after the class time on the due date will not receive any credit.
Exams  Both midterm and final examinations will be “in-class”; books and notes cannot be consulted during examinations. The final exam will be cumulative. Please check your calendars as soon as possible and avoid any scheduling conflicts for the midterm and the final. No makeup exams will be scheduled except for students with documented dire emergencies (e.g., you are admitted to a hospital).

Computer and other electronic devices  Student use of electronic devices has proven to be disruptive to the flow of the class, and therefore, no mobile phones, tablets, PDAs, or laptops may be used in class. Exceptions will be made if there is a documented need. Please have the relevant administrator contact the instructor if you fall in this category.

Academic Integrity  You are expected to abide by the University policies on academic honesty and integrity as given in the Student Handbook (available at https://knet.hks.harvard.edu). Violations of these policies will not be tolerated and are subject to severe sanctions up to and including expulsion from the university. The HKS Academic Code explains the policies on academic integrity in detail. All students enrolled in API-303 are required to read and adhere to those policies (http://www.hks.harvard.edu/degrees/registrar/procedures/integrity).

Important dates  :

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tr>
<td>First class</td>
<td>Tuesday, January 26</td>
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<tr>
<td>Midterm exam (in class, 11:45am-1pm)</td>
<td>Thursday, March 10</td>
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<tr>
<td>Group assignment essays due</td>
<td>Tuesday, April 12</td>
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<td>Presentation of group assignments</td>
<td>Tuesday, April 26 and Thursday, April 28</td>
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<tr>
<td>Final exam (in class, 2-5pm)</td>
<td>Thursday, May 12</td>
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Before enrolling in this course, please make sure that you do not have any schedule conflicts with the exam and group presentation dates/times.

Problem set due dates  :

<table>
<thead>
<tr>
<th>Problem set</th>
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<tbody>
<tr>
<td>Problem set 1</td>
<td>Tuesday, February 2</td>
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<td>Problem set 2</td>
<td>Tuesday, February 9</td>
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<tr>
<td>Problem set 3</td>
<td>Tuesday, February 16</td>
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<td>Problem set 4</td>
<td>Tuesday, February 23</td>
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<tr>
<td>Problem set 5</td>
<td>Tuesday, March 1</td>
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<td>Problem set 6</td>
<td>Tuesday, March 8</td>
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<td>Problem set 7</td>
<td>Tuesday, March 29</td>
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<td>Problem set 8</td>
<td>Tuesday, April 5</td>
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Detailed Schedule and Readings (Tentative)

DSR: Dixit, Skeath and Reiley (2015)

Tuesday, January 26: Introduction and Foundations of Game Theory

[T] DSR, Chapters 1 and 2.

[T] Kreps, Chapters 1 and 2 in *Game Theory and Economic Modeling*.


Thursday, January 28: Prisoners’ Dilemma and its Applications

[T] DSR, Chapter 4, Section 4.3.


Tuesday, February 2: Pure Strategy Nash Equilibrium

[T] DSR, Chapter 4, Sections 4.1, 4.2, 4.4, and 4.7 (additional reading: Chapter 5, Sections 5.1 and 5.2).

Thursday, February 4: Multiple Nash Equilibria and Equilibrium Selection

[T] DSR, Chapter 4, Section 4.6

– Amazon and the state of Illinois play a game of chicken over online tax collection, *mindyourdecisions.com*. 
Tuesday, February 9 and Thursday, February 11: Mixed Strategies

[T] DSR, Chapter 7 (Section 7.5 optional).


Tuesday, February 16: Sequential-Move Games

[T] DSR, Chapter 3.

Thursday, February 18: Simultaneous and Sequential-Moves Combined: Subgame Perfect Nash Equilibrium (SPNE)

[T] DSR, Chapter 6.

Tuesday, February 23: Subgame Perfection and Strategic Moves

[T] DSR, Chapter 9.


Thursday, February 25: Application of SPNE to Bargaining

[T] DSR, Chapter 17, Sections 17.6-17.7.


Tuesday, March 1: Repeated Games

[T] DSR, Chapter 10 (Sections 10.1-10.3 only).

Thursday, March 3: Collection Action and Collective Inaction Games

[T] DSR, Chapter 11.


Tuesday, March 8: Special Lecture on Elinor Ostrom’s contributions to Collective (In)Action Problems


Thursday, March 10: Midterm Exam (in class)

Tuesday, March 15, Thursday, March 17: Spring Break (no classes)

Tuesday, March 22: Introduction to Games with Incomplete Information

[T] DSR, Chapter 8, Section 8.2.

Thursday, March 24: Moral Hazard and Adverse Selection

[T] DSR, Chapter 8, Section 8.4.A.


– Writing off tyrants’ debt is a principle that should be extended to even poorer nations. The Guardian, April 21, 2003.

Tuesday, March 29 and Thursday, March 31: Signaling games

[T] DSR, Chapter 8, Sections 8.4.B, 8.5, and 8.6.

– Dixit and Nalebuff, Chapter 8 in The Art of Strategy.

Tuesday, April 5 and Thursday, April 7: Auctions

[T] DSR, Chapter 16.


Tuesday, April 12 and Thursday, April 14: Strategy and Voting

[T] DSR, Chapter 15.

Tuesday, April 19: Cheap Talk

[T] DSR, Section 8.3.


Thursday, April 21: Summing up

Tuesday, April 26 and Thursday, April 28: Presentation of group projects

Reading Period

Tuesday, May 3 and Thursday, May 5: Getting ready for the Final Exam – Reviews by Cuicui Chen

Thursday, May 12: Final Exam