API 303
Game Theory and Strategic Decisions

Course Syllabus

Spring 2011

Faculty  Pınar Doğan
pınar_dogan@hks.harvard.edu
Office: L-215  Phone: 617 496 6757

Faculty Assistant  Katie Naeve
katie_naeve@hks.harvard.edu
Office: L-349  Phone: 617 495 8833

Teaching Fellow  Tara Grillos
tara_grillos@hksphd.harvard.edu

Class Assistant  Jennifer Yen
jennifer_yen@hks11.harvard.edu

Weekly Schedule

<table>
<thead>
<tr>
<th></th>
<th>Lecture</th>
<th>Review Section</th>
<th>Office Hours*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday</td>
<td>11:40 - 1:00 p.m.</td>
<td>L-280</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>11:40 - 1:00 p.m.</td>
<td>L-280</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td>10:10 - 11:30 a.m.</td>
<td>Land</td>
</tr>
</tbody>
</table>

*Please sign up on the sheet outside my office door. 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 and negotiations. 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 course is designed to be accessible to all Kennedy School students, regardless of mathematical background. The lectures emphasize conceptual rather than technical material, however, additional technical material will be provided as optional readings.

Grading  Grades for the course will be assigned based on

Problem sets  20%
Group assignment  30%
Final exam (in class)  50%

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 through the Harvard library system 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 30% 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 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 web site shortly after they are turned in. Problem sets turned in after the class time on the due date will not receive any credit.

**Important dates** :

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>First class</td>
<td>Tuesday, January 25</td>
</tr>
<tr>
<td>Group assignment essays due</td>
<td>Tuesday, April 12</td>
</tr>
<tr>
<td>Presentation of group assignments</td>
<td>Tuesday, April 19 and Thursday, April 21</td>
</tr>
<tr>
<td>Final exam (in class, 2-5pm)</td>
<td>Tuesday, May 11</td>
</tr>
</tbody>
</table>
Problem set due dates:

<table>
<thead>
<tr>
<th>Problem set</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem set 1</td>
<td>Tuesday, February 1</td>
</tr>
<tr>
<td>Problem set 2</td>
<td>Tuesday, February 8</td>
</tr>
<tr>
<td>Problem set 3</td>
<td>Tuesday, February 15</td>
</tr>
<tr>
<td>Problem set 4</td>
<td>Tuesday, February 22</td>
</tr>
<tr>
<td>Problem set 5</td>
<td>Tuesday, March 1</td>
</tr>
<tr>
<td>Problem set 6</td>
<td>Tuesday, March 8</td>
</tr>
<tr>
<td>Problem set 7</td>
<td>Tuesday, March 22</td>
</tr>
<tr>
<td>Problem set 8</td>
<td>Tuesday, April 5</td>
</tr>
</tbody>
</table>

Detailed Schedule and Readings

DSR: Dixit, Skeath and Reiley (2009)

Tuesday, January 25: Introduction and Foundations of Game Theory

[T] DSR, Chapters 1 and 2.

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

[R] Schelling, "What is Game Theory?" Chapter 10 in Choice and Consequence, Harvard University Press (Reprinted 2007), pp. 213-242. (Over the next two classes.)


Thursday, January 27: Prisoners’ Dilemma and its Applications

[T] DSR, Chapter 4, Section 4.3.


Tuesday, February 1: Pure Strategy Nash Equilibrium

[T] DSR, Chapter 4, Sections 4.1, 4.2, 4.4, 4.6, and 4.8 (additional reading: Chapter 5, Sections 5.1 and 5.2).
Thursday, February 3: Multiple Nash Equilibria and Equilibrium Selection

[T] DSR, Chapter 4, Section 4.7

- Amazon and the state of Illinois play a game of chicken over online tax collection, mindyourdecisions.com.


Tuesday, February 8 and Thursday, February 10: Mixed Strategies

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


- World Cup Game Theory. Slate, June 24, 2006.


Tuesday, February 15: Repeated Games

[T] DSR, Chapter 11 (Sections 11.1-11.3 only).


Thursday, February 17: Collection Action and Collective Inaction Games

[T] DSR, Chapter 12.


Tuesday, February 22: Special Lecture on Elinor Ostrom’s contributions to Collective (In)Action Problems


Thursday, February 24: Sequential-Move Games

[T] DSR, Chapter 3.

Tuesday, March 1: Simultaneous and Sequential-Moves Combined: Subgame Perfect Nash Equilibrium (SPNE)

[T] DSR, Chapter 6.

Thursday, March 3: Subgame Perfection and Strategic Moves

[T] DSR, Chapter 10.


Tuesday, March 8: Application of SPNE to Bargaining

[T] DSR, Chapter 18, Sections 18.3-18.5.


Thursday, March 10: Introduction to Games with Incomplete Information

[T] DSR, Chapter 9, Section 9.2.


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

**Tuesday, March 22: Moral Hazard and Adverse Selection**

[T] DSR, Chapter 9, Section 9.4.A.


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

**Thursday, March 24 and Tuesday, March 29: Signaling games**


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

**Thursday, March 31: Cheap Talk**

[T] DSR, Section 9.3.


**Tuesday, April 5 and Thursday, April 7: Auctions**

[T] DSR, Chapter 17.


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

[T] DSR, Chapter 16.


**Tuesday, April 19 and Thursday, April 21: Presentation of group projects**

**Tuesday, April 26, 2008: Power and limits to game theory**

**Thursday, April 28: Summing up**

**TBA: Final Exam**