API 303
Game Theory and Strategic Decisions

Course Syllabus

Fall 2017

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Weekly Schedule

<table>
<thead>
<tr>
<th></th>
<th>Lecture</th>
<th>Review Session</th>
<th>Office Hours*</th>
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<tr>
<td>Monday</td>
<td>1:15 - 2:30 p.m.</td>
<td>L-280</td>
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<tr>
<td>Tuesday</td>
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<td>1:30 - 3:30 p.m.</td>
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<tr>
<td>Wednesday</td>
<td>1:15 - 2:30 p.m.</td>
<td>L-280</td>
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<tr>
<td>Friday</td>
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<td>8:45 - 10:00 a.m.</td>
<td>L-280</td>
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*Sign-up for office hours will be posted on the faculty’s office door. If you are unable to attend the office hours or they are full, please e-mail pinar_dogan@hks.harvard.edu for a different time. Additional office hours (TBA) will be held by the teaching fellow and the course assistant.

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  API 101 or an equivalent full-semester intermediate microeconomics course. If you have not taken API 101, you will need to ask instructors’s permission as the system will not let you enroll automatically. Please e-mail the instructor explaining how you satisfy the prerequisite as you are submitting your petition to enroll.

The course focuses on discrete-choice games, and therefore, calculus is not required. Comfort with algebra and basic probability will be assumed.

Cross-registration  Cross-registered students are welcome to enroll in this course. As students submit their petition to cross-register, they should e-mail the instructor explaining how they satisfy the prerequisite, as well as a brief paragraph on their motivation to take this course at HKS. Petitions that are not supported with this information will not be approved.
Auditing Policy  Auditors are not accepted for this course. Exceptions can be made if both of the following conditions hold: (i) the student cannot enroll the course for credit (e.g., National Security Fellows), and (ii) the student commits to satisfy all the requirements of the course (i.e., assignments and exams). Please contact the instructor.

Grading  Grades for the course will be assigned based on

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Problem set assignments</td>
<td>20%</td>
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<tr>
<td>Midterm exam (in class)</td>
<td>20%</td>
</tr>
<tr>
<td>Group assignment</td>
<td>30%</td>
</tr>
<tr>
<td>Final exam (in class)</td>
<td>30%</td>
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Main Textbook


Recommended Book


Other Textbooks


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 (popular press articles are not listed in this syllabus, and will be posted on the Canvas course page). 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 Key login and password. 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 4-5 page essay. The group assignment will count for 30% of the grade.

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 contact the instructor if you fall in this category. In addition, for a few specific classes, a laptop or smartphone will be required for an in-class simulation/game. However, even on these days, you may not use your electronic device other than for that specific class-related exercise.

**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 (https://www.hks.harvard.edu/education/academic-calendars-policies/student-handbook/general-regulations-and-standards/academic).

**Important dates**

- **Shopping Sessions (1:15 p.m. and 2 p.m.)** Monday, August 28
- **First class** Wednesday, August 30
- **Midterm exam (in class, 1:15 p.m. – 2:30 p.m.)** Wednesday, October 18
- **Group assignments are due** Monday, November 20
- **Final exam (in class, 9 a.m. – 12 p.m.)** Thursday, December 7

**Before enrolling in this course**, please make sure that you do not have any schedule conflicts with the exam dates/times.

**Problem set due dates**

- **Problem set 1** Monday, September 11
- **Problem set 2** Monday, September 18
- **Problem set 3** Monday, September 25
- **Problem set 4** Monday, October 2
- **Problem set 5** Wednesday, October 11
- **Problem set 6** Monday, October 23
- **Problem set 7** Monday, October 30
- **Problem set 8** Monday, November 13
Detailed Schedule and Readings (Tentative)
DSR: Dixit, Skeath and Reiley (2015)

Class #1: Wednesday, August 30

*Introduction and foundations of game theory*

[T] DSR, Chapters 1 and 2.


Class #2: Friday, September 1

*Looking forward, reasoning backwards*

[T] DSR, Chapter 3.


Labor Day: No class on Monday, September 4

Class #3: Wednesday, September 6

*Changing the game: making threats credible*

[T] DSR, Chapter 9.


Class #4: Monday, September 11

*Changing the game: making promises credible*

[T] DSR, Chapter 9.

Class #5: Wednesday, September 13

*Application: Sequential bargaining*

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


Class #6: Monday, September 18

*Prisoners’ dilemma and its applications*

[T] DSR, Chapter 4, Section 4.3.


Class #7: Wednesday, September 20

*Collective (in)action problem and social norms*

[T] DSR, Chapter 11.


– Olson, M., Chapters 1 and 2 in *The Logic of Collective Action*, Harvard University Press 1971, pp. 5-65.

Class #8: Monday, September 25

*Pure-strategy Nash equilibrium*

[T] DSR, Chapter 4, Sections 4.1, 4.2, 4.4, and 4.7.

Class #9: Wednesday, September 27

*Coordination games and equilibrium selection*

[T] DSR, Chapter 4, Section 4.6

Class #10: Monday, October 2

Keeping your opponents guessing: mixed-strategies

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

Class #11: Wednesday, October 4

Mixed-strategies in practice


Columbus Day: No class on Monday, October 9

Class #12: Wednesday, October 11

Simultaneous and sequential-moves combined

[T] DSR, Chapter 6.

Class #13: Monday, October 16

Can repeated interaction elicit cooperation?

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


Midterm Exam (in class): Wednesday, October 18

Class #14: Monday, October 23

**Games with incomplete information (1)**

[T] DSR, Chapter 8, Section 8.2.


Class #15: Wednesday, October 25

**Games with incomplete information (2)**

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

Class #16: Monday, October 30

**Auctions (1)**

[T] DSR, Chapter 16.


Class #17: Wednesday, November 1

**Auctions (2)**


Class #18: Monday, November 6

**Signaling games (1)**

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


Class #19: Wednesday, November 8

**Signaling games (2)**

Class #20: Monday, November 13

**Strategy and voting (1)**

[T] DSR, Chapter 15.


Class #21: Wednesday, November 15

**Strategy and voting (2)**

[T] DSR, Chapter 15.

Class #22: Monday, November 20

**Cheap Talk**

[T] DSR, Section 8.3.


Thanksgiving Break: No class on Wednesday, November 22

Class #23: Monday, November 27

**Game Theory and Competition policy**

– Readings TBA.
Class #24: Wednesday, November 29

*Summing up*

Final Exam: Thursday, December 7, 9 a.m. – 12 noon