Boston College
Game Theory and Social Behavior – Fall 2015
Syllabus

Lecturer: Erez Yoeli
Email: eyoeli@gmail.com
Office Hours: After class

Math TA: Andrew Ferdowsian
Email: araghi@bc.edu
Office Hours: TBD

Social Behavior TA: Victoria de Quadros
Emails: victoriadequadros@college.harvard.edu
Office Hours: TBD

Lectures: M/W 8:30-10:00am
Class Website: https://bostoncollege.instructure.com/courses/1554123
Piazza Forum: https://piazza.com/class/ie07b5gytlw1n4

DESCRIPTION

We will apply insights from game theory to explain human social behavior, focusing on novel applications which have heretofore been the realm of psychologists and philosophers—for example, why people speak indirectly, in what sense beauty is socially constructed, and where our moral intuitions come from—and eschewing traditional economic applications such as industrial organization or auctions.

We will employ standard games such as the prisoner’s dilemma, coordination, hawk-dove, and costly signaling, and use standard game theory tools such as Nash Equilibria, Subgame Perfection, and Perfect Bayesian Equilibria. These tools will be taught from scratch and no existing knowledge of game theory, economics, or mathematics is required. At the same time, students familiar with these games and tools will not find the course redundant because of the focus on non-orthodox applications.

In order to apply game theory to social applications, we will also introduce models of learning and evolution, employing mathematical techniques such as first order differential equations and Markov Chains, as well as simple computer simulations in Matlab or Python. These, too, will be taught from scratch; no prior experience with differential equations or computer programming is required.

The class will cover readings from other fields, such as research papers on animal behavior, experiments in economics and psychology, popular culture books on evolutionary biology, and essays by philosophers. Again, no background in these areas is required.

We hope this class will stimulate students with a new perspective on age-old questions, expand their economics toolkit, broaden the range of questions to which students consider applying these tools, and generate dialogue that will deepen not only students’ understanding of the world around them, but also our own.
MATERIALS

There is no required textbook. For students who wish to have a Game Theory reference, we suggest *An Introduction to Game Theory* by Martin J. Osborne. All required readings will be provided.

GRADING

Your performance in this class will be evaluated based on homework assignments (there are two types of assignments: problem sets and discussion prompts), a final exam, and class participation. Your grade will be decided using the following weights:

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Sets</td>
<td>35%</td>
</tr>
<tr>
<td>Prompts</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Class Participation</td>
<td>20%</td>
</tr>
</tbody>
</table>

The problem sets will be weighted equally, and we will drop your lowest problem set score before calculating this portion of your grade. Likewise, the responses to prompts will be weighted equally, and we will drop your lowest score. Note that participation is a significant component of the grade.

HOMEWORK ASSIGNMENTS

There are two types of homework assignments: problem sets and discussion prompts. We plan to have approximately six problem sets (about one every two weeks), and approximately 10 discussion prompts (almost one a week), though the exact number may change.

For the responses to the prompts, you will be scored on a three-point scale corresponding to our level of enthusiasm for your ideas. A check minus indicates that you have failed to meet our expectations (e.g. you have not understood the question, or thought carefully about your response, you have misused terms from lecture, you have not incorporated the readings where appropriate), a check indicates that you’ve met them, and a check plus indicates that you’ve exceeded them with unusually insightful responses.

You may work on and hand in all assignments in groups of up to two students. We will not be accepting assignments late. If you have an emergency that prevents you from turning in an assignment on time, that assignment will be the one we drop. If you have an emergency that prevents you from turning in two or more assignments, come chat with us.

FINAL EXAM
The final exam will cover all the material in the class, and will include both math and essay questions (like the ones in the problem sets and in the prompts, respectively). The best preparation is to complete the problem sets and respond to the prompts, then review the solutions we provide and discuss.

CLASS PARTICIPATION

To participate (1) ask questions or make comments during lecture, section, or office hours, or (2) ask and answer questions on our online discussion forum. Your participation will be evaluated subjectively, based on our assessment of your familiarity with the required readings, the quality of the insights you convey, and how helpful you were to your peers.

PREPARING FOR CLASS

After the first week, you will be expected to have read the readings in advance of class. Make sure to read any notes we provide on the topic, to at least skim the other readings, and to review some more closely. We’ll place the readings on the course website

HELP AND ACCOMODATION

There are two ways to get help outside of class.

We have set up a Piazza forum (the link is on the first page of the syllabus), where students can post questions. Both your peers and instructors can respond, and you get credit towards their participation grade for responding, so you can expect to hear back quickly.

Also, don’t hesitate to ask me and the TAs questions in person. After class is a great time to follow up on anything you might not have fully grasped. I’ll also be holding office hours after every class, where you can ask more detailed questions. The math TA will hold office hours each week (see time and location listed above), which will sometimes include a short lecture on critical material. We’ll announce these lectures in advance. The psychology TA is available to answer question on the readings over email in advance of discussion section.

If you have any special learning needs, we’re happy to accommodate them. Just come talk to us.

A NOTE ON COLLABORATION

Collaboration is encouraged, even outside your group of two. I suggest you credit members of others groups for any key ideas in your work, for example with a footnote like, “We thank Johnny Smartypants and Jane Clevernose for this suggestion.”
COURSE OUTLINE

This is a tentative list of topics we will cover.

Topic 1: Introduction, Course Outline, and Logistics
Topic 2: Sex Ratios (Illustrating the Power of Game Theory)
Topic 3: Evidence for Learning
Topic 4: Games and Nash Equilibrium
Topic 5: Hawk-Dove, Rights, and Dominance
Topic 6: Dynamics: Replicator, Wright-Fisher, and Reinforcement Learning
Topic 7: Costly Signaling and Aesthetics
Topic 8: Modesty
Topic 9: Repeated Prisoners’ Dilemma, Altruism and (time permitting) Relationships
Topic 10: Cooperating Without Looking
Topic 11: Common Knowledge, Symbolic Gestures, Innuendo, and Omission/Commission
Topic 12: Ineffective Norms and some more insights on Rights