

BEPP 284 - Game Theory for Business and Life (Spring 2019)

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(Note: Final syllabus is subject to minor changes)

The objective of this course is to make you *more strategic*, by which I mean enhancing your capacity for making intelligent and creative choices when interacting with your fellow human beings. The approach to doing so is game theory, which has been the focus of two rounds of Nobel Prizes in Economics. Game theory is a framework and a set of tools for solving the puzzles and tackling the challenges put forth by a collection of conscious, purposeful agents, whether they comprise a household, a team, a fraternity or sorority, a village, a company, an army, a market, a government, or a society. While the focus is primarily on the use of game theory in business, game theory has such broad relevance that we will also apply it in the arenas of politics, international relations, war, sports, history, crime, theology, and everyday life.

BEPP 284 satisfies the “Technology, Innovation and Analytics” requirement for the Wharton undergraduate major. Game theory is a valuable tool for determining the appropriate business strategies to complement new technologies, which will be exemplified by using game theory to analyze products with network effects (e.g., computers) and two-sided markets (e.g., online platforms). BEPP 284 also satisfies the BEPP Fundamental requirement for the BEPP major.

Book

Joseph Harrington, *Games, Strategies, and Decision Making*, 2nd Edition, Worth Publishers, 2015. [GSDM]

Pre-requisites: None

“But it's so simple. All I have to do is divine from what I know of you: are you the sort of man who would put the poison into his own goblet or his enemy's? Now, a clever man would put the poison into his own goblet, because he would know that only a great fool would reach for what he was given. I am not a great fool, so I can clearly not choose the wine in front of you. But you must have known I was not a great fool, you would have counted on it, so I can clearly not choose the wine in front of me.”

- Vizzini,
The Princess Bride

Lectures (with Applications)

Introduction to game theory - GSDM (Chp 1)

Modelling a strategic situation as a game - GSDM (Chp 2)

- Kidnapping

Optimal play by eliminating dominated strategies - GSDM (Chp 3; skip Appendix on Rationalizability)

- Advertising: cooperative vs. predatory
- Existence of God
- Product introductions: cookies and cigarettes
- Doping in sports

Strategic play when there are few actions - GSDM (Chps 4, 5)

- Catching cartels
- Dr. Seuss' *The Sneetches*
- Network effects and the computer industry
- Average bid procurement auctions in Italy

Strategic play when there are many actions - GSDM (Chp 6)

- Rent-seeking and lobbying
- Pricing in two-sided markets: online auctions and video games

Randomizing play - GSDM (Chp 7)

- Avranches Gap in World War II
- Penalty kick in soccer
- Inspection games
- Volunteers' Dilemma and the Bystander Effect

“I can calculate the motions of heavenly bodies, but not the madness of people.”

- Sir Isaac Newton
(upon losing £20,000 in the South Sea Bubble in 1720)

“At Bell Atlantic, we've found that the lessons of game theory give us a wider view of our business situation and provide us a more nimble approach to corporate planning.”

- Raymond W. Smith, Chairman

“If the human mind was simple enough to understand, we'd be too simple to understand it.”

- Emerson Pugh

Strategic play in sequential-move environments with perfect information - GSDM (Chp 8)

- Investment and hold-up
- Racial discrimination and sports
- Bribery in India
- Bargaining

Strategic play in sequential-move environments with imperfect information - GSDM (Chp 9)

- Making managers aggressive
- Agenda control
- Sexual harassment (Note: Trigger Warning)
- Land conflict

Strategic play when there is repeated interaction

- Trench warfare in World War I (Chp 13)
- Bidding rings (GSDM, Chp 14)
- Vampire bats (GSDM, Chps 14, 16.1)
- Medieval Law Merchant (Chp 15)

Course Requirements

Problem Sets (6): 20% (average of your best five problem sets; lowest problem set grade is dropped)

Mid-term Exam: 20%

Final Exam (not comprehensive): 20%

Paper: 20%

Participation and Experiments: 10%

Virtual Corporate Reality: 10%

“Game theory forces you to see a business situation over many periods from two perspectives: yours and your competitor's.”
- Judy Lewent, CFO Merck

“Imagine how hard physics would be if electrons could think.”
- Murray Gell-Mann (Nobel Laureate, Physics)

“If there is any one secret of success it lies in the ability to get the other person's point of view and see things from their angle as well as your own.”
- Henry Ford

Problem Sets: Problem set due dates are in the schedule at the end of the syllabus. Problem sets are to be turned in at the beginning of class. Given that answers will be posted immediately after class, late problem sets cannot be accepted.

Paper: In this paper, you are to use game theory to model and make predictive statements about the behavior of people for either a real-world, historical, or fictional situation. A real-world situation is one that routinely occurs in human or non-human society. A fictional situation can be drawn from a story, poem, play, television show, movie, or computer software program but it is not to be a product of your imagination. Your imagination can be used to model a situation but not in creating the situation. Also, the situation cannot be one that we have gone over in class. The project is to be original work and will be graded on: i) how creative, sophisticated, and accurate is your model; and ii) how compelling, insightful, and correct is your analysis. The project should be typed (though figures can be hand-drawn) and be about five double-spaced pages with a maximum length of ten pages. The paper is due May 6th (the week before the last class). Late papers will be penalized 1/3rd of a letter grade for each two business days that they are late (e.g., if grade without a penalty is B+ then the grade with a one-third penalty is B).

Experiments: Over the course of the semester, students will participate in experiments involving strategic reasoning. These experiments are tied to key concepts in class and are actually quite fun. Students are incentivized by earning points that will be applied to their course grade.

“One of the reasons game theory has finally been discovered by managers is the rapidity with which companies can now respond to changes in product, technologies and prices. Game theory helps you pay attention to your interactions with competitors, customers and suppliers, and to focus on the end-game so that your near-term actions promote your long-term interest by influencing what these players do.”

- F. William Barnett,
McKinsey &
Company

Virtual Corporate Reality: VCR is an industry simulation package that I co-developed with Professor Christopher Ruebeck at Lafayette College. Students will form teams and compete in a market setting. Your grade will be based on the value of your company at the end of the semester. It is to be emphasized that your team's value will NOT be compared to the value of other teams in your market but rather to average value based on this simulation from past semesters. Details are provided in a separate document.

URL: <https://vcr.lafayette.edu/cgi-bin/login.cgi>

“Only the paranoid survive.”

- Andy Grove, Co-founder of Intel

Attendance: While attendance is not mandatory, 10% of your grade is tied to participation and in-class experiments. If you miss an experiment without having received approval prior to class, you will receive zero points on that experiment.

“I think that God in creating Man somewhat overestimated his ability.”

- Oscar Wilde

Electronics: The use of laptops, tablets, phablets, smartphones, smartwatches, tin cans with string, carrier pigeons, telepathy, or any other method that connects you to the world outside of this classroom is *verboten* during class, unless an exception is given (such as you have written permission to hold a séance to contact your great-great-grand mother.)

Ethics: You are expected to review and abide by the University of Pennsylvania's Code of Academic Integrity. Violations of the code carry serious sanctions. All cases of code violations will be turned over to the Office of Student Conduct and I reserve the right to impose additional sanctions, including a failing grade for the assignment or exam and for the course. In other words, it's a nasty business that you want to avoid.