Instructor:
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Office: NH 3049
Office Hours: M 10:30-11:30
Course Homepage: https://gauchospace.ucsb.edu/
Lectures: MW 2 – 3:15, PHELPS 1425

Course Overview and Objectives:
In order for a decision-maker to decide the best course of action, she must take into account the actions of others, including how her own behavior influences the thinking and payoffs of others. Game theory is the systematic study of this strategic interaction. It helps us develop an understanding of how people actually behave and how they should be advised to behave in strategic situations. The formal mathematical structure allows us to trace the logical implications of our assumptions. Game theory emphasizes the role of conflicting or shared goals, timing, private information and its manipulation in determining outcomes. It is used by researchers in every area of economics, and increasingly in other sciences such as political science, psychology, sociology, and biology.

This course introduces some of the game theory’s main topics and analytic tools, with an emphasis on gaining a practical understanding. Because of the tools-oriented approach, many of the games we analyze will have no obvious economic interpretation. At the end of the course you should be able to formalize a strategic situation as a well-defined game; choose appropriately from a basic kit of analytic tools, called solution concepts, to analyze and solve a wide variety of games and applications; and understand the assumptions underlying these concepts, as well as their strengths and limitations. While the emphasis is on the practical, a solid understanding of game theory requires some mathematical sophistication. You should have some experience with basic probability theory and calculus. More importantly you should be used to thinking analytically and in mathematical terms.

Prerequisites:
To enroll in this course you must already be accepted in the Economics major. This means that you must have taken Econ 1,2, and 10A, Math3AB, and Pstat5E.

Registration
The Economics Department Undergraduate Office handles all matters related to dropping or adding the course, wait-lists, etc. Please contact them regarding these issues. You can find a link to sign up for the waitlist on the main Economics Department homepage. During the second week of classes, the Undergraduate office will provide me with a prioritized wait-list and a limited number of access codes. Only then will I be able to admit anyone into the class.
**Required Materials:**

Watson, J., *Strategy*, 2nd edition, Norton, 2008. All of the readings and some of the problem set questions are from this text. A good online resource is [GameTheory.net](http://GameTheory.net), which has lecture notes, extra problems, a glossary, and interactive materials.

Clickers: We will use iClickers in this course. You will use them to give me feedback, check you understanding, record your attendance, and to participate in in-class games. You must bring yours to each class. They are available at the bookstore and were required for the most recent offerings of Econ 10A and 100B. If you are buying a new one, make sure that you get the kind that the Economics Department uses—the iClicker. It doesn’t matter whether you have the original iClicker or the newer iClicker 2.

**Grading:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Problem Sets (3)</td>
<td>30%</td>
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<tr>
<td>Midterms (2)</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
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<tr>
<td>Clicker/online questions</td>
<td>10%</td>
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If your grade on the final exam is higher than both of your midterm grades, I will replace your lowest midterm score with your final exam score. This weighting scheme will be used to calculate your final average. After calculating your final average, I will assign a letter grade by examining the grade distribution and setting reasonable cutoffs.

There is no explicit, pre-ordained curve or distribution for letter grades. Instead I will assess to what extent you have mastered the material given the final average you've maintained. If more people in the class show me that they've learned the material quite well, then I will give out more A's. Importantly, this means that one person's success does not lower someone else's grade. Thus, you should view studying and working on problem sets for this class as a collaborative, rather than a competitive endeavor. For borderline cases, I do take into account factors such as effort, participation, and improvement.

I will make every effort to return your graded problem sets and midterms no more than one week after you hand them in. Graders are human, just like you, and occasionally make mistakes. When you get something back, please immediately check for errors in the tallying of your score. If I added up your score incorrectly, you may bring that to my attention on the spot (or at the end of class) and I will fix it.

On the other hand, if you believe that a specific question on a problem set or midterm has been graded unfairly or in error, you may submit a request *in writing* on a separate piece of paper, explaining exactly what the problem is and why you believe you deserve more credit than you have been given. No verbal arguments will be considered. After carefully reading your request and rereading your original answer I may revise your grade either upward or downward, and there is no guarantee that your grade will change at all. Important: You have one week after your work is returned to make this request and **once you take the paper out of the classroom, no requests will accepted**. You must give your paper back to me if you’d like more time to make your request. You can access it again in office hours. Finally, you can submit at most two requests per quarter.

**Problem Sets:**

The three problem sets will be posted on Gauchospace and will develop your practical skills in applying the concepts of game theory. Problem sets may be handed in either in the lecture or as an attachment (acceptable formats: pdf or doc) to an email sent to me. Either way, they must be handed in
by 3:15pm on the due date. Because solutions are posted very quickly after class, late problem sets will not be accepted.

Start the problem sets early! You can typically start some of the problems on each problem set as soon as it has been posted. You may work with others on your problem set—in fact, I strongly encourage you to do so. However, what you hand in must be your own words and in your own handwriting (or typing). If you solve a problem in a group, you must write up your solutions separately. Failure to do so will be considered a violation of academic honesty.

**Important:** Each problem is labeled with one to three stars. One- and two-star problems are material you are required to know intimately for the final exam. One-star problems require mundane technical skills, or repeat the lecture or reading very closely. These skills can only be acquired by doing the problems and these skills are considered a requirement for passing the course. For example, there is a big difference between understanding what Nash equilibrium is and actually being able to quickly compute all Nash equilibria in simple games. **You should not hand in one-star problems.** These are provided on the problem set for your own practice and will not be graded. You **should** hand in two-star problems. **Three star problems are entirely optional.** You can think about them, hand them in to me separately from your problem set, discuss them in OH or run your thoughts by me in an email. They are meant for students who wish to refine their skills and game-theoretic mindset, or pursue some issues more deeply than can be covered in this course. Three-star problems are absolutely, positively not required material for this course. The final will include questions that are similar to one- and two-star problems that appear on the problem sets. It will not contain any problems closely related to any three-star problems from the problem sets.

The intended schedule for problem sets is as follows.

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<thead>
<tr>
<th>PS</th>
<th>Posted</th>
<th>Due, sols. posted</th>
<th>Returned/Available</th>
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<tbody>
<tr>
<td>1</td>
<td>W, 10/3</td>
<td>W, 10/17</td>
<td>F, 10/19</td>
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<td>2</td>
<td>W, 10/24</td>
<td>W, 11/14</td>
<td>F, 11/16</td>
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<td>3</td>
<td>W, 11/21</td>
<td>W, 12/5</td>
<td>F, 12/7</td>
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**Exams:**

There will be two midterm exams and a final exam. Unless I announce otherwise, all exams are closed book, with only pens and paper (blue books) allowed. You will be asked to turn off all electronic devices (and make sure that your seatback and tray-tables are in the upright and locked position.) The midterms will be held in class on Monday, October 22 and Monday, November 19. The final exam is on Monday, December 10, 4-7pm. The second midterm will focus on the material covered since the first midterm, but the final exam will be cumulative.

There are **NO makeup exams.** If you miss any of the tests, you will receive a grade of zero. If you cannot attend the final, you should drop this class and take it another quarter.

**DSP:**

Students with disabilities will be accorded academic accommodations. If you require such an accommodation, please let me know at the beginning of the term using the forms provided by the DSP office. You are required to request the accommodations in advance of each relevant class activity (e.g.
exam) and the accommodations will be arranged through the DSP office and the Economics Department Undergraduate Office. If you are uncertain how to go about doing this, please contact the DSP office.

**Academic Integrity:**
Please review the University’s policies on academic integrity. Some useful guides are found on the Office of Judicial Affairs’ website:

[http://judicialaffairs.sa.ucsb.edu/StudentResources.aspx](http://judicialaffairs.sa.ucsb.edu/StudentResources.aspx)

**How to Succeed in this Course:**
Come to class and participate. Read the textbook. Start each problem set early. Do as much as you can by yourself at first, then discuss and work with others to finish it. Try the extra exercises in the book. Come to office hours. When solutions are posted and problem sets/exams are returned, go over your exam and try to understand everything that you didn’t get. Studying for exams: go back to the problem sets and extra exercises; without looking at the solutions, try to solve the problems again, then refer to the solutions to figure out what you didn’t get.

**Tentative Outline and Schedule:**
*(This is subject to change. Please check Gauchospace regularly for announcements and updates.)*

**Class 1 (M 10/1)**
(Preliminaries, overview, normal form, best responses, dominance)

Reading: Chapters 1, 3, 4, 6, 7. You may wish to skim the omitted chapters (2 and 5), to which we will later return.

**Class 2 (W 10/3)  PS1 posted**
(Normal form, dominance, iterated dominance)

**Class 3 (M 10/8)**
(Classical normal form games, underlying assumptions, Nash equilibrium)

Reading: Chapters 5, 9

**Class 4 (W 10/10)**
(Applications of NE)

Reading: Chapters 8, 10

**Class 5 (M 10/15)**
(mixed strategy Nash equilibrium)

Reading: Chapter 11
Class 6 (W 10/17)  PS1 due, solutions posted  
(More mixed strategy Nash equilibrium, examples, applications)

(Friday, 10/19:  *PS1 returned/available for pick-up*)

Class 7 (M 10/22)  **Exam 1**

Class 8 (W 10/24)  PS2 posted  
(Extensive form, NE in extensive form)

    Reading:  Chapters 2, 14, 15

Class 9 (M 10/29)  
(Backwards induction, subgame perfection)

Class 10 (W 10/31)  
(Bargaining)

    Reading:  Chapters 18, 19

Class 11 (M 11/5)  
(Repeated games)

    Reading:  Chapter 22

Class 12 (W 11/7)  
(Veterans’ Day: No Class on Monday, November 12)

Class 13 (W 11/14)  PS2 due, solutions posted  
(Incomplete information, Bayesian games, Bayesian Nash equilibrium)

    Reading:  Chapters 24, 26

(Friday, 11/16:  *PS2 returned/available for pick-up*)

Class 14 (M 11/19)  **Exam 2**

Class 15 (W 11/21)  PS3 posted  
(Information economics:  risk, incentives, contracts, moral hazard)

    Reading:  Chapters 25

Class 16 (M 11/26)  
(Information economics:  adverse selection, auctions, information aggregation)
Reading: Chapter 27

Class 17 (W 11/28)
(More information economics: adverse selection, auctions, information aggregation)

Class 18 (M 12/3)
(Perfect Bayesian equilibrium, Bayes rule)

Reading: Chapter 28

Class 19 (W 12/5)   PS3 due, solutions posted
(Job-market signaling, reputation)

Reading: Chapter 29

PS3 available for pickup: Friday, December 7

Final Exam: Monday, December 10, 4-7pm