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GAME THEORY
Business 42116
Spring 2022

SYLLABUS

A. COURSE OVERVIEW

In the terminology of economics, a *game* is any situation where the best course of action depends on what others will do. Under this definition, most business environments are games. Game theory is a framework for analyzing games. The course will focus on two questions: (i) how to *play* games (i.e., how to predict what others will do and respond appropriately) and (ii) how to *design* games (i.e., how to structure your business environment).

B. MODALITY

The class will be In-Person Only. One section of the class will be recorded each week. Access to that recording will be conditional on the confirmation of a valid (e.g., medical) reason for missing the in-person class. Note that watching the recording will be a worse substitute for in-person attendance than is the case for many classes, given the important role of active playing of games in-class (see below).

C. CLICKERS

All students enrolled in the course will be issued a clicker for the duration of the quarter. The clickers will be used to participate in the in-class games. Each registered student will need to pick up a clicker at the start of the first class and they will only be issued to registered students. Each student must pick up only their own. Please arrive early if possible to reduce congestion and delaying the start of class. Clickers will be pre-issued to students who enroll before 5pm on Thursday, March 24th. If you register after that time, please email my assistant Jessica Henderson (jessica.henderson@chicagobooth.edu) to ensure a clicker is ready for you or to make alternate arrangements to pick one up. For those students in the evening section, the TA will be outside the classroom for clicker pick up starting at 5:30pm. If you lose your clicker, it will take time to issue you a replacement and you will be penalized with a zero grade on game performance for two weeks.

D. ATTENDANCE AND PARTICIPATION

Having the chance to play the games we analyze will be an important part of the learning process. I expect you to take the play of these games seriously and put yourself in the frame of mind of someone whose firm's performance depends on the outcome of the game. To make it easier for you to take that perspective, your payoffs from the games we play in class will constitute a part of your final grade. If you have a valid reason to miss the in-person class, your grade will of course not be penalized.

You are expected to attend the section that you are enrolled in. However, if on a particular occasion you must attend a different section, you will be able to do that and still participate in the games.

To participate in the games, you will need to know your Student ID number. Please make sure you have access to your Student ID number during class.

E. TEACHING ASSISTANTS

The teaching assistants for the class are

Monday afternoon: Ricardo Quineche Uribe (rquineche@uchicago.edu)

Monday evening & Tuesday morning: Ana Vasilj (anavasilj@uchicago.edu)

My assistant is Jessica Henderson (jessica.henderson@chicagobooth.edu).

Please direct administrative questions (e.g., problems with the website) to Jessica.

Please direct clarifying questions about course content or the problem sets to your TAs.

You should feel free to call me or send me an e-mail if you have substantive questions about the class material. I will not hold regular office hours, but will be available to meet by appointment.

F. MATERIALS

Our textbook is:

Dutta, Prajit K. (1999) *Strategies and games*, MIT Press.

The readings indicated on the syllabus should be read **prior** to the relevant class. For example, you should come to the first meeting of class on March 28th or 29th having already read Chapters 1, 2, 3, and 4 of the textbook.

G. CONTENT

You are responsible for all the material presented during the lectures. You are NOT responsible for the material that is covered by the textbook if that material is not directly presented during the lectures. Slides used during each lecture will be available on Canvas.

H. COURSE REQUIREMENTS AND GRADING

Grading will be based on:

- game performance
- problem sets
- the midterm
- the final

While I will always gladly meet with you to discuss the class material, **I am unwilling to discuss individual grades under any circumstances**. If you think there is an arithmetical error leading to

a mistake in your problem set, midterm or final exam grade, you may bring this to a TA's attention. Please refrain from all other types of complaints regarding your grade.

Game performance

Most weeks we will play games in class. Having you think hard about the best course of action will help you with the formal analysis of these games. As mentioned above, your payoffs in these games will determine a part of your overall grade.

Problem sets

There will be four problem sets over the course of the quarter. Working on these problem sets will help solidify your understanding of the formal concepts that we introduce in class. You are welcome to form teams of up to three people to work on the problem sets. Each team is expected to work on each problem set jointly and turn in a single solution set.

Midterm

The midterm will be given in week 5 of the class. It is an in-class, closed-book exam. I will discuss the format of the exam the week before it takes place. You will not be allowed to take the midterm outside of normal class hours.

Final

The final will be given in the usual exam period. Please note that this means Monday sections will have the exam on Memorial Day. It will be a remote, open-book exam. It will have a format similar to the midterm. You will not be allowed to take the final outside of the scheduled exam hours.

I. HONOR CODE

Students enrolled in this class are expected to adhere to the terms of Booth's honor code.

J. ACCOMMODATIONS FOR DISABILITIES

The University of Chicago is committed to ensuring the full participation of all students in its programs. If you have a documented disability (or think you may have a disability) and, as a result, need a reasonable accommodation to participate in class, complete course requirements, or benefit from the University's programs or services, please contact Student Disability Services as soon as possible. To receive a reasonable accommodation, you must be appropriately registered with Student Disability Services. Please contact the office at 773-702-6000 or disabilities@uchicago.edu, or visit the website at disabilities.uchicago.edu. Student Disability Services is located at 5501 S. Ellis Avenue.

If you have an approved accommodation from Student Disability Services that you plan to use in this course, please contact Academic Services (AcademicServices@lists.chicagobooth.edu) as soon as possible. Academic Services will provide support to you and your instructor and coordinate the details of your accommodations on your behalf.

Class Schedule and Readings

Session 1	March 28, 29 Reading: Chapters 1, 2, 3, and 4. Introduction to static games Dominant strategies Iterated dominance
Session 2	April 4, 5 Reading: Chapters 5, 6, 7 Nash equilibrium Coordination Public goods Pre-play communication <u>Problem Set 1 Handed Out</u>
Session 3	April 11, 12 Reading: Chapter 8, 10, 11, 12, 13 Mixed strategies Zero sum games Introduction to dynamic games Subgame perfect equilibrium Commitment and game modification <u>Problem Set 1 Due</u> <u>Problem Set 2 Handed Out</u>
Session 4	April 18, 19 Reading: Chapters 20, 21 Static games of incomplete information Bayes Nash equilibrium Implicit information Market for lemons <u>Problem Set 2 Due</u>

Session 5	<p>April 25, 26</p> <p>Midterm Exam</p> <p>Reading: Section 23.1, 23.2, 23.3 Introduction to auctions</p>
Session 6	<p>May 2, 3</p> <p>Reading: Sections 23.4, 23.5</p> <p>Revenue equivalence Common value auctions</p> <p><u>Problem Set 3 Handed Out</u></p>
Session 7	<p>May 9, 10</p> <p>Reading: Chapter 24, What the seller won't tell you (Milgrom)</p> <p>Dynamic games of incomplete information Perfect Bayesian Equilibrium Communication Disclosure</p> <p><u>Problem Set 3 Due</u> <u>Problem Set 4 Handed Out</u></p>
Session 8	<p>May 16, 17</p> <p>Reading: Spence Nobel Prize Lecture, pp. 407-414</p> <p>Signaling Selling status goods Reputation</p> <p><u>Problem Set 4 Due</u></p>
Session 9	<p>May 23, 24</p> <p>No reading</p> <p>Information Design Course re-cap</p>