Decision Sciences 201/Economics 362/Political Science 217: Discovering Game Theory

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Class Room: East Duke 209 **Class Time:** M/W 10:15-11:30am

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COURSE OVERVIEW

The social world in which we live is highly complex. An important reason for that complexity is *strategic interdependence*: How individuals act depends on their expectations of the actions (and reactions) of others, which in turn depend on the expectations those individuals hold, and so on. Consider a simple illustration: Whether you should drive on the right or the left depends on what you expect the oncoming driver to do – but of course what the oncoming driver will do depends on her expectation of which side you will drive on. Such strategic interdependence is rampant in the social world, and it generates tremendous complexity because it implies that social interactions can develop along many alternative paths.

Across the social sciences, scholars rely on game theory as a tool to analyze social phenomena in the face of strategic interdependence. The insights of game-theoretic reasoning are central to economics, political science, sociology, and the other social sciences. Game-theoretic approaches also have prominent practical applications, such the design of auctions for the selling of radio frequencies, the mechanisms for assigning students to public schools, to efforts at constitutional reform, or campaign strategies.

This course will provide you with an introduction to game-theoretic reasoning and modeling in a highly interactive learning environment. By the end of the semester, you will have gained knowledge and skills that will allow you to be intelligent consumers of applied game-theoretic work across the social sciences, to develop your own simple models, and to have the foundation for more advanced course work. While this class does not presume any mathematical background beyond basic algebra, it is important to stress that game theory is a deductive, mathematical enterprise. Therefore, it requires abstract, symbolic reasoning. The only way to learn these skills is to practice them. You should attend class regularly, and work diligently through class notes, assigned reading, and homework.

A SPECIAL NOTE ON THE SYLLABUS

The premise of this course is that you will *discover* game theory by playing games, thinking through puzzles, and discussing how and why you approached these. You must **bring your laptop, tablet, or smartphone to class** in order to be able to participate in game play.

Because you are discovering game theory, we do not want you to come to class "prepared" – we want you to encounter the material we cover in each period without any preconceived notions or knowledge. For this reason, this syllabus does not provide the usual semester schedule and readings – we do not want you to know "what comes next" or to read ahead. Instead, we will let you know from week to week what preparation – if any – we would like you to complete before class. Each week, we will also post lecture notes and readings that go over the week's materials. Typically, there will also be a homework assignment for you to complete. With that in mind, here are some critical dates you should mark in your calendars:

- First midterm exam, Monday, October 17
- Second midterm exam, Wednesday, December 7

REQUIRED READINGS

Required readings will be available through the **Sakai page** for this course, as well as through the electronic resources available through Duke Library. There is no assigned textbook for the course; we will be distributing lecture notes as the semester progresses. Make sure that you check the Sakai website regularly to stay current with assignments.

MOBLAB SUBSCRIPTION

You will need to buy a "premium" subscription to MobLab, an online platform that we will use in order to play games in class. The subscription costs $25; it is the only thing you'll need to purchase for the course. You will receive an invitation email by Tuesday, August 30, to your Duke email address. This email will include the class code that will allow you to link your account to our class. Please be sure to register by class on Wednesday, August 31 because we will begin playing games. If you have any questions, please get in touch.

TEACHING ASSISTANT

Griffin Riddler will serve as teaching assistant for this course. In addition to Professors A and V, you can contact him with questions, etc.. Griffin will hold office hours on Wednesdays at 7pm. *Please make every effort to limit your requests for help to office hours.* You can reach Griffin at griffin.riddler@duke.edu.

GRADES AND EVALUATION

There are four components to your grade:

Two Midterm Exams (50 percent of your course grade): Each midterm exam will count for 25 percent of your course grade. The first exam will be on Monday, October 17, in class; the second exam will be on Wednesday, December 7, in class. If you miss one of the midterm exams, and have not made alternative arrangements prior to the exam with us, you will need to provide documentation of an acceptable reason for missing the exam (typically, a medical emergency). If you can document an acceptable reason for missing the exam, you will be given a make-up exam during the regularly scheduled final exam period for this class on Friday, December 16, at 2pm. Please plan accordingly.

Application project (20 percent of your course grade): Your task for this assignment is to **either** write a short paper (5 pages, double-spaced) **or** to produce a short video (approximately 5 minutes) that develops a simple game or model to explain a contemporary or historical example of interest to you. If you choose the video option, you may work on this as a group project, with a maximum of four participants per group. (The paper must be written by you alone; you are also free to produce a video on your own.)

Homework and in-class exercises (30 percent of your course grade): Over the course of the semester, you will complete a number of homework assignments and in-class exercises that will count for the remainder of your grade. Homework assignments will be distributed and submitted electronically via Sakai.

Course grades will be determined according to the following grading scale: **A:** 93-100 **A-:** 90-92 **B+:** 88-89 **B:** 83-87 **B-:** 80-82 **C+:** 78-79 **C:** 73-77 **C-:** 70-72 **D+:** 68-69 **D:** 63-67 **D-:** 60-62 **F:** 0-59

PROCEDURE FOR TESTING ACCOMODATIONS

This class will use the Testing Center to provide testing accommodations to undergraduates registered with and approved by the Student Disability Access Office (SDAO). The center operates by appointment only and appointments must be made at least 7 consecutive days in advance, but please schedule your appointments as far in advance as possible. You will not be able to make an appointment until you have submitted a Semester Request with the SDAO and it has been approved. So, if you have not done so already, promptly submit a Semester Request to the SDAO in order to make your appointment in time. For instructions on how to register with SDAO, visit their website at https://access.duke.edu/requests. For instructions on how to make an appointment at the Testing Center, visit their website at https://testingcenter.duke.edu.

ACADEMIC DISHONESTY

Students and faculty at Duke are governed by the **Duke Community Standard**, and academic dishonesty will not be tolerated. If I suspect that a student has attempted to represent someone else's work as their own, or to cheat in any other manner on an exam or a written assignment, I will refer the case to the Office of Student Conduct in accordance with university policy. If a violation of the academic integrity policy is found to have occurred, the minimum penalty will be

a zero (0) on the assignment/exam in question. If you have any questions about plagiarism and proper citation methods, please consult the **Duke Tutorial on Plagiarism**.

STUDENTS WITH CHALLENGES

Students with challenges who require individualized testing or other accommodations should identify themselves and express their needs during the first week of the semester. Where the challenge is not immediately apparent, verification will be required.