Introduction to Strategic Behavior
ECON 411

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Department of Economics
University of North Carolina

Spring, 2021

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Outline

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Syllabus changes

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The professor reserves the right to make changes to the syllabus, including assignment due dates, and test dates. These changes will be announced as early as possible.

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Course Objectives

The course main goal is to provide tools to enable you to:

1. build models of strategic behavior,
2. identify their (built-in) limitations and
3. think about how to apply them to real-life problems;

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On Exactitude in Science
Jorge Luis Borges, *Collected Fictions*, translated by Andrew Hurley.

"In that Empire, the Art of Cartography attained such Perfection that the map of a single Province occupied the entirety of a City, and the map of the Empire, the entirety of a Province. In time, those Unconscionable Maps no longer satisfied, and the Cartographers Guilds struck a Map of the Empire whose size was that of the Empire, and which coincided point for point with it. The following Generations, who were not so fond of the Study of Cartography as their Forebears had been, saw that that vast Map was Useless, and not without some Pitilessness was it, that they delivered it up to the Inclemencies of Sun and Winters. In the Deserts of the West, still today, there are Tattered Ruins of that Map, inhabited by Animals and Beggars; in all the Land there is no other Relic of the Disciplines of Geography.

Suarez Miranda,Viajes de varones prudentes, Libro IV,Cap. XLV, Lerida, 1658."

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Mont Sainte Victoire
Photography vs Cézanne

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Reaching Our Goals

To achieve our goals, we rely on:

1. Class discussion.

2. Problem solving practices.

3. Reading and discussion of real-life cases

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Recommended Texbook

Osborne, Martin J. (2004)

An Introduction to Game Theory, Oxford University Press.

This is an excellent textbook, which is also used in ECON 511. Although it is not required, it provides a very nice companion to our course and is a great reference source.

In particular, for additional practice exercises this is an ideal textbook.

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Tentative Coverage

1. Strategic Games
2. Solution Concepts: Nash Equilibrium
3. Dominance concepts
4. Solution Concepts: Iterative deletion
5. Symmetric and Zero-Sum games
6. Pareto Efficiency
7. Expected Utility (review)
8. Mixed Strategy Nash Equilibrium
9. Extensive games of perfect information
10. Solution Concept: Subgame Perfection
11. Simultaneous moves and uncertainty
12. Extensive Games: Repeated Games
13. Games with Imperfect Information
14. Solution Concepts: Perfect Bayesian Equilibrium
15. Mechanism Design

Class Information and policies

- We meet online Tuesdays and Thursdays, from 8:00 am. to 9:15 am. (EST) Please, see Sakai > Announcements for the ZOOM links.

- Please install Mathematica in the computer or laptop you intend to use with ZOOM so you can share your screen/work. Avoid using a tablet/ipad for the ZOOM calls.

- Sakai will be used to schedule office hours meetings, post grades, course announcements, readings, supplementary materials, messaging, problem sets, class ZOOM links, etc...

Class Information and policies

• This course requires **synchronous participation** through Zoom. You need to be in front of your computer during the designated class time and be able to interact with your instructor and classmates. Please, turn your camera and microphone on during class because you need to be visible and audible to your instructor and your classmates during class.

• Some (but not all) ZOOM recordings of our class meetings may be available as a study resource. However, synchronous participation in class is required. Recordings will be accessible only to enrolled students, instructor, and teaching assistant. All recordings in which students appear will be deleted after the end of the course. Feel, free to use a virtual background if you need more privacy. However, your camera and audio must be on.

• Suggestions: Please, try to connect from a quiet environment without background noise. Also, take class notes in a notebook.

Contact Info and Office Hours

1. Email: `sergiop@unc.edu`.
2. Please use Sakai>Messages to reach me.
   Regular mails have lower priority.
3. Office hours (OH) are by Sakai appointment only. Registration opens a week before and closes a day before the OH meeting.
   - Wednesday: 3–4 pm., Friday: 11 am. – 12 pm.
   - To schedule an OH meeting use Sakai > sign-up.
   - Do not hesitate to Sakai>Message me to schedule meetings outside regular OH if your schedule conflicts with the regular OH.

Evaluation

- **March 2nd** — 1st Midterm
- **April 13th** — 2nd Midterm
- **May 8th**, Saturday at 8 am. — Final Examination
- Midterm grades account for 35% of the final grade.
- Final examination grade is worth 35% of the final grade.
- Ten or more problem sets and/or writing assignments: 20%.
- Active Participation 5%.
- There are no make-ups for midterms.
- The weight of a missing midterm (with justification) is transferred towards the final exam.

Computing Grades

- Exam grades are converted into scores accordingly to:

$$\texttt{Score} \;=\; \texttt{Exam Grade} + 100 - \max(\texttt{Top Exam Grade}, 50).$$

- Assignments scores are identical to assignment grades.
- Course grades are computed accordingly to the table:

letter grade	min. score
A	95
A-	90
B+	87
B	83
B-	80
C+	77
C	73
C-	70
D+	67
D	60

Student Support Services

- The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in barriers to fully accessing University courses, programs and activities. Accommodations are determined through the Office of Accessibility Resources and Service (ARS) for individuals with documented qualifying disabilities in accordance with applicable state and federal laws. See the ARS Website for contact information: ars.unc.edu or email ars@unc.edu.

- Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Please contact the Director of Title IX Compliance (Adrienne Allison –Adrienne.allison@unc.edu), Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators (gvsc@unc.edu; confidential) to discuss your specific needs. Additional resources are available at safe.unc.edu

- CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: caps.unc.edu or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more.

To do list for the first week

1. If you are eligible for taking exams with ARS, please schedule with them using arshub.unc.edu within the first or second week of classes.

2. If a) you have more than 3 final exams in more than 24 hours; b) ECON411 is one of these exams; and c) you wish to re-schedule one of your exams; then you **MUST** ask for an alternative date before February 14th. If you do not follow these procedures your request may not be accommodated.

3. Place an order for the software *Mathematica* throughout software.sites.unc.edu/software/mathematica/. The *student license is free.* However, you must place an order.

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Class Discussion

During this course, we shall employ additional material from TV, movies, or literature to discuss strategic related issues.

Sometimes, you may find the political or religious views; or the profanity contained in the additional material offensive or objectionable and you may feel uncomfortable.

I do not endorse any particular views ex but ...

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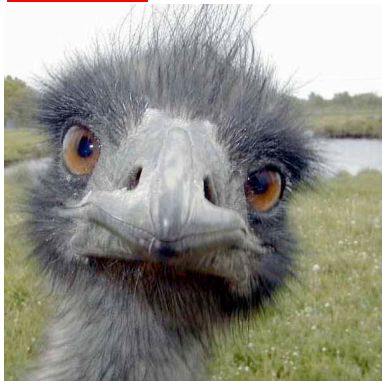
engage in `critical thinking`,
and also respect different opinions expressed by your classmates.

Problem Sets (PS)

1. PS are posted on Sakai > Assignments.

2. Past due date PS are not accepted.

3. PS are assigned to groups (max. size = 3).

4. Groups are randomly formed for each PS.

5. PS grading criteria:

grade	solutions	work	presentation
4.0	correct	explained	reasonable
3.5	comput. err.	explained	reasonable
3.0	concept. err.	explained	reasonable
2.0	–	omitted	reasonable
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Questions & Answers

This course is called Game Theory. I like games!
The course sounds/looks fun !!
Should I take this class?

Sorry for curbing your enthusiasm...
But playing a game often is more fun than studying one... ☺

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The only way to make sure you understood the material is to solve problems. Try to work in groups and try to solve as many problems as you can. Do not be frustrated if you get stuck with a problem. The problems where you get stuck are precisely the ones that are useful for your study. They should serve as a guide to where the focus of your reading should go and to which questions you should bring to class.

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Questions & Answers

Is ECON 411 a pre-requisite to ECON 511?

At the present, the answer is no. Thus, there is some overlap of content across these courses. But in the future, ECON 411 will be a pre-requisite for ECON 511.

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The point of solving problems is not to come up with a right answer but rather to elicit questions that you may have about the material. If you are unsure about your work or answer this is a good signal. Please do bring the problem to class and express your doubts. If you faced a challenge when trying to solve a problem, and you are not sure of your answer, or not sure on how to proceed at some step, chances are, your colleagues have similar questions and it is worth to discuss it in class.

The lack of an answer key is, for most of the cases, deliberate. It is designed to give incentives for you to work the problems rather than trying to memorizing solutions.

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No. Often the Problem Set is broken down in small steps to help you solve it. As a result, the items are often interconnected. The best approach is to solve the items in the order that they are presented. You can solve the PS faster if all members discuss every item together.

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Is this course useful?
for an Econ PhD

I want to go to grad. school in Economics.
Game Theory is very important for Economics, should I take this course?

No. In grad school, you will have several opportunities to take Game Theory classes. If you want to increase your chances of being accepted by a top program, you should take more classes at the Mathematics Department.

Is this course useful?
Econ and other fields

Would you recommend this course to any Econ, CS or Poli Sci major or PPE minor?

Of course: if you want to learn more about incentives in strategic environments, this is a good course for you. If you plan to go to Law School, grad school in Public Policy, Political Science, etc ... or if you just want to learn for the sake of learning, this is a terrific course for you.

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Chances are, you will not write down a model for some concrete real-life situation, solve for its equilibrium and make accurate predictions based on it. But that does not mean that models are useless. Game theory may help you avoid real-life pitfalls. Also check this Noah Smith's article for several interesting examples of applications of GT to real-life.

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