Introductory Game Theory
PSCI 7055
Th 2:00 - 4:30 PM, KTCH 1B31

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Hours:	M 2:00–3:00 PM, or by appt.

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This course introduces students to methods of formal modeling in political science. We will begin with the basic foundations of game theory and work our way up to a selection of more advanced concepts and models that are commonly seen in formal-theoretic political science. The majority of the course content will consist of a technical introduction to non-cooperative game theory. We will also discuss how models are used in political science, and the role(s) formal modeling plays in the overall research enterprise. By the end of the course, students should be informed consumers and critics of game-theoretic work, and should have some ability to develop simple original models.

Grading and Assignments:

Problem Sets 15%
You will be expected to complete problem sets (roughly weekly) that require you to solve models using techniques introduced in class. The problem sets will be where a significant portion of your learning happens in this course, as you will benefit greatly from repetition and practice. You are permitted to help one another with the problem sets, and compare your work, but *only* after seriously attempting them on your own. You are not allowed to simply copy others' answers, and if you do you will gain very little from this course.

Midterm Exam 15%
A midterm exam will be given on March 5th. This will be an in-class, closed book exam.

Final Paper 25%
You will develop a research paper that uses a formal model. The paper should provide a clear research question, and develop a model appropriate to that question. You should be ambitious in your efforts to develop an interesting and nuanced model; however, because your solving skills will still be limited after only one semester, you will most likely solve a simplified version or special case of your game. We will discuss an appropriate course of action on a case-by-case basis. You should consider this paper a stepping stone towards a potentially publishable project. The paper is due in class on April 23rd.

Paper Proposal 5%
Students are required to turn in a 1–2 page paper proposal writeup on March 12th, the week following the midterm. This proposal should identify your research question and provide some preliminary ideas for how your model will answer that question. Your

proposal should specify, at minimum, who your actors are, what choices they are making, and some tradeoff or tension that they will face. I will evaluate your proposals for substantive interest and feasibility and provide feedback as we settle on your paper topic.

Paper Comments 5%
To give you some practice critiquing formal models, and provide your colleagues with additional feedback on their papers, each student is required to write a short memo (2–3 pages) commenting on another student's paper. I will assign a peer commenter for each of you. The memo should comment on the fit between model and research question, and consider the reasonableness of the paper's modeling choices. Comments are due on April 30th.

Final Exam 25%
The final exam will be in a take-home format. You will be on your honor to complete the exam on your own within a 24-hour window of your choosing. The exam must be turned in by 5:00 PM on Wednesday, May 6th.

Preparation and Participation 10%
Students are expected to come to class prepared and take part in discussions and exercises. Attendance is mandatory except in cases of illness or family emergency. Any unexcused absences will result in a penalty of *half* your participation grade (or 5 points from your final average).

A Note on Math: The study of game theory requires a certain level of mathematical sophistication, particularly as one delves deeper into it. In this introductory class, though, strong command of the basics is much more important than any knowledge of higher-level math. To succeed in this course, you should have (or develop) high facility with basic algebra, functions, sets, and probability; you should also have some familiarity with very basic calculus (simple derivatives). We will not be using any particularly esoteric math concepts, but it is important that the simpler ones not be a stumbling block. If you are unsure of your abilities, or find yourself struggling with the mathematical content as we go along, please come see me sooner rather than later, and we will figure out a course of action.

Late Work Policy: Late assignments will be penalized 5 points per day late. Late problem sets will not be accepted. If illness or family emergency prevents you from completing an assignment on time, these penalties may be waived.

Academic Honesty: Students are expected to adhere to standards of academic integrity set forth in the Colorado Honor Code. All incidents of academic misconduct, such as plagiarism or cheating, shall result in failure on the relevant assignment, and may be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273) and/or the graduate program director.

Accommodations: If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner (for exam accommodations

provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with me.

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. If you have a conflict with one of the scheduled exam dates in this class due to a religious observance, you may notify me at least two weeks in advance and we will arrange an alternative time.

Class Schedule and Required Readings:

The course has two required books. For readings from the Osborne textbook, you may find it most useful to skim the chapters before class and go back to them more seriously afterwards to reinforce your understanding. For assigned journal articles, and the Clarke and Primo book, you should come to class prepared to discuss them.

> Osborne, Martin. 2003. *An Introduction to Game Theory*. Oxford University Press.

> Clarke, Kevin and David Primo. 2012. *A Model Discipline: Political Science and the Logic of Representations*. Oxford University Press.

The following is a tentative schedule. We may depart from it if we get behind or if there is a need to spend more time on particular topics. Any changes to the schedule will be announced in class.

Jan. 16 . . . . Utility, decision theory, rationality
Required readings: None

Jan. 23 . . . . Discrete-choice games in normal form
Required readings: Osborne 1,2
Recommended: Osborne 3

Jan. 30 . . . . Mixed strategies
Required readings: Osborne 4

Feb. 6 . . . . Extensive form
Required readings: Osborne 5
Recommended: Osborne 6

Feb. 13 . . . . Subgame perfection
Required readings: Osborne 7

Feb. 20 . . . . .Continuous-choice games
Required readings: Osborne 17, and review Osborne 2.8 and 6.1

Feb. 27 . . . . .Social choice
Required readings: Osborne 8
Riker, William. 1980. "Implications from the Disequilibrium of Majority Rule for the Study of Institutions," *American Political Science Review* 74:432
Recommended: Diermeier, Daniel and Keith Krehbiel. 2003. "Institutionalism as a Methodology," *Journal of Theoretical Politics* 15: 123

Mar. 5 . . . . .MIDTERM EXAM

Mar. 12 . . . . Interlude—Models in political science
Required readings: Clarke and Primo (entire);
Varian, Hal. 1994. "How to Build an Economic Model in Your Spare Time," Unpublished Manuscript
PAPER PROPOSAL DUE

Mar. 19 . . . . .Signaling 1
Required readings: Osborne 10
Recommended: review Osborne 17.6 on Bayes' rule

Mar. 26 . . . . .NO CLASS (Spring break)

Apr. 2 . . . . Signaling 2
Required readings: Rogers, Jim. 2001. "Information and Judicial Review: A Signaling Game of Legislative-Judicial Interaction," *American Journal of Political Science*.

Apr. 9 . . . . .Bargaining 1
Required readings: Osborne 16

Apr. 16 . . . . .Bargaining 2
Required readings: Powell, Robert. 2006. "War as a Commitment Problem," *International Organization*.

Apr. 23 . . . . .Iterated games 1
Required readings: Osborne 14
Recommended: Osborne 15
PAPERS DUE

Apr. 30 . . . . .Iterated games 2
Required readings: Weingast, Barry. 1997. "The Political Foundations of Democracy and the Rule of Law," *American Political Science Review*.
PAPER COMMENTS DUE