University of Mannheim
Chair of Political Economy
Prof. Dr. Thomas J. Bräuninger

Game Theory

Lecture, MA/PhD program Political Science
Meeting times: Mondays, 10:15am-11:45am
Meeting location: A5, 6 Room tba

Instructor:
Thomas Bräuninger, thomas.braeuninger@uni-mannheim.de

Office hours:
Tuesdays, noon-1pm in person or on Zoom, please sign-up in ILIAS

Tutor:
Carlos Gueiros, cgueiros@uni-mannheim.dee

Course description

The objective of this course is to provide students with the basics of formal modeling in political science. The course has some breadth in coverage in the sense that it provides a graduate-level introduction and overview to different areas in game theory. It is also narrow in the sense that the emphasis is not on application and model testing but getting trained in reading and writing down formal models. At the conceptual level the course will cover the following topics: normal form games, Nash equilibria, extensive form games, subgame perfect equilibria, repeated games, bargaining, games with incomplete and imperfect information, Bayesian perfect equilibria, signaling games, preferences and individual choices, basics of decision theory and social choice. At the substantial level, we will use these concepts to study, as examples, candidate competition, political lobbying, and war and deterrence.

Prerequisites

School level maths, see Math for Political Science – Preparation Course

Course Requirements

Final grading of the course will be based on the final exam. We will not have midterm exams or anything comparable. The final exam will take place in the exam weeks (after the teaching block, see academic calendar). The exact day and time will be finally scheduled by the Students' Office in November.

Working in small groups on the weekly assignments is good and we encourage this. Even online meetings on Zoom in groups of two to four is, in our experience, feasible and efficient.

In any case, make sure that your group is not too large so that anyone can contribute to the discussion. Simply copying someone's else work is a waste of time.

While Carlos and I do not keep accounts on class attendance, we think that for most students attendance and actually active participation in class is extremely conducive for mastering the course materials. If you cannot make it to class for whatever reason, you are not expected to drop a note. Make sure that you become familiar with the topics we covered in the class you have missed.

Course registration

The course is open to MA Political Science, GESS and polisci exchange students and, as long as there are open slots, Mannheim and exchange students from other fields. MA polisci students have to register in "Portal^2", GESS students at the GESS, all other students are asked to contact Carlos or me.

Learning Resources

Materials (slides, problem sets, videos, copies of literature) will be provided in ILIAS, the online learning platform (https://ilias.uni-mannheim.de/). The ILIAS course name is "Game theory [V] [1.PG]". Make sure that you have access to the system and, please, regularly check your Uni Mannheim email account. Carlos and I will use the ILIAS mailing list to send around announcements etc. and you can use it for the same purpose. It is in your responsibility to make sure that you get them.

Textbooks

We do not use a single textbook. Rather students are encouraged to look at different books and read them crosswise. We will upload selected chapters to ILIAS of the following textbooks, all great reads.

- McCarty, Nolan and Adam Meirowitz. 2007. *Political Game Theory.* Cambridge: Cambridge University Press.
  Comprehensive introduction into game theory for political scientists using a consistent framework of concepts and notations. Don't be scared by the maths, you are neither expected to fully understand or read the proofs, nor the more advanced examples and chapters.

- Tadelis, Steven. 2013. *Game Theory: An Introduction.* Princeton: Princeton University Press.
  My other favorite. Excellent introduction written by an economist. Many examples address economic questions but that's not bad.

- Osborne, Martin. 2003. An Introduction to Game Theory. Oxford: Oxford University Press.
  Another excellent textbook.

- Morrow, James. 1994. Game Theory for Political Scientists. Princeton, NJ: Princeton University Press.

Good balance between maths and text. Chapters on normal form and sequential games are great but there is not much on social choice and spatial models.

- Dixit, Avinash K., Susan Skeath, and David H. Reiley. 2009. *Games of Strategy.* 3. ed. New York: Norton.
  This is an easy to read albeit somewhat lengthy introduction in English.

- Hinich, Melvin J. and Michael C. Munger. 1997. Analytical Politics. Cambridge: Cambridge University Press.
  This is an easy to read intro in spatial models and social choice.

- Osborne, Martin and Ariel Rubinstein. 2020. Models in Microeconomic Theory. Open Book Publishers.
  Somewhat advanced though highly accessible. Full text of the book is freely available in electronic form here.

Course Calendar

Weeks 1/2: Normal Form Games, Dominance, and Nash Equilibrium (Ch. 1 & 2)

Topics: introduction, normal-form games, dominance, best response, Nash equilibrium

Reading (pick one or two of the following books): McCarty/Meirowitz ch. 5.1 & 5.2, Tadelis ch. 3-5, Morrow ch. 4, or Osborne ch. 2

Week 3/4: Mixed and continuous strategies (Ch. 3 & 4)

Topics: mixed strategies, Nash theorem, games with parameters, continuous strategies, refinements

Reading (pick one or two): McCarty/Meirowitz ch. 5.3-5.13, Tadelis ch. 6, Morrow ch. 4, or Osborne ch. 4

Week 5: no class

Week 6: Extensive Form Games and Subgame Perfection (Ch. 5 & 6)

Topics: extensive form games, subgames, information sets, perfect and complete information, subgame perfect equilibrium, one-shot deviation principle

Reading (again, pick the book you feel most comfortable with): McCarty/Meirowitz ch. 7, Tadelis ch. 7-9, Morrow ch. 3 & 5, or Osborne ch. 5

Week 7: Perfect Bayesian Equilibrium and Incomplete Information Games (Ch. 7 & 8)

Topics: Bayes' rule, beliefs, weak consistency, Perfect Bayesian equilibrium

Reading: McCarty/Meirowitz ch. 8.1, Tadelis ch. 15 & 16, Morrow ch. 6 & 8, or Osborne ch. 10

Week 8: Signaling games (Ch. 9)

Topics: signaling games, pooling and separating equilibria

Reading: McCarty/Meirowitz ch. 8.2, Tadelis ch. 15 & 16, Morrow ch. 6 & 8, or Osborne ch. 10

Week 9: Cheap talk and Delegation (Ch. 10)

Topics: cheap talk, delegation games, adverse selection and moral hazard

Reading: McCarty/Meirowitz ch. 8.4 & 8.5, Tadelis ch. 18, Morrow ch. 6 & 8, or Osborne ch. 10

Week 10: Preferences and Decisions Under Risk (Ch. 11 & 12)

Topics: preferences, weak orderings, maximal set, utility functions, single-peaked preferences, uncertainty and risk, lotteries, St Petersburg paradox, risk behavior

Reading: McCarty/Meirowitz ch. 2, Tadelis ch. 1 & 2, Morrow ch. 2

Week 11: Expected Utility Framework and Its Limits (Ch. 13)

Topics: expected utility, Von Neumann-Morgenstern theorem, Allais' paradox, prospect theory, heuristics

Reading: McCarty/Meirowitz ch. 3, Tadelis ch. 2, Morrow ch. 2

Week 12: Finitely and Infinitely Repeated Games (Ch. 14)

Topics: collective action, discounting, finitely and infinitely repeated games, grim trigger, tit-for-tat

Reading: McCarty/Meirowitz ch. 9.1-9.3 (see also ch. 2.5 on discounting), Tadelis ch. 10.1-10.3, Morrow ch. 9 (p. 260-8), Dixit ch. 11, Osborne ch. 14

Week 13: Bargaining (Ch. 15)

Topics: Rubinstein model, Baron-Ferejohn model

Reading: McCarty/Meirowitz ch. 10.2 & 10.3, or Morrow ch. 5 (p. 145-156)

Week 14: Social choice (Ch. 16)

Topics: aggregation rules, Condorcet paradox, Arrow theorem, Black's theorem, winset, core, median voter theorem, chaos theorem

Reading: McCarty/Meirowitz ch. 4.1 & 4.2, McCarty/Meirowitz ch. 4.3, Hinich/Munger ch. 2 & 3, Hinich/Munger ch. 5