

PLSC 518. Introduction to Game Theory

Spring 2019

Syllabus (this draft: April 5, 2019)

Professor Alexandre Debs
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Class: MW 9.25-10.15am, Rosenkranz Hall, 115 Prospect St., Room 05.
Office Hours: MT 4-5pm, Rosenkranz Hall, 115 Prospect St., Room 311.
Book directly at <https://calendly.com/alexdebs/15min/>.

Teaching Fellow:

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Sections: M 10.30-11.30am, Rosenkranz Hall, 115 Prospect St., Room 301.

Office Hours: W 10.30-11.30am, Rosenkranz Hall, 115 Prospect St., Room 220.

This course provides an introduction to game theory for graduate students in political science. Game theory is a set of mathematical tools used to understand strategic interactions, where one person's best course of action depends on the behavior of others. The course provides an introduction to the "science" and the "art" of game theory, discussing how to solve games and how to create them to represent strategic situations and shed new light on political events. Applications are taken from international relations, with a review of the First World War, the Second World War, and tensions in the nuclear age (nuclear crises and nuclear proliferation, the Cuban Missile Crisis, and the 2003 U.S.-led invasion of Iraq). Students are assumed to have taken the Political Science Math Camp and the semester-long "Mathematics for Political Science."

Texts and References

There are two main books used in this class.

- Osborne, Martin J. 2004. *An Introduction to Game Theory*. New York, N.Y.: Oxford University Press.
- Watson, Joel. 2013. *Strategy: An Introduction to Game Theory*. Third Edition. New York, N.Y.: W.W. Norton & Company.

Watson (2013) is required for the course. Osborne (2004) is recommended for the course. Both textbooks are available at the Yale Bookstore, 77 Broadway at York Square, where new copies are sold for \$124 and \$147.95, respectively. Copies are also put on reserve at CSSSI, for 2-hour loans (the library has the second edition of Watson's *Strategy*). There are many good textbooks in game theory, including the following:

- Fudenberg, Drew and Jean Tirole. 1991. *Game Theory*. Cambridge, MA: MIT Press.
- Gibbons, Robert. 1992. *Game Theory for Applied Economists*. Princeton, N.J.: Princeton University Press.
- Kydd, Andrew H. 2015. *International Relations Theory: The Game-Theoretic Approach*. Cambridge, U.K.: Cambridge University Press.
- McCarty, Nolan and Adam Meirowitz. 2007. *Political Game Theory: An Introduction*. New York, NY: Cambridge University Press.
- Morrow, James D. 1994. *Game Theory for Political Scientists*. Princeton, N.J.: Princeton University Press.

Other references below will be available on Canvas. Note that the use of any electronic devices, including laptop computers, tablets, and phones is not allowed during lectures or sections. Please plan to take notes using pen and paper. Lecture slides will be made available on Canvas shortly after class, at the latest.

Course Requirements

The course grade is a combination of participation (10%), one topic review and presentation (10%), problem sets (20%), a midterm exam (25%), and a final exam (35%).

Participation (10%): Students are expected to attend lectures and sections and actively participate in discussions in class and in sections.

Topic Review and Topic Presentation (10%): A topic review is a short written assignment (no longer than six pages, double-spaced, excluding the bibliography) which should summarize three articles on a narrow topic, explain their contribution, the questions that remain unresolved and an approach, using game-theoretic tools seen in class, to address these shortcomings. The list of papers is due on Wednesday March 6. The topic review itself is due on Wednesday April 17. Students will present their topic review during the week of April 22.

Problem Sets (20%): Problem sets test the student's understanding of the solution concepts seen in class. Problem sets are handed out more or less on a weekly basis. Students can consult each other in working on the solutions, but every student must submit his/her own answer in his/her own words/formulae. Problem sets get a late penalty for missing the deadline, and cannot be accepted after solutions are posted on the course website.

Midterm Exam (25%): The midterm exam is scheduled for Wednesday, February 27.

Final exam (35%): The final exam will take place on Wednesday, May 1, 9am-12noon, in Rosenkranz Hall, room 202.

Academic Integrity

Students should be familiar with the University's policies on academic integrity and plagiarism (consult the relevant section of the Yale College Writing Center here).

Course Outline

1. Introduction

- **The Theory of Rational Choice** (Monday January 14)

Required Reading

- Osborne. 2004. Chapter 1; Watson. 2013. Chapter 1.

- **Strategies, the Normal Form, and Best Responses** (Wednesday January 16)

Required Reading

- Watson. 2013. Chapters 3, 4, and 6.

Recommended Reading

- Osborne. 2004. Chapter 2, pp. 13-21;
- Watson. 2013. Chapter 5.

- **Nash Equilibrium** (Friday January 18)

Required Reading

- Watson. 2013. Chapter 7 and Chapter 9, pp. 95-104.

Recommended Reading

- Osborne. 2004. Chapter 2, pp. 21-47, 50-54.

Monday January 21: no class (Martin Luther King, Jr. Day).

- **Mixed Strategy Nash Equilibrium** (Wednesday January 23)

Required Reading

- Osborne. 2004. Chapter 4, pp. 111-114;
- Watson. 2013. Chapter 11.

Recommended Reading

- Osborne. 2004. Chapter 4, pp. 99-111.

- **Algorithm for Finding Nash Equilibria** (Monday January 28)

Required Reading

- Osborne. 2004. Chapter 4, pp. 137-142.

Recommended Reading

- Osborne. 2004. Chapter 4, pp. 120-23.

- **The Role of Game Theory in International Relations** (Wednesday January 30)

Required Reading

- Debs, Alexandre. 2017. “The Empirical Promise of Game Theory,” *The Oxford Encyclopedia of Empirical International Relations*, William Thompson, ed. (forthcoming). Oxford: Oxford University Press. Digital version at <http://politics.oxfordre.com/>.
- Powell, Robert L. 1999. *In the Shadow of Power: States and Strategies in International Politics*. Princeton, N.J.: Princeton University Press, pp. 23-39.

Recommend Reading

- Clarke, Kevin A. and David M. Primo. 2012. *A Model Discipline: Political Science and the Logic of Representations*. Oxford: Oxford University Press.
- Goemans, H.E. and William Spaniel. 2016. “Multimethod Research: A Case for Formal Theory.” *Security Studies*, Vol. 25, No. 1, pp. 25-33.
- Lorentzen, Peter, Taylor M. Fravel, and Jack Paine. 2017. “Qualitative Investigation of Theoretical Models: The Value of Process Tracing.” *Journal of Theoretical Politics*. Vol. 29, No. 3, pp. 467-491.

2. The First World War

- **Planning for War** (Monday February 4)

Required Reading

- Trachtenberg, Marc. 1991. *History and Strategy*. Princeton, N.J.: Princeton University Press. Chapter 2. “The Coming of the First World War: A Reassessment,” pp. 47-99.

Recommend Reading

- Keegan, John. 1999. *The First World War*. New York: Alfred A. Knopf. Chapter Two: War Plans, pp. 24-47.
- Copeland, Dale A. 2000. *The Origins of Major War*. Ithaca, NY: Cornell University Press. Chapter 4. “The July Crisis and the Outbreak of World War I,” pp. 79-117
- Zuber, Terence. 1999. “The Schlieffen Plan Reconsidered,” *War in History*, Vol. 6, no. 3, pp. 262-305.
- Lieber, Keir A. 2007. “The New History of World War I and What It Means for International Relations Theory,” *International Security*, Vol. 32, No. 2, pp. 155-191.

- Snyder, Jack and Keir A. Lieber. 2008. “Correspondence: Defensive Realism and the “New” History of World War I,” *International Security*, Vol. 33, No. 1, pp. 174-194.
 - Ehlert, Hans, Michael Epkenhans, and Gerhard P. Gross. 2014. *The Schlieffen Plan: International Perspectives on the German Strategy for World War I*. Lexington, Kentucky: University Press of Kentucky.
 - Jervis, Robert, Marc Trachtenberg, Dale C. Copeland, and Stephen A. Schuker. 2017. “New Light on 1914?” H-Diplo Forum, No. 16.
 - Tanenbaum, Jan Karl. 2014 [1986]. “French Estimates of Germany’s Operational War Plans,” in *Knowing One’s Enemies: Intelligence Assessment before the Two World Wars*, edited by Ernest R. May, pp. 150-171. Princeton, N.J.: Princeton University Press. Available electronically here.
- **War of Attrition** (Wednesday February 6)
 - Required Reading
 - Osborne. 2004. Chapter 3, pp. 70-80.
 - Recommended Reading
 - Watson. 2013. Chapter 27, pp. 363-368.
- **Subgame Perfection** (Monday February 11)
 - Required Reading
 - Watson. 2013. Chapters 14 and 15, pp. 183-192.
 - Recommended Reading
 - Osborne. 2004. Chapter 5, pp. 153-173.
- **Repeated Games** (Wednesday February 13)
 - Required Reading
 - Watson. 2013. Chapter 22.
- **Fighting in the First World War** (Monday February 18)
 - Required Reading
 - Hastings, Max. 2013. *Catastrophe 1914: Europe Goes to War*. New York: Alfred A. Knopf. Chapter 18: Silent Night, Holy Night, pp. 541-566.
 - Axelrod, Robert. 1984. *The Evolution of Cooperation*. New York: Basic Books: 3-24, 73-87.

3. The Second World War

- **Bargaining** (Wednesday February 20)

Required Reading

- Watson. 2013. Chapter 19.

- **Incomplete Information, Bayesian Nash Equilibrium** (Monday February 25)

Required Reading

- Watson. 2013. Chapters 24, 26.

Recommended Reading

- Osborne. 2004. Chapter 9, pp. 273-282, 285-287.

Midterm Exam: Wednesday February 27

- **Information, Commitment Problems, and War** (Monday March 4)

Required Reading

- Fearon, James D. 1995. “Rationalist Explanations for War.” *International Organization*. Vol. 49, No. 3, pp. 379-414.

Recommended Reading

- Powell, Robert. 2006. “War as a Commitment Problem.” *International Organization*. Vol. 60, No. 1, pp. 169-203.

- **1938-1940. The Munich Conference and The Phoney War** (Wednesday March 6)

Required Reading

- Parker, R. A. C. 1993. *Chamberlain and Appeasement: British Policy and the Coming of the Second World War*. London: Macmillan. Chapter 8. “Munich,” pp. 156-181.
- Mearsheimer, John J. 1983. *Conventional Deterrence*. Ithaca, N.Y.: Cornell University Press. Chapters 3 and 4, “The Allied Decision *Not* to Attack Germany, March 1939-May 1940” and “The German Decision to Attack in the West, 1939-1940,” pp. 67-133.

Recommended Reading

- Tooze, Adam. 2006. *The Wages of Destruction: the Making and Breaking of the Nazi Economy*. Longman: Penguin. Introduction, pp. 1-33.
- Weinberg, Gerhard L. 1992. “Germany and Munich.” in Maya Latynski, ed. *Reappraising the Munich Pact: Continental Perspectives*. Washington, D.C.: Woodrow Wilson Center Press, pp. 9-20.

Monday March 11, Wednesday March 13, Monday March 18, Wednesday March 20:
no class (Spring recess).

• **1940-1941. The Pacific Theater, the U.S. Entry into the War** (Monday March 25)

Required Reading

- Kershaw, Ian. 2007. *Fateful Choices: Ten Decisions That Changed the World, 1940-1941*. New York: The Penguin Press. Chapter 9. “Berlin, Autumn 1941. Hitler Declares War on the United States.” pp. 382-430.
- Monteiro, Nuno P. and Alexandre Debs. 2018. “An Economic Theory of War.” *Journal of Politics* (forthcoming).

Recommend Reading

- Barnhart, Michael A. 1987. *Japan Prepares for Total War: The Search for Economic Security, 1919-1941*. Ithaca, N.Y.: Cornell University Press.
- Copeland, Dale C. 2015. *Economic Interdependence and War*. Princeton, N.J.: Princeton University Press. Chapter 5. “The Russian Problem and the Onset of the Pacific War, March-December 1941.” pp. 184-246.
- Heinrichs, Waldo. 1990. “The Russian Factor in Japanese-American Relations, 1941.” In Hilary Conroy and Harry Wray, eds. *Pearl Harbor Reexamined: Prologue to the Pacific War*. Honolulu: University of Hawaii Press. pp. 163-177
- Iriye, Akira. 1987. *The Origins of the Second World War in Asia and the Pacific*. New York: Longman.
- Keegan, John. 1989. *The Second World War*. London: Hutchinson. Chapter 12. “Tojo’s Strategic Dilemma.” pp. 240-250.
- Watson. 2013. Chapter 21.

• **The Nuclear Attacks on Hiroshima and Nagasaki** (Wednesday March 27)

Required Reading:

- Sherwin, Martin. 2003. *A World Destroyed: Hiroshima and Its Legacies*. Stanford, CA: Stanford University Press. Chapters 8 and 9 (pp.193-238).

Other Reading

- Alperovitz, Gar. 1995. “Hiroshima: Historians Reassess.” *Foreign Policy*. 99 (Summer): 15-34.
- Bernstein, Barton J. 1995. “The Atomic Bombings Reconsidered.” *Foreign Affairs*. 74(1): 135-152.
- Hersey, John. 1966. *Hiroshima*. New York, N.Y.: A. A. Knopf.

- Rhodes, Richard. 1986. *The Making of the Atomic Bomb*. New York, N.Y.: Simon and Schuster. Chapter 19 (pp. 679-747).
- Stimson, Henry L. 1947. “The Decision to Use the Atomic Bomb.” *Harper’s Magazine*. 194 (1161): 97-107.
- Walker, J. Samuel. 2005. “Recent Literature on Truman’s Atomic Bomb Decision: A Search for Middle Ground.” *Diplomatic History*. 29(2): 311-334.

4. The Nuclear Age

- **Arms Races in the Early Nuclear Age. The Soviet Atomic Bomb and the Hydrogen Bomb** (Monday April 1)

Required Reading

- Wells, Samuel F., Jr. 1979. “Sounding the Tocsin: NSC 68 and the Soviet Threat.” *International Security*. Vol. 4, No. 2, pp. 116-158.
- Jervis, Robert. 1978. “Cooperation under the Security Dilemma.” *World Politics*. Vol. 30, No. 1, pp. 167-214.

Recommended Reading

- “General Advisory Committee’s Majority and Minority Reports on Building the H-Bomb.” October 30, 1949. [available on PBS.org here].
- National Security Council Report 68 (NSC-68). April 7, 1950, *Foreign Relations of the United States*. 1950, Vol. I, Document 85, enclosure 2. Available here.
- DeGroot, Gerard J. 2005. *The Bomb: A Life*. Cambridge, MA: Harvard University Press. Chapter 10: “To Little Boy, a Big Brother.” pp. 162-183.
- Holloway, David. 1994. *Stalin and the Bomb: The Soviet Union and Atomic Energy, 1939-1956*. New Haven: Yale University Press. Chapters 10 and 11 (pp. 196-252).
- Rosenberg, David Alan. 1979. “American Atomic Strategy and the Hydrogen Bomb Decision.” *The Journal of American History*. Vol. 66, No. 1, pp. 62-87.

- **Nuclear Deterrence and the Cuban Missile Crisis** (Wednesday April 3)

Required Reading

- Dobbs, Michael. 2008. *One Minute to Midnight: Kennedy, Khrushchev, and Castro on the Brink of Nuclear War*. New York, N.Y.: Alfred A. Knopf. Chapters 1-2 (pp. 3-57).
- Fursenko, Aleksandr and Timothy Naftali. 1997. *“One Hell of a Gamble”: Khrushchev, Castro, and Kennedy. 1958-64*. New York, N.Y.: W.W. Norton and Co. Chapter 14 (pp. 257-289).

- Schelling, Thomas C. 2008 [1966]. *Arms and Influence*. New Haven, CT: Yale University Press. Chapter 2 (pp. 92-125). Available here.

Recommended Reading

- Blanton, Thomas. 2012. “The Cuban Missile Crisis Just Isn’t What It Used to Be.” in *The Global Cuban Missile Crisis at 50: New Evidence from Behind the Iron, Bamboo, and Sugar-cane Curtains, and Beyond*. James G. Hershberg and Christian F. Ostermann (eds.). Wilson Center. Cold War International History Project. Issue 17/18: 11-18.
- Schelling, Thomas C. 2008 [1966]. *Arms and Influence*. New Haven, CT: Yale University Press. Chapters 1 and 2 (pp. 1-91).

• **Beliefs, Information Aggregation** (Monday April 8)

Required Reading

- Watson. 2013. Chapter 27, pp. 368-373.

• **Perfect Bayesian Equilibrium, Signaling** (Wednesday April 10)

Required Reading

- Watson. 2013. Chapters 28, 29.

Recommended Reading

- Osborne. 2004. Chapter 10, pp. 313-336.

• **The 2003 U.S.-led Invasion of Iraq** (Monday April 15)

Required Reading

- Bozo, Frederic. 2016. *A History of the Iraq Crisis: France, the United States, and Iraq, 1991-2003*. Washington, D.C.: Woodrow Wilson Center Press. Chapter 4 “The Negotiations: September-December 2002,” pp. 133-173.
- Debs, Alexandre and Nuno P. Monteiro. 2014. “Known Unknowns: Power Shifts, Uncertainty, and War.” *International Organization*. Vol. 68, No. 1, pp. 1-32.

Recommended Reading

- Bas, Muhammet A. and Andrew J. Coe. 2016. “A Dynamic Theory of Nuclear Proliferation and Preventive War.” *International Organization*. Vol. 70. No. 4, pp. 655-685.
- Brands, Hal and David Palkki. 2011. “Saddam, Israel, and the Bomb: Nuclear Alarmism Justified?” *International Security*. Vol. 36, No. 1, pp. 133-166.
- Brands, Hal and David Palkki. 2011. “Why did Saddam Want the Bomb?” Washington, D.C.: Foreign Policy Research Institute. Available here.

- Braut-Hegghammer, Malfrid. 2016. *Unclear Physics: Why Iraq and Libya Failed to Get the Bomb*. Ithaca, N.Y.: Cornell University Press.
- Debs Alexandre, Nuno P. Monteiro, and David A. Lake. 2013. “What Caused the Iraq War? A Debate.” Duck of Minerva online. July 30 - August 6.
- Debs, Alexandre and Nuno P. Monteiro. 2017. *Nuclear Politics: The Strategic Causes of Proliferation*. Chapter 2, “A Strategic Theory of Nuclear Proliferation.” pp. 33-60.
- Duelfer, Charles. 2004. *Key Findings of the Comprehensive Report of the Special Advisor to the DCI on Iraq’s WMD*.
- Ehrenberg, John, J. Patrice McSherry, Jose Ramon Sanchez, and Caroleen Marji Sayej. 2010. *The Iraq Papers*. New York: Oxford University Press. Chapter 2 “Organizing for Preemptive War: Iraq and the Presidency of George W. Bush,” pp. 52-115.
- Jervis, Robert. 2010. *Why Intelligence Fails: Lessons from the Iranian Revolution and the Iraq War*. Ithaca, N.Y.: Cornell University Press. Chapter 3 “The Iraq WMD Intelligence Failure: What Everyone Knows Is Wrong,” pp. 123-155. Available here.
- Lake, David A. 2010/2011. “Two Cheers for Bargaining Theory: Assessing Rationalist Explanations of the Iraq War.” *International Security*. Vol. 35, No. 3, pp. 7-52.
- Thompson, Alexander. 2009. *Channels of Power: The U.N. Security Council and U.S. Statecraft in Iraq*. Ithaca, N.Y.: Cornell University Press. Chapter 5 (pp. 133-162). Available here.
- Woods, Kevin M., David D. Palkki and Mark E. Stout. 2011. *The Saddam Tapes: The Inner Workings of a Tyrant’s Regime, 1978-2001*. New York, N.Y.: Cambridge University Press.

● **Nuclear Proliferation** (Wednesday April 17)

Required Reading

- Debs, Alexandre and Nuno P. Monteiro. 2017. “Conflict and Cooperation on Nuclear Non-Proliferation.” *Annual Review of Political Science*, Vol. 20, pp. 331-349.
- Sagan, Scott D. 1996-1997. “Why Do States Build Nuclear Weapons?: Three Models in Search of a Bomb.” *International Security*, Vol. 21, No. 3, pp. 54-86.

Recommended Reading

- Sagan, Scott D. 2011. “The Causes of Nuclear Weapons Proliferation.” *Annual Review of Political Science*, Vol. 14, No. 1, pp. 225-244.
- Debs, Alexandre and Nuno P. Monteiro. 2017. *Nuclear Politics: The Strategic Logic of Proliferation*. New York: Cambridge University Press. Chapters 1-2.

5. Conclusion

- Monday April 22: **Review Session**
- Wednesday April 24: **Topic Presentations**

Final exam: Wednesday, May 1, 9am-12noon, in Rosenkranz Hall, room 202.