

DRAFT
11-29-24

Nuclear Policy

Harris School Course #33510

Winter 2025

Keller 0007

Kennette Benedict, Ph.D., Lecturer

E-mail: kbenedict@alumni.stanford.edu

Office hours: Tuesdays, 1-3 pm and by appointment.

Course Description

“With the unleashing of atomic energy, everything has changed save our way of thinking, and thus we drift toward catastrophe beyond comprehension.” Albert Einstein made this observation in 1953, when the United States and the Soviet Union were pitted against each other in the most dangerous arms race in history with the potential, at its peak, to destroy human civilization and lay waste to the planet. At the same time, the United States and the Soviet Union were also developing peaceful uses of nuclear energy for life-saving medical treatments and for generating electricity. While issues arising from technologies that have both military uses and civilian applications are not new, the nearly incomprehensible damage from nuclear weapons focuses the mind as few other dual-use technologies can.

This course will review the development of nuclear energy for both military and civilian uses. We will examine plans for fighting and avoiding nuclear war, as well as the effects on societies of using nuclear weapons. We will briefly review the history of the international proliferation of nuclear technology and material and explore efforts to curtail the spread of weapons. The second part of the course focuses on the development of civilian nuclear power, its benefits and risks, and on efforts to reduce accidents and dispose of nuclear waste materials. Finally, we will consider the role of citizens in nuclear policymaking.

The course is organized around in-class lectures, readings, videos and podcasts (to be found on Canvas), group discussions and formal debates in a weekly three-hour format. Each week a different team of students will participate in a formal debate on a topic assigned by the instructor and based on the readings and lectures. Two written essays are required in response to dilemmas posed by the instructor.

Course Readings

Required (Please purchase the following books.)

Nuclear Weapons: A Very Short Introduction, Joseph M. Siracusa (Oxford University Press, 2020, 3rd edition)

Nuclear Choices for the Twenty-First Century: A Citizen's Guide, Richard Wolfson and Ferenc Dalnoki-Veress (MIT Press, 2021)

Hiroshima, John Hersey (New York: Bantam Books, 1946, 1986)

Voices from Chernobyl, Svetlana Alexievich. Translated by Antonina W. Bouis (Arum Press, 1999)

Recommended

The Making of the Atomic Bomb, Richard Rhodes (Simon and Schuster, 1986)

The Bomb: Presidents, Generals, and the Secret History of Nuclear War, Fred Kaplan (Simon and Schuster, 2020)

Command and Control: Nuclear Weapons, the Damascus Incident, and the Illusion of Safety, Eric Schlosser (Penguin Press, 2013)

Midnight in Chernobyl, Adam Higginbotham (Simon and Schuster, 2019)

All other course readings, articles, and materials listed in the syllabus are available on Canvas or through the University of Chicago online journals library.

Consult these sites for additional information and useful analysis:

Bulletin of the Atomic Scientists at www.thebulletin.org. Sign up for the electronic newsletter delivered to your inbox.

Arms Control Today at www.armscontrol.org

International Atomic Energy Agency at www.iaea.org

Nuclear Threat Initiative at <https://www.nti.org/analysis/articles/overview-of-the-nuclear-disarmament-resource-collection/>

At the Brink podcasts <https://atthebrink.org>

Course Requirements

1. Participation in formal debates and class discussion will count for 30% of your grade.

Attending and preparing for debate and weekly discussions is a priority.

2. Two essays will count for 70% of your grade.

Each student will write two essays of 1,000 words (about four pages double-spaced) based on the readings and lectures in response to a dilemma posed by the instructor (See Course Outline). **The first essay is due on January 31. The second essay is due on March 7.**

3. Meeting with the instructor in person or by zoom at least once during the quarter is highly recommended.

The instructor will meet with each student in person or by zoom at a mutually convenient time once during the quarter to discuss essays, course material, and answer questions.

Grading

Class participation and formal debates: 30%

Weekly Written essays: 70%

In-person or Zoom meeting with instructor: Highly recommended

ADA Student Accommodations

Any student who believes they may need assistance should inform the Harris Dean of Students office by the end of the first week of class. The Dean of Students office will coordinate any student accommodations with Harris instructors.

Academic Dishonesty: Statement and Penalties

All University of Chicago students are expected to uphold the highest standards of academic integrity and honesty. Among other things, this means that students shall not represent another's work as their own, use un-allowed materials during exams, or otherwise gain unfair academic advantage. All students suspected of academic dishonesty will be reported to the Harris Dean of Students for investigation and adjudication. The disciplinary process can result in sanctions up to and including suspension or expulsion from the University. In addition to disciplinary sanctions, I will impose a grade penalty of "F" for students who have committed academic dishonesty. The Harris policy and procedures related to academic integrity can be found at <https://harris.uchicago.edu/gateways/current-students-policies>. The University of

Chicago Policy on Academic Honesty and Plagiarism can be found at <https://studentmanual.uchicago.edu/academic-policies/academic-honesty-plagiarism/>

Teaching and learning in person

This course is planned as an in-person experience, and students are expected to attend class at the Keller Center, with some exceptions as discussed below. Our practices and expectations include the following:

- Wearing face masks to prevent transmission of Covid-19 is optional. Please respect those who do wish to wear masks. If University guidance changes during the quarter, I will inform you about any new requirements.
- Please display your name tent at every class so that I can more easily call on you by name.

That said, public health and/or personal health circumstances vary across individual members of the University community and may change abruptly with limited notice. Students, TAs, and instructors may need to participate remotely for a short time. To guide expectations and plans, please note the following:

- **If you are experiencing COVID-19 symptoms or are required to isolate, please do not come to class.**
 - As soon as possible, contact me or the TA by email if you cannot attend class for this reason.
 - Students missing class for short spells during the term are encouraged to watch class on Zoom either live or via recordings of class sessions, and otherwise participate in class as fully as possible, health permitting.
- **If I find that I cannot teach in person at some point during the term, I will communicate this as soon as possible to all the relevant stakeholders, including students.**
 - Health permitting, I will teach remotely via Zoom on such occasions.
 - Students can attend class in the Keller Center but would participate via Zoom on such days. Students can also attend remotely from home (or any other location that is devoid of distractions).

Video and Audio Recordings

By attending course sessions, students acknowledge that:

i. They will not:

- (i) record, share, or disseminate University of Chicago course sessions, videos, transcripts, audio, or chats;
- (ii) retain such materials after the end of the course; or
- (iii) use such materials for any purpose other than in connection with participation in the course.

- ii. They will not share links to University of Chicago course sessions with any persons not authorized to be in the course session. Sharing course materials with persons authorized to be in the relevant course is permitted. Syllabi, handouts, slides, and other documents may be shared at the discretion of the instructor.
- iii. Course recordings, content, and materials may be covered by copyrights held by the University, the instructor, or third parties. Any unauthorized use of such recordings or course materials may violate such copyrights.
- iv. Any violation of this policy will be referred to the Area Dean of Students.

Using Artificial Intelligence or Large Language Models

This course places a premium on thinking through questions about the most destructive technology on Earth. It requires that you become familiar with the history of nuclear weapons, policies developed to prevent their use, and the moral consequences and ethical dilemmas that nuclear weapons and civilian nuclear power present. The required essays offer opportunities for students to think through some of these issues and to reflect on the readings, lectures, and class discussions over our nine weeks together. Therefore, use of tools like Chat GPT, Bard, and Llama 2, for example, are not compatible with the goals of the course and would interfere with student learning and may limit students' understanding of the material. If you have questions about this approach, please contact me. If you would like help in crafting essays, please contact the Harris School Writing Workshop. <https://harris.uchicago.edu/student-life/dean-of-students-office/writing-workshop>

Course Outline: Readings and Assignments

Week 1: Introduction

Joseph M. Siracusa, *Nuclear Weapons: A Very Short Introduction*, chapters 1, 2, 3, 4

Report of the Committee on Political and Social Problems to the U.S. Secretary of War, June 1945 (Also known as the Franck Report) <https://sgp.fas.org/eprint/franck.html>

View the documentary *The Day After Trinity* by Jon Else
<https://www.youtube.com/watch?v=FNbhfKeOO5k>

Richard Wolfson and Ferenc Dalnoki-Veress, *Nuclear Choices for the Twenty-First Century*, chapter 12.

For the basics of nuclear fission and radiation see chapters 2, 3, 4, 5

Special note: For the history of the origins of the atomic bomb at the University of Chicago, take a tour of the Main Quad and the “Sites of the Manhattan Project.” Use the “Ranger in Your Pocket” feature at the Atomic Heritage Foundation and find the University of Chicago at www.atomicheritage.org Highly recommended!

Week 2: Effects of Using Nuclear Weapons

John Hersey, *Hiroshima*, entire

At the Brink, Episode 8, Hibakusha: Survivors of the Bomb (podcast)

Wolfson and Dalnoki-Veress, chapter 13

Francois Diaz-Maurius, “Nowhere to Hide,” *Bulletin of the Atomic Scientists*, October 20, 2022. https://thebulletin.org/wp-content/uploads/2022/11/NowhereToHide_EnglishPDFTranslation-1.pdf?utm_source=Website&utm_medium=Article&utm_campaign=NowhereToHideENGpdf

Lynn Eden, “City on Fire,” *Bulletin of the Atomic Scientists*, January/February 2004, pp. 32-27, 40-43 <https://www.tandfonline.com/doi/abs/10.1080/00963402.2004.11460746>

Lesley M. M. Blume, “U.S. Nuclear Testing’s Devastating Legacy Lingers 30 years after Moratorium,” *National Geographic*, September 22, 2022
<https://www.nationalgeographic.com/history/article/us-nuclear-testings-devastating-legacy-lingers-30-years-later?fbclid=IwAR2IsLcOpZg2GmA7a5cf63ik8lli8Qe1gXqynaIOiwtgKd8X8vNjFa5fzOW>

Alex Wellerstein, Nukemap, <http://nuclearsecrecy.com/nukemap/>

Week 3: Avoiding Nuclear War: Deterrence

Siracusa, *Nuclear Weapons*, chapter 5, 6, 7

Wolfson and Dalnoki-Veress, chapters 14, 15, 17

Benoit Pelopidas, "A Bet Portrayed as a Certainty: Reassessing the Added Deterrent Value of Nuclear Weapons in *The War that Must Never be Fought: Dilemmas of Nuclear Deterrence*, ed. by George P. Schultz and James E. Goodby, Hoover Institution Press: Stanford CA

James E. Doyle, "Inhumanity of Nuclear Deterrence," *Bulletin of the Atomic Scientists* 75:2, 85-91 (<https://doi.org/10.1080/00963402.2019.1580893>)

At the Brink, Season 1, Episode 1, "Seek Immediate Shelter: Nuclear False Alarms" (podcast)

Recommended: Eric Schlosser, "World War Three, By Mistake," *The New Yorker*, December 23, 2016 <https://www.newyorker.com/news/news-desk/world-war-three-by-mistake/>

Week 4: Avoiding Nuclear War: Restraint and Disarmament

Wolfson and Dalnoki-Veress, chapters 18, 19, 20

Nina Tannenwald, "Stigmatizing the Bomb: Origins of the Nuclear Taboo," *International Security* Vol 29 Issue 4 Spring 2005, pp. 5-49
<https://direct.mit.edu/isec/article-abstract/29/4/5/11828/Stigmatizing-the-Bomb-Origins-of-the-Nuclear-Taboo?redirectedFrom=fulltext>

Alexei Arbatov, "Saving Nuclear Arms Control," *Bulletin of the Atomic Scientists*, April 2016 www.tandfonline.com/doi/full/10.1080/00963402.2016.1170393

Sanders-Zakre, Alicia, "Nuclear Weapons Ban Treaty to Enter into Force," <https://www.armscontrol.org/act/2020-11/features/nuclear-weapons-ban-treaty-enter-into-force-whats-next>

WRITTEN ESSAY DUE FRIDAY, JANUARY 31

Question: Should political leaders rely on deterrence to prevent nuclear war, but risk nuclear weapons use due to miscalculation, misperception, or accident, or should they reduce nuclear weapons risk by strengthening treaties, norms of restraint, and international cooperation, but risk nuclear weapons use if countries break out of international treaties and agreements?

Week 5: Contemporary Challenges: Three-Way Arms Race, Conflict in Europe, Cyber and AI

Charles Glaser, James M. Acton, and Steve Fetter, “The U.S. Nuclear Arsenal Can Deter Both China and Russia,” *Foreign Affairs*, October 5, 2023

<https://www.foreignaffairs.com/united-states/us-nuclear-arsenal-can-deter-both-china-and-russia>

Listen to the podcast, *At the Brink*, Season 1, Episode 4, Modernizing Doomsday: The True Cost of Our Nuclear Arsenal <https://atthebrink.org/podcast/modernizing-doomsday-the-true-cost-of-our-nuclear-arsenal/>

Recommended: Tong Zhao, “Why the United States Should Discuss Mutual Nuclear Vulnerability with China,” pp. 71-81, in *U.S.-China Mutual Vulnerability: Perspectives on the Debate*, edited by David Santoro, *Pacific Forum*, May 2022. <https://pacforum.org/wp-content/uploads/2022/05/Issues-Insights-Vol.-22-SR-2.pdf>

Recommended: “The New Nuclear Age”, *Scientific American*, December 2023 <https://www.scientificamerican.com/report/the-new-nuclear-age/>

Keir A. Lieber and Daryl G. Press, “The Return of Nuclear Escalation,” *Foreign Affairs*, November/December 2023.

<https://www.foreignaffairs.com/united-states/return-nuclear-escalation>

Alexander K. Bollfrass and Stephen Herzog, “The War in Ukraine and Global Nuclear Order,” *Survival*, vol. 64, no. 4, August-September 2022 pp. 7-32

<https://doi.org/10.1080/00396338.2022.2103255>

Richard Clarke, Nuclear Weapons and Cyber Security

<https://www.nti.org/news/new-video-breaks-down-the-cyber-nuclear-threat/>

Maike Verbruggen, “The Impact of Artificial Intelligence on Nuclear Weapons and Warfare” in *The Extensive Role of Artificial Intelligence in Military Transformation*, Stockholm International Peace Research Institute Apr. 1, 2020, pp. 11-16.

<https://www.jstor.org/stable/resrep24515.8>

Week 6: Developing Civilian Nuclear Power

Wolfson and Dalnoki-Veress, chapters 6 and 7

Recommended: Wolfson and Dalnoki-Veress, chapter 11 on nuclear fusion technology

Leonard Weiss, “Atoms for Peace,” *Bulletin of the Atomic Scientists*, November/December 2003, Vol. 59, No. 6, pp. 34-44 DOI: 10.2968/059006009 <https://www.tandfonline.com/doi/epdf/10.1080/00963402.2003.11460728?needAccess=true>

International Atomic Energy Agency, *Energy, Electricity and Nuclear Power Estimates for the Period up to 2050*. Vienna: IAEA. https://www-pub.iaea.org/MTCD/Publications/PDF/RDS-1-42_web.pdf

Week 7: Benefits and Risks of Nuclear Energy

Alex Glaser and Robert Socolow, “Balancing Risks: Nuclear Energy and Climate Change,” *Daedalus*, Fall 2009, pp. 1-14 http://www.princeton.edu/~aglaser/2009aglaser_daedalus.pdf

Francois Diaz-Maurin, “Nuclear Expert Mycle Schneider on the Cop28 Pledge to Triple Nuclear Energy Production,” *Bulletin of the Atomic Scientists*, December 18, 2023 <https://thebulletin.org/2023/12/nuclear-expert-mycle-schneider-on-the-cop28-pledge-to-triple-nuclear-energy-production-trumpism-enters-energy-policy/>

Elisabeth Eaves, “Can North America’s Advanced Nuclear Reactor Companies Help Save the Planet?” *Bulletin of the Atomic Scientists* Vol. 73:1, 27-37, December 2016. <https://doi.org/10.1080/00963402.2016.1265353>

Svetlana Alexievich, *Voices of Chernobyl*, entire

Recommended: Adam Higginbotham, *Midnight in Chernobyl* (Simon and Schuster, 2019) (Also a six-part Netflix series based on the book, “Midnight in Chernobyl.”)

Week 8: Controlling Nuclear Technologies and Materials

Wolfson and Dalnoki-Veress, chapters 8, 9, 10

Tatsujiro Suzuki, “Deconstructing the Zero-Risk Mindset: The Lessons and Future Responsibilities for a post-Fukushima Nuclear Japan,” *Bulletin of the Atomic Scientists*, 67:5, 9-18 <https://doi.org/10.1177/0096340211421477>

Allison Macfarlane, "It's 2050: Do You Know Where Your Nuclear Waste Is?" *Bulletin of the Atomic Scientists*, 2011. <https://DOI:10.1177/0096340211413357>

Laura Rockwood, "How the IAEA Verifies if a Country's Nuclear Program is Peaceful or Not: The Legal Basis," *Bulletin of the Atomic Scientists* 2015 Vol. 71:2
<https://www.tandfonline.com/doi/abs/10.1080/00963402.2018.1507789>

Week 9: Public Opinion and Nuclear Policy

Jonathan Baron, Rebecca Davis Gibbons, and Stephen Herzog, "Japanese Public Opinion, Political Persuasion, and the Treaty on the Prohibition of Nuclear Weapons," *Journal for Peace and Nuclear Disarmament*, December 13, 2020.
<https://doi.org/10.1080/25751654.2020.1834961>

Listen to *At the Brink*, Season 1, Episode 2: The Biscuit and the Football (podcast)

Paul Slovic (2012) The perception gap: Radiation and risk, *Bulletin of the Atomic Scientists*, 68:3, 67-75. <https://doi.org/10.1177/0096340212444870>

Jonathan Baron and Stephen Herzog, "Public Opinion on Nuclear Energy and Nuclear Weapons: The Attitudinal Nexus in the United States," *Energy Research and Social Science*, April 2020. <https://doi.org/10.1016/j.erss.2020.101567>

WRITTEN ESSAY DUE FRIDAY, MARCH 7

Question: Should countries build more nuclear power plants to provide a major energy source without further disrupting the climate, but risk more accidents and proliferation of nuclear weapons to more countries, or should they phase out nuclear power to prevent accidents and the further spread of nuclear weapons, but risk continued climate change?