

NE290D: SPECIAL TOPICS IN NUCLEAR HISTORY, POLITICS, AND FUTURES

Spring 2021

Instructors^a:	Aaron Berliner Jake Hecla Peter Hosemann	Time:	Tue/Thu 3:30-5:00 PM (1.5hr,2x/week)
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^aOffice Hours by Request and via Zoom

Course Description

This course provides an overview of the history of nuclear energy and its interaction with society. It seeks to contextualize the importance of the field at its inception, in current affairs, and in future endeavors. Understanding this history is paramount in internalizing a sense of respect for the fruits of an unlocked atom, as well as its perils.

This class will focus on the history of key developments in the nuclear field, especially those with exceptional relevance to current affairs. We will begin with 20th-century developments in fundamental physics, the Radium era and the lead-up to the Manhattan project, and its oft-ignored foreign counterparts. We will then explore the early atomic age with a look at how the growing tension with the Soviets led to the arms race that dominated foreign policy for decades. Proceeding chronologically, we will discuss the era of strategic bombers, the development of the nuclear submarine, the space race, and the hydrogen bomb (and controversy surrounding it). While we walk along the timeline of key events, we will be exploring the sociological and humanistic aspects of our field through literature that speaks to the tolls of the nuclear complex, nuclear testing, and the growing disillusionment and terror inspired by nuclear technology. We will also explore the neutron bomb, nuclear winter, and the evolution of modern nuclear arsenals.

Readings

Readings for the course will be described in the initial timeline following this basic syllabus. The readings are broken down by week and lecture to help paint a picture for the class direction throughout the semester. All students are expected to have an understanding of all of the readings. The syllabus will be updated frequently.

Assignments and Grading

The class will be graded based on the following:

- Weekly Reading Responses 30%
- Class Participation 20%
- Term Paper 50%

Students will be expected to provide a thoughtful, weekly response of 1 page to the reading materials. We will be reading these responses. Each week, a random selection of students will be asked to share their responses with the class to foster a discussion, so students will need to be prepared to engage and discuss both the literature and their interpretation of it. Assigned reading will be accompanied with either a short quiz given the day before class via bCourses or with a Jeopardy! Match at the start of class. The point of these quizzes is to help students internalize important aspects of the literature. Since class participation factors into your final grade, please read!

Reading/Guest Lecture Responses. Much of the process for becoming conversant in history is active reading. We have prepared readings and generally been able to provide the materials to you. On occasion, we have been able to provide more modern media (audiobooks, videos, etc.) to augment the reading process. Additionally, we have sourced some fantastic guest lecturers. The response prompt will be posted at the end of each class and due the following day. Sometimes it may be as simple as a free write, and other times a specific question will be levied. Please write a thoughtful -1 page response and submit to bCourses. The responses will be public, unless you ask they not be. We will be placing the responses in Miro on our class timeline to illustrate the meta-relationship between the historical timeline and the class learning timeline.

Miro Content Additions. No one likes talking to a snarky fact-spitting party-poopers; so we feel that becoming conversant in history means developing an agency for creatively processing the past in the present for a better future. Or something wise and/or silly like that. To aid in this, we have prepared an interactive Miro board across which we will all be posting materials and adding comments and suggestions. Additionally, we have prepared an immersive Gather.Town environment to bring history to life. When not asked for a response page, you will be asked to add content to Miro that you feel brings the history to life.

Final Project. In the middle of the course, we will break into teams and select a topic on which we will endeavor to write a scholarly article that examines the history, politics, and future of some aspect of the nuclear landscape. An individual's contribution to this final term paper will account for the bulk of the grade.

Attendance and Participation

Obviously since class participation accounts for 25% of your grade, attendance should be considered mandatory. This class is meant to serve as a reprieve from the Nuclear Engineering department's didactic style of pedagogy; **we want you to come prepared to answer and – more importantly – ask questions**¹. If you cannot attend a session because of an emergency and you notify the instructor the day before class, or provide some evidence of the emergency afterward. If you cannot make the zoom-time, time can be arranged to meet with instructors to ensure a sufficient participation score!

Academic Dishonesty & Plagiarism

As a student at Cal, you are responsible for knowing and abiding by the Student Code of Conduct (available online at <http://students.berkeley.edu/uga/conduct.asp>). All work submitted by you and that bears your name is presumed to be your own, original work. You may use others' words or ideas only if you attribute them properly. This means that you identify the original source and extent of your use of the words or ideas of others that you use.

This goal of this course is to improve your critical reading, thinking and writing skills. My accurate evaluation of these skills involves the assumption that your words and ideas are your own. Therefore, using other people's ideas as your own, in addition to being forbidden in the Student Code of Conduct, interferes with the aims of this course; hence my zero- tolerance policy regarding plagiarism. Using words or ideas that are not your own without attributing them, whether in your papers or in-class writing assignments is unacceptable. Not to mention that those who rely on others' ideas, rather than taking the intellectual risk and challenge to develop their own, will not improve as writers and thinkers and will thus probably fail even if they don't get caught. If you are unsure of the expectations for completing an assignment, just ask before you turn in your work! We are more than happy to discuss these matters with you.

ADA and DSP Accommodations

"No one, on the basis of their disability, may be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any UC Berkeley program or activity. The ADA (Americans with Disabilities Act)/504 Compliance Officer is responsible for ensuring that the policies and procedures developed

¹Although, maybe not at once.

by the campus comply with federal, state, and University requirements. The ADA/504 Compliance Officer serves as a resource to those with disabilities who believe that they are not receiving appropriate accommodations or that they are being treated in a discriminatory manner. In addition, the ADA/504 Compliance Officer may set aside or modify an accommodation that is under dispute.” (<https://compliance.berkeley.edu/responsibilities-guide/disability-services>)

The teaching team will take all necessary steps to ensure the classroom and course-related activities are ADA accessible. Please contact the teaching team with any concerns with regard to this.

The UC Berkeley Disabled Students’ Program (DSP) (<http://dsp.berkeley.edu>) provides students with disabilities accommodations to ensure equal opportunity in the classroom. The policy of the university is that testing and teaching accommodations may only be provided to students with a DSP certified Letter of Accommodation. Students with DSP accommodations are encouraged to contact the teaching team as soon as possible to arrange their accommodations. Students with disabilities that have not been provided a Letter of Accommodation by DSP and encouraged to contact DSP as soon as possible, the teaching team can only provide interim accommodations if allowed to do so by DSP.

Inclusivity and a Safe Environment

Every student has the right to learn, regardless of race, color, religion, creed, sex, sexual orientation, gender identity, national origin, ancestry, age, veteran status, disability, genetic information, military service, or other protected status. The teaching team will always strive to make every student feel welcome and safe in the learning environment. All students will treat each other with respect and abide by the UC Berkeley Student Code of Conduct (<http://sa.berkeley.edu/code-of-conduct>). The teaching team will not tolerate behavior that creates a hostile or unsafe learning environment for any of the students.

FERPA and Privacy

“Under the Federal Family Educational Rights and Privacy Act of 1974 (FERPA) and provisions of state law relating to public records disclosure, the University of California Policies Applying to the Disclosure of Information from Student Records and the Berkeley Campus’ implementation of that policy assure Berkeley students the following rights:

1. To inspect and review their student records.
2. To have withheld from public disclosure, absent their prior consent, personally identifiable information from their student records.
3. To inspect records maintained by campus offices concerning disclosure of confidential information from their student records.
4. To seek corrections of their records through a request to amend the records, or a request for a hearing to challenge the content of their records, or to include a written statement therein.
5. To file complaints with the Office of the Chancellor or with the U.S. Department of Education regarding violations of the rights accorded by federal law or University policy.
6. Campus policy defines ‘public records’ which may be released without prior student consent, describes the record access rights of applicants who have not been admitted or enrolled at the Berkeley campus, and describes the conditions under which students may waive the right of access to their records.” (<http://registrar.berkeley.edu/academic-policies-procedures/ferpa>)

The teaching team takes very seriously the FERPA protections of students. The teaching team will not comply with third party requests for student grades, records, or information. If students have any FERPA related concerns they may contact the teaching team or the UC Berkeley Office of the Registrar.

Students may contact the teaching team about personal issues related to course performance. The teaching team will do its best to maintain the confidentiality of this information. However, students should be aware that the teaching team is legally required to report Title IX violations (such as sexual violence and harassment)

to the Office of Prevention of Harassment and Discrimination.

Sexual Violence and Harassment

The teaching team will not tolerate behavior that creates a hostile or unsafe environment for any of the students. The teaching team is legally required to report Title IX violations (such as sexual violence and harassment) to the Office of Prevention of Harassment and Discrimination. Students that have been the victim of sexual harassment or violence should consult the following resources:

Confidential resources:

- The Confidential Care Advocate [For 24-hour hotline (510) 643-2005; for scheduling appointments (510) 642-1988]
- The Social Services branch of the Tang Center [(510) 642-6074; (855) 817-5667 after-hours emergency]

Non-confidential resources:

- - The UC Police Department [911 or (510) 642-3333].
- The Office of the Prevention of Harassment and Discrimination (OPHD) [(510) 643-7985]
- The Gender Equity Resource Center (<http://ejce.berkeley.edu/>)

Week	Date	Lecture	History Reading	Homework (due that day)
1	1/19/21	Introductions exposition, and awful icebreakers		
	1/21/21	Nuclear Prehistory	<i>Faust in Copenhagen (FiC) Intro, Ch. 1,2</i> <i>Atomic Accidents Ch. 1</i> <i>Robison, R. F., and R. F. Mould. "St. Joachimstal: pitchblende, uranium and radon-induced lung cancer." Nowotwory 56.3 (2006): 275-281.</i>	Sign into the Miro. Miro content addition.
2	1/26/21	20th Century Physics Part 1	Badash, Lawrence. "Becquerel's blunder." <i>Social Research: An International Quarterly</i> 72.1 (2005): 31-62. FiC Ch. 3,4	1/2-1 page reflection
	1/28/21	20th Century Physics Part 2	Einstein, Albert. "Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig?" <i>Annalen der Physik</i> 323.13 (1905): 639-641. Bohr, Niels, and John Archibald Wheeler. "The mechanism of nuclear fission." <i>Physical Review</i> 56.5 (1939): 426. FiC Ch. 5,6	Miro content addition.
3	2/2/21	Cyclotron History Guest Lecture by Tim Koeth	Meitner, Lise, and Otto Robert Frisch. "Disintegration of uranium by neutrons: a new type of nuclear reaction." <i>Nature</i> 143.3615 (1939): 239-240. Frayn, Michael. <i>Copenhagen</i> . Bloomsbury Publishing, 2017. (or listen to the audio!) FiC Ch. 7,8	Miro content addition.
	2/4/21	Radium Era Guest Lecture by Carl Willis		Cyclotron-based Miro content addition.
4	2/9/21	20th Century Physics Part 3	FiC Ch. 9,10,11	1/2-1 page reflection on Willis
	2/11/21	Early Manhattan Project	Frisch, Otto Robert. "The Frisch-Peierls Memorandum." <i>The American Atom</i> , University of Pennsylvania Press, Philadelphia (1984). Einstein-Roosevelt-letter The Los Alamos Primer	Miro content addition.
5	2/16/21	Growing up in Los Alamos Guest Lecture by Sarah Schrieber	No reading	Miro content addition.
	2/18/21	German Bomb Project Guest Lecture by Mimi Hiebert	Landsale Document U-Memo	1/2-1 page reflection on Schrieber
6	2/23/21	Morality of First Use Guest Lecture by Alex Wellerstein	Guest Lecture Readings [TBD]	1/2-1 page reflection on Hiebert
	2/25/21	Fermi and the Nuclear Pile	Anderson, Herbert L. "Fermi, Szilard and Trinity." <i>Bulletin of the Atomic Scientists</i> 30.8 (1974): 40-47.	1/2-1 page reflection on Wellerstein
7	3/2/21	Manhattan Project and Oppenheimer	Watch "The Day After Trinity" https://www.youtube.com/watch?v=Vm5fCxXnK7Y	Miro content addition.
	3/4/21	Frenemies - Implications of Exclusion of the Soviets	Abella, Alex. <i>Soldiers of reason: The RAND corporation and the rise of the American empire</i> . Houghton Mifflin Harcourt, 2009. (SoR) Ch. 1	Miro content addition.
8	3/9/21	Soviet Civilian Nuclear Power	SoR Ch. 2,3 Guest Lecture Readings [TBD]	Miro content addition.

		Guest Lecture by Sonia Schmid		
	3/11/21	Early Nonproliferation Guest Lecture by Anne Harrington	SoR Ch. 3,4	1/2-1 page reflection on Schmid
9	3/16/21	Soviet Bomb Project	SoR Ch. 5,6	1/2-1 page reflection on Harrington
	3/18/21	Nuclear Weapon Effects and the Super	Goncharov, German A. "American and Soviet H-bomb development programmes: historical background." <i>Physics-Uspekhi</i> 39.10 (1996): 1033. SoR Ch. 7,8	Miro content addition.
10	3/30/21	Nuclear History from a Historian Guest Lecture by Richard Rhodes [Tentative]	Rhodes, Richard. "Dark sun: the making of the hydrogen bomb." (1996): 829-831. (Rhodes) (TBD)	Miro content addition.
	4/1/21	RAND	SoR Ch. 9,10,11	1/2-1 page reflection on Rhodes
11	4/6/21	Nuclear Colonialism Guest Lecture by Marty Pfeiffer	Guest Lecture Readings [TBD]	Miro content addition.
	4/8/21	ARGUS and The Outer Space Treaty	Ireland, Northern. "Treaty on principles governing the activities of states in the exploration and use of outer space, including the moon and other celestial bodies." (1967). Christofilos, NCr. "The argus experiment." <i>Journal of Geophysical Research</i> 64.8 (1959): 869-875. How the World Learned About the Pentagon's Sky-High Nuclear Testing https://www.theatlantic.com/science/archive/2018/11/operation-argus-how-cold-war-secret-new-york-times/575983/	1/2-1 page reflection on Pfeiffer
12	4/13/21	ABM Systems / ABM Treaty	[TBD]	Miro content addition.
	4/15/21	Espionage or Star Wars (the Reagan one)	[TBD]	Miro content addition.
13	4/19/21	Cooperative Threat Reduction Guest Lecture by Cheryl Rofer	Guest Lecture Readings [TBD]	Miro content addition.
	4/22/21	Nonproliferation in Asia Guest Lecture by Vipin Narang [Tentative]	Guest Lecture Readings [TBD]	1/2-1 page reflection on Rofer
14	4/27/21	Nuclear Winter Guest Lecture by Ed Geist	Robock, Alan, Luke Oman, and Georgiy L. Stenchikov. "Nuclear winter revisited with a modern climate model and current nuclear arsenals: Still catastrophic consequences." <i>Journal of Geophysical Research: Atmospheres</i> 112.D13 (2007). Robock, Alan. "Nuclear winter is a real and present danger." <i>Nature</i> 473.7347 (2011): 275-276. Guest Lecture Readings [TBD]	1/2-1 page reflection on Narang
	4/29/21	Final Project Presentations	BBC Documentary "On the 8th Day" https://www.youtube.com/watch?v=WCTKcd2Ko98	1/2-1 page reflection on Geist