

INTA/NRE 6720-MEK/ERI: Politics, Tech & Proliferation

Course Syllabus Spring 2023
Tuesdays & Thursdays 12:30 – 1:45pm
Habersham Building, G17
Canvas.gatech.edu

Faculty Contact Information:

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Course Description

How should the international community respond to changes that have taken place in the nuclear landscape since the end of the Cold War? There are new nuclear states, growing nuclear arsenals, dying arms control and verification measures, and significant technological advancements, all of which challenge deterrence and nonproliferation frameworks that have governed international politics for the last decades. Is the current regime that relies primarily on deterrence, verification, and detection the best one for the evolving environment? Creative solutions are needed, and they require an interdisciplinary undertaking.

To that end, this seminar course is designed to encourage new thinking and creative effort on nuclear deterrence and strategic stability for our global future. It is project based, where students will work in interdisciplinary teams to design, execute, and present projects that speak to the next generation of deterrence, detection, and verification.

The course is comprised of three parts. The first part offers an introduction to key concepts in both nuclear engineering and international security. Part two offers a deeper dive into relevant treaty, detection, and verification frameworks, including details on the potential implications of emerging technology on the nuclear nonproliferation regime and deterrence in the global political environment. Finally, part three includes a look at the current nuclear proliferation landscape and student independent group project presentations.

Learning Outcomes

By the end of the course, students will be able to:

1. Identify and explain fundamental concepts in nuclear engineering and international security
2. Interpret a variety of emerging technologies and their implications for international security and global proliferation
3. Effectively apply oral communication tools to demonstrate knowledge and make cogent arguments at the intersection of technology and security
4. Effectively apply written communication to showcase knowledge, especially but not exclusively in the policy writing styles
5. Design and execute an independent research project of interest to scientific, engineering, and international security communities
6. Demonstrate knowledge of emerging technology and nuclear proliferation at the interaction of nuclear engineering and international security.

Course Readings

There is no book to purchase in this class. Instead, students will have access to course materials via both the Canvas course website and through Georgia Tech Library databases. The professors maintain discretion to modify readings and topics as necessary. Students are responsible for completing readings PRIOR to coming to class.

Course Requirements and Student Evaluation

Participation - 20%

Students will come to class prepared to engage with the reading material and the lectures. They will ask and answer questions and pose topics for discussion based on the reading material.

Individual Policy Memos - 20%

Twice during the semester (February 20th & April 11th), students will individually prepare short writing assignments designed to engage course topics. Memos must be uploaded to Canvas prior to the class session for which they are due, and students will be prepared to discuss them as part of the session's discussion. Memos must engage some topic germane to the section of the course in which they are due. Additional details will be forthcoming.

Group Project - 60%

Following the introductory sessions and by the fourth week of the semester, students will be organized into interdisciplinary groups to undertake projects designed to problematize and potentially rethink the nuclear regime as it exists. Projects will substantively speak to technical and strategic issues; methodologically, groups have wide latitude to conduct their analysis using all necessary methods.

Group project grades will include both a long form (~2500 word) written analysis, a group policy memo, and an oral presentation. The content of these projects will vary substantively, but all will produce the same deliverables.

Note that each group will receive a grade for this project, though there will be an opportunity for peer evaluation, which can positively or negatively influence your individual grade.

Additional details will be forthcoming throughout the semester, though note that you have the following deliverables to produce, which together sum to 60 points.

Group Project Deliverables:

- Proposal document, **Tuesday, February 13th**: 3-page narrative uploaded to Canvas including aspects of the nuclear nonproliferation regime your project will address and your plans for the project over the course of the semester. (5 points)
- Proposal presentation, **Tuesday, February 13th**: ~15-minute (10-minute remarks + 5-minute Q&A) group presentation of your proposal. Exact schedule to be determined. (5 points)
- Mid-semester project outline, **Tuesday, March 19th**: provide as much detail as possible about how your project will address the strategic, political, and technical obstacles to nuclear nonproliferation based upon your vision of a new or improved regime. (10 points)
- Group policy memo, **Tuesday, April 16th**: single, group policy memo addressed to an appropriate U.S. policy maker of your choosing, describing the policy problem encountered in your project, the policy options, the evaluation thereof, and the recommendation(s). (5 points)
- Final presentation, **Thursday, April 18th**: ~15-minute (10-minute remarks + 5-minute Q&A) group presentation of the project and results. (15 points)
- Final paper, **Friday, April 26th**: a full report including the required components as outlined in class. (20 points)
- Peer evaluation to be completed individually and turned in to the professors alongside the final project, **Friday, April 26th**.

Summary of Course Grades and Breakdown

Participation: 20 points

Individual Memos: 20 points

Group Project: 60

Final Grade: out of 100 total points

We use a traditional grading scale with assignments totaling 100 points:

100-90 A | 89-80 B | 79-70 C | 69-60 D | 50-0 F

No curves should be anticipated for this class.

Late Papers / Penalties / Unexcused Absences

The dates of the course activities and paper assignments are set. Unless you have an approved accommodation, assignments turned in after the deadline will be penalized 10% for each day or fraction thereof where it is late. This means that if you turn in the paper at 5:00 pm instead of 3:30 pm on the day that it is due, you will automatically lose 10% of the total possible points; if you turn it in at 9am on the day after it was due, you will lose 20% and so on and so forth.

Accommodations can be sought in advance of a valid conflict, including, but not limited to, illness such as Covid-19, family or religious obligation, or approved university business, including travel or athletic competition that constitutes “approved Institute activities.” Religious holidays and regular sporting competition are both already on the calendar, so these should be brought to the instructors during the first two weeks of the semester. Subsequently, should an unforeseen, new conflict arise, please contact the instructors immediately and provide the necessary documentation, as offered by the Office of Student Life or relevant healthcare professional. In short, please contact us as soon as possible regarding any conflicts or absences when assignments are due.

Covid-19, Masks, and Illness

Attendance and participation are important to your success in this course. However, we recognize that elements of the global pandemic remain, so we are going to be gracious with ourselves as the situation requires. If you are sick, have been exposed to Covid-19, or your health precludes your from participating in class meaningfully, please stay home. Coming to class sick only risks spreading illnesses. We urge you to do your part to engage in healthy behaviors by abiding by [CDC](#) and [WHO](#) guidelines, which include getting vaccinated for Covid-19, including booster shots, and staying home when sick.

Georgia Tech encourages students to get vaccinated and boosted against Covid-19 to protect against severe disease and to wear a mask according to personal preference and risk tolerance. Additionally, visit <https://health.gatech.edu/coronavirus/institute-operations> for updated school policies regarding Covid-19.

Should circumstances necessitate a return to a virtual environment, additional instructions will be provided. Nevertheless, students will engage with each other respectfully whether in a virtual or in-person format.

Class Discussion Policy

This class is a forum for personal growth, curious discussion, and lively intellectual debate. It is crucial that the spirit of discussion remain open, honest, and respectful even when we disagree. We will always be polite with each other and recognize that even those with whom we disagree have something to contribute to the conversation. Your reflections or suggestions on how to ensure an inclusive learning environment for you individually or for others are always welcome.

Academic Integrity and University Statement on Plagiarism

According to the Georgia Tech Student Affairs Code of Conduct, plagiarism “[includes] submission of material that is wholly or substantially identical to that created or published by another person or persons, without adequate credit notations indicating the authorship.”^[1] It is the act of appropriating the work of another, or parts of passages of his or her writings, or language or ideas of the same, and passing them off as a product of one’s own. It involves the deliberate or accidental use of any outside source without proper acknowledgment. Plagiarism is scholarly misconduct whether it occurs in any work, published or unpublished, or in any application for funding. There is a zero-tolerance policy for plagiarism and penalties will be doled out per university regulations. The [GT Honor Code](#) is available online.

Writing Services

If you are concerned about your writing, or seek to improve it, we highly recommend contacting the [GT Communication Center](#) located in Clough Commons 447. They offer several services from CV development to peer tutoring and are a great resource for all kinds of assignments – oral, written, visual, etc.

Students with Disabilities

Georgia Tech is committed to providing accommodation for all students with disabilities through the [Office of Disability Services](#). Any student in this course who has a disability that may prevent them from fully demonstrating their abilities should contact us via appropriate channels as soon as possible to discuss necessary accommodations to ensure full participation and facilitate their educational opportunities. Students with disabilities must be registered with the Disability Services Program prior to receiving accommodations in this course and provide appropriate documentation attesting to their registration. The Disability Services Program is located in Smithgall Student Services Building, phone 404-894-2563 or TDD 404-894-1664.

Additional Student Resources

The [Center for Academic Success](#) offers a variety of academic support services to help students succeed academically at Georgia Tech (e.g., tutoring, peer-led study groups, study skills, etc.). The [Division of Student Life](#) – often known as the Office of the Dean of Students – offers resources and support for all students in the Tech community. The [Counseling Center](#) offers free mental health services, as well as stress management and wellness workshops to all currently enrolled students. The Counseling Center is located in Smithgall, Suite 238 and are offering virtual and in-person resources.

Technology Policy

Laptops can be a distraction both to ourselves and to our classmates. We are all guilty of multitasking in meetings and otherwise. Please be mindful of your classmates, and come to class prepared to work, discuss, and engage with the material. All cell phones and other devices that make noise must be silenced and put away as soon as class begins.

Course Outline: Subject and Readings Schedule

Background materials are to be learned prior to the course session for which they are listed. Students should be prepared to discuss assignments in the class session on their due date.

N.B.: This schedule and the course content is subject to revision at the professors' discretion. Should modifications become necessary, we will provide as much advanced warning as is possible.

Part I: Introduction and Fundamentals

Week 1

Tuesday, January 9 – Course Introduction

- Drs. Anna Erickson and Maggie Kosal
- Syllabus review and project requirements overview

Thursday, January 11 – Brief History of Nuclear Weapons

- In-class video lecture – Dr. Rachel Whitlark, Sam Nunn School of International Affairs, Georgia Tech
- Background Materials:
 - Freedman, Lawrence. 2003. “The Arrival of the Bomb” in *The Evolution of Nuclear Strategy*. 3rd London: UK: Palgrave Macmillan: Pages 3-20. (Available on Canvas under **Files**)
 - Narang, Vipin. 2014. Chapter 1 in *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict*. Princeton, NJ: Princeton University Press: Pages 1-12. (Available on Canvas under **Files**)
 - Albert Einstein’s Letter to Pres Roosevelt, 2 August 1939, https://www.osti.gov/opennet/manhattan-project-history/Events/1939-1942/einstein_letter.htm (be sure you look at the actual letter, not just the DOE write-up)
 - “Planning Armageddon,” episode 1 of the podcast, *A Most Terrible Weapon*, available here: <https://warontherocks.com/2020/10/planning-armageddon/> and anywhere else you get your podcasts.

Week 2

Tuesday, January 16 – Introduction to Group Project Assignment and Skills Session: How to Write (and Read) a Policy Memo

- Dr. Maggie Kosal, Nunn School of International Affairs, Georgia Tech
- Dr. Anna Erickson, Nuclear and Radiological Engineering, Georgia Tech
- Background Materials:

- Mastro, Oriana. “Teach What You Preach,” *Journal of Political Science Education* (2021), 17:sup1, 326-340, <https://www.tandfonline.com/doi/full/10.1080/15512169.2020.1865990>
- Broad Institute Research Communication Lab, “Policy Memo,” <https://mitcommlab.mit.edu/broad/commkit/policy-memo/>
- *Browse*: DoD 5110.4-M, “Manual for Written Material,” especially sections 7.3 (Action Memoranda) and 7.4 (Info Memoranda) <https://www.esd.whs.mil/CMD/MFWM/>
- *Browse*: State Department Foreign Affairs Manual 5 FAH-1 Correspondence Handbook, especially section 300 on Memoranda <https://fam.state.gov/Volumes/Details/05FAH01>
- *Browse*: Rumsfeld Snowflakes Come in from the Cold, National Security Archive, <https://nsarchive.gwu.edu/briefing-book/foia/2018-01-24/rumsfeld-snowflakes-come-cold>

Thursday, January 18 – TBD

Week 3

Tuesday, January 23 - Fundamentals of Nuclear Technology Part I

- Dr. Anna Erickson, Department of Nuclear and Radiological Engineering, Georgia Tech
- Nuclear technology and reactor types
- Background Materials:
 - Introduction into basic physics (1-hr lecture) by Prof. Steve Biegalski, Georgia Tech: <https://eti.gatech.edu/eti101/>

Thursday, January 25 – Fundamentals of Nuclear Technology Part II

- Dr. Abdalla Abou Jaoude, Advance Reactor Core Analyst at Idaho National Laboratory *Advanced Reactor Design and Proliferation*
- Background Materials:
 - General Background on Advanced Nuclear Reactors: <https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/generation-iv-nuclear-reactors.aspx>
 - VTR Project: <https://www.sciencemag.org/news/2019/02/departement-energy-moves-forward-controversial-test-reactor>
 - ARDP Award: <https://www.powermag.com/doe-picks-more-ardp-winners-one-or-more-advanced-nuclear-demonstrations-will-be-in-washington-state/>
 - Microreactor - Civilian Use:
 - <https://inl.gov/trending-topic/microreactors/#:~:text=A%20microreactor%20is%20a%20small,provide%20heat%20for%20industrial%20applications>
 - <https://www.energy.gov/ne/articles/what-nuclear-microreactor>

- Microreactors - Military Use:
<https://www.defense.gov/Newsroom/Releases/Release/Article/2105863/dod-awards-contracts-for-development-of-a-mobile-microreactor/>
- Nuclear Rockets - Civilian Use:
<https://www.cnn.com/2021/02/03/world/nuclear-powered-rocket-scn-spc-intl/index.html#:~:text=Seattle%2Dbased%20company%20Ultra%20Safe,Mars%20in%20just%20three%20months.&text=%22Nuclear%20technology%20will%20expand%20humanity's,space%2C%22%20he%20tells%20CNN>
- Nuclear Rockets - Military Research & Development:
<https://www.darpa.mil/program/demonstration-rocket-for-agile-cislunar-operations>
- Browse: National Academies of Sciences, Engineering, and Medicine. 2023. *Merits and Viability of Different Nuclear Fuel Cycles and Technology Options and the Waste Aspects of Advanced Nuclear Reactors*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26500>.

Week 4

Tuesday, January 30 – Fundamentals of Nuclear Deterrence

- Dr. Maggie Kosal, Sam Nunn School of International Affairs, Georgia Tech
- Background Materials:
 - Deterrence 101, Module 1 CSIS:
https://www.youtube.com/watch?v=g1th_3v1Ld4
 - Deterrence 101, Module 2 CSIS:
<https://www.youtube.com/watch?v=BTedg2Ya0ZQ>
 - Robert Gates, “Nuclear Weapons and Deterrence in the 21st Century,” Remarks at the Carnegie Endowment for International Peace, 28 October 2008,
http://carnegieendowment.org/files/1028_transcrip_gates_checked.pdf
 - Jeffrey W Knopf, “The Fourth Wave in Deterrence Research,” *Contemporary Security Policy*, April 2010, 31, pp 1-33,
<https://www.tandfonline.com/doi/full/10.1080/13523261003640819>
 - 2022 Nuclear Posture Review Fact Sheet,
<https://www.defense.gov/Portals/1/Spotlight/2022/NDS/NUCLEAR%20STRATEGY%20AND%20POLICY%20-%20NPR%20Factsheet.pdf>
 - Mitsuru Kurosawa (2023) Biden Administration’s Nuclear Posture Review: Analysis and Assessment, *Journal for Peace and Nuclear Disarmament*, 6:2, 312-326, <https://doi.org/10.1080/25751654.2023.2235764>
 - *Browse*: <https://dod.defense.gov/News/Special-Reports/21st-Century-Nuclear-Deterrence-and-Missile-Defense/> (old but still informative)

Thursday, February 1 – In-Class Group Project Work

- Project guidelines document will be available on Canvas in *Files*

Part II: Treaties, Safeguards, Verification and Technology

Week 5

Tuesday, February 6 – Safeguards

- Zoe Gastelum, Sandia National Laboratory & School of Public Policy, Georgia Tech
- Background Materials:
 - Familiarize yourself with the following:
 - Statute of the IAEA <https://www.iaea.org/about/statute>
 - INFCIRC/153(Corr.) <https://www.iaea.org/sites/default/files/publications/documents/infcircs/1972/infcirc153.pdf>
 - INFCIRC/540 (Corr.) <https://www.iaea.org/sites/default/files/infcirc540c.pdf>
 - UN Charter <https://www.un.org/en/charter-united-nations/>
 - A Day in the Life of a Safeguards Inspector <https://www.iaea.org/newscenter/news/a-day-in-the-life-of-a-safeguards-inspector>
- Readings:
 - Brian Boyer and Mark Schanfein, "International Safeguards Inspection: An Inside Look at the Process," in *Nuclear Safeguard, Security, and Nonproliferation: Achieving Security with Technology and Policy*, James E. Doyle, Los Alamos National Laboratory
 - Rockwood Laura, "The IAEA's State-Level Concept and the Law of Unintended Consequences," Arms Control Association, <https://www.armscontrol.org/act/2014-08/iaea%E2%80%99s-state-level-concept-law-unintended-consequences>
 - "VCDNP Report on the Impact of the Model Additional Protocol from a State Perspective," Vienna Center for Disarmament and Non-Proliferation, October 31, 2018, <https://vcdnp.org/vcdnp-report-on-the-impact-of-the-model-additional-protocol-from-a-state-perspective/>
 - "VCDNP Report on IAEA Safeguards: Staying Ahead of the Game," Vienna Center for Disarmament and Non-Proliferation, September 18, 2019, <https://vcdnp.org/vcdnp-report-on-iaea-safeguards-staying-ahead-of-the-game/#:~:text=To%20stay%20ahead%20of%20the,turn%20these%20challenges%20into%20opportunities>
 - Y. Feldman, Z. Gastelum, J. Reed, G. Dupuy, "Integrating Visual Data Into Safeguards Implementation and the State Evaluation Process," <https://www.osti.gov/biblio/1482878>
 - Giacomo G.M. Cojazzi, et al., "Collection, Analysis, and Dissemination of Open Source News and Analysis for Safeguards Implementation and Evaluation" (on Canvas)

Thursday, February 8 - International Treaties

- Dr. Maggie Kosal, Sam Nunn School of International Affairs, Georgia Tech

- Background Materials:
 - U.S. Defense Secretary Robert McNamara to President John F. Kennedy, “The Diffusion of Nuclear Weapons with and without a Test Ban Agreement,” memorandum, 12 February 1963, <https://fas.org/man/eprint/dod1963.pdf>
 - Lee, Manseok and Michael Nacht, “Challenges to the Nuclear Non-Proliferation Treaty,” *Strategic Studies Quarterly*, Fall 2020, Vol. 14, No. 3: 95-120.
 - “North Atlantic Council Statement as the Treaty on the Prohibition of Nuclear Weapons Enters Into Force,” December 15, 2020 https://www.nato.int/cps/en/natohq/news_180087.htm
 - Amy F. Woolf, Paul K. Kerr, & Mary Beth D. Nikitin, “Arms Control and Nonproliferation: A Catalog of Treaties and Agreements,” Congressional Research Service, 26 March 2020, <https://fas.org/sgp/crs/nuke/RL33865.pdf/>

Week 6

Tuesday, February 13 – Group Project Presentations

- No reading assignment
- **Assignment:** Each group to brief class on project proposal; proposal document due to canvas at start of class period

Thursday, February 15, Fusion & International Security

- *Guest speaker TBD*
- Background materials
 - Giorgio Franceschini, Matthias Englert & Wolfgang Liebert (2013) “Nuclear Fusion Power for Weapons Purposes,” *The Nonproliferation Review*, 20:3, 525-544, <https://www.tandfonline.com/doi/full/10.1080/10736700.2013.852876>
 - Sauter, Philipp, Safeguarding Nuclear Fusion – “Nuclear Non-Proliferation Law in a Fusion-Powered Future” (May 15, 2023). Max Planck Institute for Comparative Public Law & International Law (MPIL) Research Paper No. 2023-13, <https://ssrn.com/abstract=4448671>
 - Zoe Lofgren (D-CA) (ranking member of the House Committee on Science, Space, and Technology), “Fusion Energy: Seizing Our Opportunity for a Clean Energy Future, Perspectives,” October 31, 2023, <https://www.nationalacademies.org/news/2023/10/fusion-energy-seizing-our-opportunity-for-a-clean-energy-future>
 - White House, International Partnerships in a New Era of Fusion Energy Development, 02 December 2023, <https://www.whitehouse.gov/ostp/news-updates/2023/12/02/international-partnerships-in-a-new-era-of-fusion-energy-development/>
 - Browse: <https://usfusionenergy.org/>

Week 7

Tuesday, February 20 – Discussion - Reconceptualizing the Existing Regime Part I

- Background Materials:
 - Mueller, John. "The essential irrelevance of nuclear weapons: Stability in the postwar world." *International Security* 13, no. 2 (1988): 55-79.
 - Roberts, Brad, "Ban the Bomb? Or Bomb the Ban? Next Steps on the Ban Treaty," GLOBAL SECURITY POLICY BRIEF, March 2018 <https://www.europeanleadershipnetwork.org/wp-content/uploads/2018/03/180322-Brad-Roberts-Ban-Treaty.pdf>
 - George P. Shultz, William J. Perry, Henry A. Kissinger, and Sam Nunn, "A World Free of Nuclear Weapons." *The Wall Street Journal*, January 4, 2007. <https://www.wsj.com/articles/SB116787515251566636>
 - Schelling, Thomas C. "A world without nuclear weapons?" *Daedalus* 138, no. 4 (2009): 124-129.
- **Assignment:** Individual Policy Memo Due – Upload via Canvas

Thursday, February 22 – Detection and Materials Accounting

- Guest speaker from SRNL or ORNL
- Background Materials:
 - Nuclear material accounting handbook https://www-pub.iaea.org/MTCD/Publications/PDF/svs_015_web.pdf
 - Safeguards techniques and equipment publication https://www-pub.iaea.org/MTCD/Publications/PDF/nvs1_web.pdf
 - National Academies of Sciences, Engineering, and Medicine. 2023. *Nuclear Proliferation and Arms Control Monitoring, Detection, and Verification: A National Security Priority: Summary of the Final Report*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26558>.
- Note: **SKIM** documents for big picture, big ideas, key terms, etc.

Week 8

Tuesday, February 27 – Comprehensive Test Ban Treaty

- Dr. Steve Biegalski, Professor and Chair of Nuclear and Radiological Engineering and Medical Physics, Georgia Tech
- Background Materials:
 - Comprehensive Nuclear Test Ban Treaty (CTBT) available on Canvas in **Files**

Thursday, February 29 – Nuclear Energy Landscape

- Dr. Adam Stulberg, Sam Nunn Professor and Chair, Sam Nunn School of International Affairs, Georgia Tech
- Background Materials:

- Laura S. Holgate & Sagatom Saha, “America Must Lead on Nuclear Energy to Maintain National Security,” *The Washington Quarterly*, Vol. 41, No. 2 (July 5, 2018), pp. 7-25.
- Matthew Furchmann, “Spreading Temptation: Proliferation and Peaceful Nuclear Cooperation Agreements,” *International Security*, 34, No. 1 (Summer 2009), pp. 7–41.
- Nicholas L. Miller, “Why Nuclear Energy Programs Rarely Lead to Proliferation,” *International Security*, Volume 42, Number 2 (Fall 2017), pp. 40-77.
- Additional background for those interested:
 - Jane Nakano, “The Changing Geopolitics of Nuclear Energy: A Look at the United States, Russia, and China,” Center for Strategic and International Studies, March 2020 https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/200416_Nakano_NuclearEnergy_UPDATED%20FINAL.pdf?heOTjmYgA_5HxCUvVIZ2PGedzzQNq24v

Week 9

Tuesday, March 5 – Advanced Technology and Nonproliferation

- Dr. Maggie Kosal, Sam Nunn School of International Affairs, Georgia Tech
- Background Materials:
 - Kosal, Margaret E., “Emerging Technologies and NATO’s Expansion,” *Transatlantic Policy Quarterly*, Spring 2023, Vol 22, No 1, pp 96-105, <http://transatlanticpolicy.com/article/1200/emerging-technologies-and-natos-expansion>
 - Sechser, Todd S., Neil Narang, and Caitlin Talmadge. 2019. “Emerging Technologies and Strategic Stability in Peacetime, Crisis, and War.” *Journal of Strategic Studies* 42 (6): 727–35. doi:[10.1080/01402390.2019.1626725](https://doi.org/10.1080/01402390.2019.1626725).
 - Defense Science Board, *21st Century Strategic Technology Vectors*, Volume 1 (Main Report), February 2007, <http://www.acq.osd.mil/dsb/reports/ADA463361.pdf>

Thursday, March 7 – Discussion - Reconceptualizing the Existing Regime Part II

- Background Materials:
 - The Risks and Rewards of Emerging Technology in Nuclear Security, https://media.nti.org/documents/THE_RISKS_AND_REWARDS_OF_EMERGING_TECHNOLOGY_IN_NUCLEAR_SECURITY.pdf
 - IAEA Nuclear Security Recommendations (INFCIRC/225): The Next Generation, <https://www.stimson.org/wp-content/uploads/2020/07/IAEA-225-Recommendations.pdf>
 - Nuclear Security in Times of Crisis, <https://www.stimson.org/2021/nuclear-security-in-times-of-crisis/>

- Nancy Gallagher, "Re-Thinking the Unthinkable: Arms Control in the 21st Century," *The Nonproliferation Review* Vol. 22, Issue 3-4 (2015), pp. 469-498, <https://doi.org/10.1080/10736700.2016.1149279>.
- Jessica Rogers, Matt Korda & Hans M. Kristensen (2022) The long view: Strategic arms control after the New START Treaty, *Bulletin of the Atomic Scientists*, 78:6, 347-368, DOI: [10.1080/00963402.2022.2133287](https://doi.org/10.1080/00963402.2022.2133287)

Part III: Contemporary Proliferation Landscape and Project Work

Week 10

Tuesday, March 12 – Dedicated Time to Work on Projects

- Mentors from previous years' course to work with groups

Thursday, March 14 – Dedicated Time to Work on Projects

- Mentors from previous years' course to work with groups
- **Assignment:** Mid-semester project outline - document outlining the nonproliferation regime areas your project will cover - upload to Canvas.

Week 11

Tuesday March 19 – University Spring Break

- NO CLASS

Thursday, March 21 – University Spring Break

- NO CLASS

Week 12

Tuesday, March 26 – Dedicated Group Project Time

- No new course materials

Thursday, March 28 – Iran

- Guest speaker
- Background Materials:
 - “Iran: Nuclear Intentions and Capabilities,” National Intelligence Estimate, ODNI, November 2007: https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/20071203_release.pdf

- “Iran,” in Annual Threat Assessment of the U.S. Intelligence Community,” ODNI, February 6, 2023 (pgs. 17-19): <https://www.dni.gov/files/ODNI/documents/assessments/ATA-2023-Unclassified-Report.pdf>
- Paul Kerr, “Iran’s Nuclear Program: Status,” Congressional Research Service, 20 December 2019, <https://www.everycrsreport.com/reports/RL34544.html>
- “Annex: Possible Military Dimensions to Iran’s Nuclear Programme,” in Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions in the Islamic Republic of Iran, November 8, 2011 (pgs. 11-25): <https://www.iaea.org/sites/default/files/gov2011-65.pdf>
- “Road-map for the Clarification of Past and Present Outstanding Issues regarding Iran’s Nuclear Program,” IAEA, July 14, 2015: <https://www.iaea.org/sites/default/files/gov-inf-2015-14.pdf>
- “Final Assessment on Past and Present Outstanding Issues regarding Iran’s Nuclear Programme, IAEA, December 2, 2015: <https://www.iaea.org/sites/default/files/gov-2015-68.pdf>
- “Islamic Republic of Iran,” in Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments, State Department, June 2020 (pgs. 35-42) <https://www.state.gov/wp-content/uploads/2020/06/2020-Adherence-to-and-Compliance-with-Arms-Control-Nonproliferation-and-Disarmament-Agreements-and-Commitments-Compliance-Report-1.pdf>

Week 13

Tuesday, April 2 – Contemporary Nuclear Landscape: China and North Korea

- In-class video lecture - Dr. Tong Zhao, Senior Fellow, Nuclear Policy Program, Carnegie Endowment for International Peace
- Background Materials:
 - Evan Braden Montgomery & Toshi Yoshihara (2022), “The Real Challenge of China’s Nuclear Modernization,” The Washington Quarterly, 45:4, 45-60, DOI: 10.1080/0163660X.2022.
 - (Name Redacted), “China and Proliferation of Weapons of Mass Destruction and Missiles: Policy Issues,” Congressional Research Service, 5 January 2015, <https://www.everycrsreport.com/reports/RL31555.html>
 - “Is it time to accept North Korea is a nuclear power?” | CNN, <https://www.cnn.com/2022/10/28/asia/north-korea-nuclear-threat-solution-analysis-intl-hnk/index.html>
 - Chronology of U.S.-North Korean Nuclear and Missile Diplomacy | Arms Control Association, <https://www.armscontrol.org/factsheets/dprkchron>

Thursday, April 4 – Contemporary Nuclear Landscape: US Nuclear Modernization

- Background Materials:

- Amy Woolf, "U.S. Strategic Nuclear Forces: Background, Developments, and Issues," Congressional Research Service, December 10, 2020: Introduction and pp. 9-47, "Strategic Nuclear Delivery Vehicles: Post-Cold War Reductions and Current Modernization Programs," <https://crsreports.congress.gov/product/pdf/RL/RL33640>
- Chapter 4: Nuclear Force Posture and Nuclear Command, Control, and Communications (pp. 51-72): https://carnegieendowment.org/files/Perkovich_Vaddi_NPR_full1.pdf
- "Reducing U.S. Nuclear Weapons Excess," pp. 6-9: https://www.armscontrol.org/sites/default/files/files/Reports/ACA-Report_First100Days_NuclearChallenges_FINAL_2%20%281%29.pdf
- Against a change in policy: <https://warontherocks.com/2019/07/assessing-the-risks-of-a-nuclear-no-first-use-policy/>
- For a change in policy: Admiral Richard at STRATCOM: <https://www.usni.org/magazines/proceedings/2021/february/forging-21st-century-strategic-deterrence>

Week 14

Tuesday, April 9 – Contemporary Proliferation Landscape - Russia

- Background materials:
 - Amy F. Woolf, "Russia's Nuclear Weapons: Doctrine, Forces, and Modernization" (Congressional Research Service, July 20, 2020), <https://crsreports.congress.gov/product/pdf/R/R45861>
 - Pavel Podvig, "Russia's Current Nuclear Modernization and Arms Control," *Journal for Peace and Nuclear Disarmament* 1, no. 2 (July 3, 2018): 256–67, <https://doi.org/10.1080/25751654.2018.1526629>
 - Russian Nuclear Coercion in Ukraine, https://www.nato.int/docu/review/articles/2022/11/29/russias-nuclear-coercion-in-ukraine/index.html?fbclid=IwAR00avfHuzn9MVueYexVqV50VgBr_7e8gZTHB LPVpBlyO3LucFlyDbMoW7w
 - President of Russia, "Presidential Address to the Federal Assembly," March 1, 2018, <http://en.kremlin.ru/events/president/news/56957>. Starting at "Now, on to the most important defence issue." <http://en.kremlin.ru/events/president/news/56957#sel=170:1:Qx3,170:8:rnr>
 - Pavel Podvig, "Nuclear Weapons in Europe after the INF Treaty," *Deep Cuts Issue Brief #10*, June 2020. https://deepcuts.org/files/pdf/Deep_Cuts_Issue_Brief_10-NW_Post-INF_Europe.pdf
 - Jill Hruby, *Russia's New Nuclear Weapon Delivery Systems*, NTI, November 2019, pp 17-28 https://media.nti.org/pdfs/NTI-Hruby_FINAL.PDF

Thursday, April 11 – Discussion – Reconceptualizing the Existing Regime Part III

- Background materials:

- Watch video lecture “Deterrence and Arms Control in a Multi-Polar Global Environment” by Brad Roberts, Director, Center for Global Security Research, Lawrence Livermore National Laboratory
- Roberts, Brad, “On Adapting Nuclear Deterrence to Reduce Nuclear Risk,” *Daedalus*, the Journal of the American Academy of Arts & Sciences, Spring 2020, Vol. 149, No. 2,
https://cgsr.llnl.gov/content/assets/docs/Daedalus_Sp20_5_Roberts.pdf
- Brad Roberts, “Toward New Thinking About Our Changed and Changing World: A Five-Year CGSR Progress Report,” Center for Global Security Research Lawrence Livermore National Laboratory, October 2020,
<https://cgsr.llnl.gov/content/assets/docs/CGSRfiveDIGITAL.pdf>
- **Assignment:** Second Individual Policy Memo Due – Upload to Canvas

Week 15

Tuesday, April 16 – Final Presentations Part I

- **Assignment:** Group presentations of final project in class
- **Assignment:** Group Policy Memo Due – Upload to Canvas

Thursday, April 18 – Final Presentations Part II

- **Assignment:** Group presentations of final project in class

Week 16

Tuesday, April 23 – Last Day of Class

Final Group Papers Due: Friday, April 28th 2:10pm – Upload to Canvas

No Final Exam

[1] “Student Code of Conduct.” <https://policylibrary.gatech.edu/student-life/student-code-conduct> Links to an external site. (Accessed January 5, 2022).