INTRO TO GLOBAL WMD ISSUES

INTA 2XXX



**Dr. Margaret E. Kosal**

Sam Nunn School of International Affairs

3 credits

**Overview**

This course will explore the challenges of weapons of mass destruction (WMD). We will examine the characteristics and addresses problems posed by nuclear, chemical, and biological weapons. Topics covered will include history and major theoretical frameworks relating to WMD, such as the development, use, and motivations of major state weapons programs and non-state actors. We will explore efforts to control technology, material, and knowledge – *to limit proliferation* – via multilateral agreements, initiatives, export control, and national legislation, particularly evaluating the efforts to limit “rogue” state and terrorist acquisition. Strategies and regimes for implementing compliance and verification will be considered, along with limitations. Counterproliferation strategies to deter, deny, and passively or actively defend against nuclear, biological, and chemical weapons will be studied. Also examined will be proliferation concerns related to the renewed interest in nuclear energy and emerging technologies, e.g., space weapons, biotechnology, nanotechnology, synthetic genomics.

**Learning Outcomes**

* Students will understand and be able to apply the critical concepts of science & technology, e.g., theory, hypothesis, causality, correlation, accuracy, precision, and technological determinism, to international affairs.
* Students will understand causal and determinant relationships between science and technology (S&T) and international affairs across different topic areas.
* Students will understand and be able to assess relationships between organizational institutions & structures at the local, national, regional & global level and S&T.
* Students will become familiar with multiple major governance entities (e.g., international agreements and institutions) relevant to S&T and international affairs.
* Students will understand and learn about how S&T shaped history, promising S&T developments, and pressing S&T challenges for the future in an international context.

*General Education*

* Learning Goal E: Social Sciences. Student will demonstrate the ability to describe the social, political, and economic forces that influence social behavior.
* Learning Goal II: Global Perspectives. Student will demonstrate the ability to describe the social, political, and economic forces that influence the global system.

**Course Materials**

Two texts are required:

1. Joseph Cirincione, [Jon Wolfsthal](http://www.carnegieendowment.org/experts/index.cfm?fa=expert_view&expert_id=34), [Miriam Rajkumar](http://www.carnegieendowment.org/experts/index.cfm?fa=expert_view&expert_id=68), *Deadly Arsenals: Nuclear, Biological, and Chemical Threats*, Second Edition Revised and Expanded, 2005
2. Jonathan Tucker (editor), *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*, MIT Press, 2000

All texts are available at Engineer’s Bookstore on Marietta Ave, NW.

Other short articles will be required reading; these will be announced in class and posted on the T-square course website (https://t-square.gatech.edu).

**Class Requirements**

1. 1st Mid-term exam (30%)
2. 2nd Mid-term exam (30%)
3. Final Exam (30%)
4. Attendance (5%)
5. Participation (5%)

**Academic Integrity**

For all assignments, materials, and exams, you are expected to maintain the highest academic integrity.

Per the Georgia Tech Honor Code, plagiarism is an act of academic misconduct. The Georgia Tech Honor Code specifies: “’Plagiarism’ is the act of appropriating the literary composition of another, or parts of passages of his or her writings, or language or ideas of the same, and passing them off as the product of one's own mind. It involves the deliberate use of any outside source without proper acknowledgment.” Plagiarism ranges from the blatant – purchasing a term paper or copying on an exam – to the subtle – failing to credit another author with the flow of ideas in an argument. Simply changing a few words from the writings of other authors does not alter the fact that you are essentially quoting from them. Paraphrasing of this sort, where you use the words of another almost verbatim without acknowledging your source, is the most common form of plagiarism among undergraduate students and academics. When you state another author’s viewpoint, theory, or hypothesis – especially when it is original or not generally accepted – you must also include a reference to the originator. In general citations are unnecessary when the information is considered common knowledge or a matter of widespread agreement or controversy.

**More simply put: don’t cheat. When in doubt, give credit.**

For more information on the Georgia Tech Honor Code, please see <http://www.honor.gatech.edu>.

**Accommodations for students with disabilities**

Per Georgia Tech policy: if you have a significant disability, special arrangements will be made to accommodate documented needs (through the ADAPTS office). Please contact me after class or at your earliest convenience.

**The Syllabus is Dynamic and**

**Is Likely to be Updated**

**Throughout the Semester.**

**Course Calendar and Content**

**WEEK 1**

Overview of the class, syllabus, and class requirements.

Introduction to current issues.

Atomic physics & start of the nuclear age

**Required Reading:**

* George Shultz, William Perry, Henry Kissinger, & Sam Nunn, “Next Steps in Reducing Nuclear Risks,” *WSJ,* 5 March 2013, <http://online.wsj.com/article/SB10001424127887324338604578325912939001772.html> or <http://www.nti.org/analysis/opinions/next-steps-reducing-nuclear-risks-pace-nonproliferation-work-today-doesnt-match-urgency-threat/>
* 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>

**Required Web Subscription:**

* Global Security Newswire (GSN), <http://www.nti.org/gsn/>

We will read & discuss stories shared via GSN throughout the semester. GSN *“offers daily news updates about nuclear, biological and chemical weapons, terrorism and related issues. A free e-daily, the Newswire provides thorough, accurate coverage of these critical international security issues and includes abstracts drawn daily from a vast array of publications to provide a comprehensive survey of the day's developments.”*

**WEEK 2**

The nuclear revolution

Use at the end of World War II

Science & secrecy

Nuclear weapons complex, expansion, & testing

**Required Reading:**

* *Deadly Arsenals*, Chapter 1-3

**Optional Podcast:**

* MIT Technology and Culture Forum with Joe Cirincione on “Bomb Scare: The History and Future of Nuclear Weapons,” 13 December 2011, <http://techtv.mit.edu/videos/16218-bomb-scare-the-history-and-future-of-nuclear-weapons>

**Optional Reading:**

* OTA, *Technologies Underlying Weapons of Mass Destruction* (Washington, DC: OTA 1993), chapter 4, “Technical Aspects of Nuclear Proliferation,” pp 119-195, <http://www.fas.org/spp/starwars/ota/934406.pdf>

**WEEK 3**

Arms control, disarmament, and nonproliferation

The Nuclear Non-Proliferation Treaty (NPT) & other treaties

Cooperative Threat Reduction (CTR)

**Required Reading:**

* *Deadly Arsenals*, Chapter 6-10
* Sam Nunn, “Away from a World of Peril,” *Survival,* February-March 2012, pp 234–244, <http://www.tandfonline.com/doi/abs/10.1080/00396338.2012.657556>
* Richard G. Lugar, “Nunn-Lugar: Science Cooperation Essential for Nonproliferation Efforts,” *Science & Diplomacy*, March 2012, <http://www.sciencediplomacy.org/perspective/2012/nunn-lugar>
* Rich Kelly, “The Nunn-Lugar Act: A Wasteful and Dangerous Illusion,” CATO Institute Foreign Policy Briefing, 18 March 1996, <http://www.cato.org/publications/foreign-policy-briefing/nunnlugar-act-wasteful-dangerous-illusion>

**WEEK 4**

Nuclear proliferation

Unsecured nuclear material & nuclear trafficking

**Required Reading:**

* *Deadly Arsenals*, Chapter 11-13; Appendixes A (NPT), D (Nuclear Suppliers Group), E (CTBT)

**WEEK 5**

Nuclear terrorism

**Required Reading:**

* *Deadly Arsenals*, Chapter 14 &15
* Rolf Mowatt-Larssen, “Al Qaeda Weapons of Mass Destruction Threat: Hype or Reality?” January 2010, <http://belfercenter.ksg.harvard.edu/files/al-qaeda-wmd-threat.pdf>

***1st EXAM***

**WEEK 6**

**Required Viewing:**

* Watch and discuss: *Last Best Chance* & *Nuclear Tipping Point*

**Browse:**

* Movie website: <http://www.lastbestchance.org/>
* Documentary website: <http://www.nucleartippingpoint.org/home.html>

**Required Reading:**

* *Toxic Terror,* Appendix

***Interim Grades due at end of Week 6***

**WEEK 7**

Chemical Weapons – state programs

Syria

**Required Reading:**

* *Deadly Arsenals*, Chapter 4; Appendix C (CWC), sections in state chapters on CW program (Iran, Libya, North Korea, Israel, India, US, France, Russia, China, South Africa)

**Browse:**

* Federation of American Scientists (FAS) Biological and Chemical Weapons website: <http://www.fas.org/programs/bio/index.html>

**Optional Reading:**

* OTA, *Technologies Underlying Weapons of Mass Destruction* (Washington, DC: OTA 1993), chapter 2, “Technical Aspects of Chemical Weapon Proliferation,” pp 15-69, <http://www.fas.org/spp/starwars/ota/934404.pdf>

**WEEK 8**

Chemical Weapons - terrorism

**Required Reading:**

* *Toxic Terror,* Chapters 1, 5, 6, 9, 11, 12, & 14

**WEEK 9**

Biological Weapons – state programs from Kaffa to Sverdlovsk

**Required Reading:**

* *Deadly Arsenals*, *Deadly Arsenals*, sections in state chapters on BW program (Iran, Libya, North Korea, Israel, India, US, France, Russia, China, South Africa)

**Optional Reading:**

* Ann M. Becker, “Smallpox in Washington’s Army: Strategic Implications of the Disease During the American Revolutionary War,” *The Journal of Military History*, April 2004, pp 381-430; <http://muse.jhu.edu/journals/jmh/summary/v068/68.2becker.html>

**WEEK 10**

Biological Weapons proliferation & nonproliferation efforts

Political and technical challenges of limiting and verifying biological weapons

**Required Reading:**

* *Deadly Arsenals*, Appendix B (BWC)

**Optional Reading:**

* Mark Wheelis and Malcolm Dando “On the Brink: Biodefence, Biotechnology and the Future of Weapons Control,” *The CBW Conventions Bulletin*, December 2008, no 58, pp 3-7, <http://www.fas.harvard.edu/~hsp/bulletin/cbwcb58.pdf>

***2nd EXAM***

**WEEK 11**

Biological Weapons – terrorismfrom Aum Shinrikyo to Amerithrax

**Required Reading:**

* *Toxic Terror,* Chapters 7, 8, 10, & 13

**Optional Reading:**

* OTA, *Technologies Underlying Weapons of Mass Destruction* (Washington, DC: OTA 1993), chapter 3, “Technical Aspects of Biological Weapon Proliferation, pp 71-117, <http://www.fas.org/spp/starwars/ota/934405.pdf>

**WEEK 12**

US policy responses to terrorist threat of WMD

Dark Winter & Atlantic Storm table-top exercises

DHS TOPOFF Full-scale exercises

**Required Readings:**

* FoxNews.com, “Smallpox Attack Exaggerated,” 10 July 2003, <http://www.foxnews.com/story/0,2933,35758,00.html>
* Martin Enserink, “How Devastating Would a Smallpox Attack Really Be?” *Science*, 31 May 2002, vol 296, pp 1592-1595, <http://www.sciencemag.org/cgi/content/summary/296/5573/1592>

**Optional Reading:**

* Tara O’Toole, Michael Mair, and Thomas Inglesby, “Shining Light on ‘Dark Winter’,” *Clinical Infectious Diseases*, April 2002, vol 34, pp 972-983,

<http://www.journals.uchicago.edu/doi/full/10.1086/339909>

* M.I. Meltzer, “Modeling Potential Responses to Smallpox as a Bioterrorist Weapon,” *Emerging Infectious Diseases*, Nov-Dec 2001, vol 7, no 6, <http://www.cdc.gov/ncidod/eid/vol7no6/pdf/meltzer.pdf>
* Ronald Barrett, “Dark Winter and the Spring of 1972: Deflecting the Social Lessons of Smallpox,” *Medical Anthropology*, July 2006, vol 25, no 2, pp171-191,
* Jennifer Brower, Peter Chalk, “The Global Threat of New and Reemerging Infectious Diseases: Reconciling U.S. National Security and Public Health Policy,” 2003, RAND, Santa Monica, <http://www.rand.org/pubs/monograph_reports/MR1602/index.html>

**WEEK 13**

Missiles & Delivery Vehicles

**Required Readings:**

* *Deadly Arsenals,* Chapters 5 & 17
* Congressional Research Service, “Nuclear, Biological, and Chemical Weapons and Missiles: Status and Trends,” updated 20 February 2008, <http://www.fas.org/sgp/crs/nuke/RL30699.pdf>

**Optional Reading:**

* OTA, *Technologies Underlying Weapons of Mass Destruction* (Washington, DC: OTA 1993), chapter 5, “The Proliferation of Delivery Systems,” pp 197-255, <http://www.fas.org/spp/starwars/ota/934407.pdf>

**WEEK 14**

Space Weapons

**Required Readings:**

* Josephine Wolff, “North Korea Reportedly Making Progress on Newt Gingrich's Nightmare Weapon,” *Slate Future Tense,* 7 November 2013, <http://www.slate.com/blogs/future_tense/2013/11/07/north_korea_reportedly_making_progress_on_emp_weapon.html>
* Nick Schwellenbach, “EMPtyThreat?” *Bulletin of the Atomic Scientists,* September 2005, vol 61 no 5, pp 50-57, <http://bos.sagepub.com/content/61/5/50.full>
* Op-Ed: Lex Loeb, *Nuclear Weapons May Already Be Obsolete-- New Space Based Weapons of Mass Destruction Are Simpler and Just as Lethal,* 12 January 2012, <http://voices.yahoo.com/nuclear-weapons-may-already-obsolete-space-5255529.html>

**Browse:**

* Federation of American Scientists (FAS) Weapons in Space website: <http://www.fas.org/programs/ssp/man/spacewpnsmain.html>

**Optional Reading:**

* Electromagnetic Pulse (EMP) Commission Report, 2007, <http://www.empcommission.org/docs/A2473-EMP_Commission-7MB.pdf>
* “Electromagnetic Pulse Weapons, Generating Waves of Fear in America for 20 Years,” 9 November 2011, <http://fabiusmaximus.com/2011/11/09/30691/> and references therein

**WEEK 15**

Future WMD

Emerging technologies: synthetic biology, nanotechnology, and trans-humanism

**Required Reading:**

* Central Intelligence Agency, Directorate of Intelligence, “The Darker Bioweapons Future,” OTI SF 2003-108, 3 November 2003, <http://www.fas.org/irp/cia/product/bw1103.pdf>
* Kosal, M.E. “Is Small Scary? Nanotechnology Research in an Age of Terrorism,” *Bulletin of Atomic Scientists,* September/October 2004, vol 60, pp 38-47,

<http://thebulletin.metapress.com/content/3207012131w62987/fulltext.pdf>

**Optional Reading:**

* Christopher Chyba and Alex Greninger *(who was a political science undergrad at the time he co-authored the article),* “Biotechnology and Bioterrorism: An Unprecedented World,” *Survival*, January 2004, vol 46, pp 143-162, <http://cisac.stanford.edu/publications/biotechnology_and_bioterrorism__an_unprecedented_world/>
* James B. Petro, Theodore R. Plasse, and Jack A. Mcnulty, “Biotechnology: Impact on Biological Warfare and Biodefense,” *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science,* 2003,vol 1, pp 161-168, <http://online.liebertpub.com/doi/abs/10.1089/153871303769201815>

***FINAL EXAM Per GT Registrar & Academic Calendar***

*One Last Thought*

**Collaboration, sharing ideas, etc.**

“Talk about your ideas. Help your colleagues work out their problems. Pay attention to what other people are doing, and see if you can learn something, or if you can contribute.

“Other than the mundane goal of getting your degree, you are in school to push back the frontiers of knowledge. You do this by generating and exploring new ideas. There is no way that you will ever be able to explore all of the ideas that you generate, but some of those ideas that you discard might be just what some of your colleagues are looking for.

“Human nature tends to make us want to hoard our own ideas. You have to fight against that. Human nature also tends to make us treat other people's ideas with disrespect. The closer the idea to our own area of research, the more likely some part of our brain will try to find fault with it. Fight against that even harder.

“You will find many people in academia who give in to the dark side. These Stealth Researchers never discuss what they are working on, except in vague and deceptive terms. They are experts at finding fault with the work of their colleagues. The Stealth Researcher writes papers that make very grand claims, but you can never quite figure out what they've accomplished and what they haven't. He is a master at omitting the key detail of the design or process that would enable others to follow his work. The Stealth Researcher is a knowledge diode, a roach motel for information. He has replaced the fundamental goal of discovery and publication with the twin evils of ego and empire.

“Be open about what you are working on. Be honest about what you've done, and even more honest about what you haven't. Don't ever hide an idea for fear that someone will steal it, even if you are talking to a Stealth Researcher. With patience, maybe we can cure them.”

*Prof Kristofer S.J. Pister*

*Electrical Engineering and Computer Science*

*UC Berkeley*