Course Description
The taming of the atom is one of the defining features of the modern era. The awesome creative and destructive potential of nuclear energy has had an enormous impact on international security, the environment, economic development, and international institutions. Limiting the risk of nuclear Armageddon is one of the dominant challenges in international politics and global governance. In this course, we will study 1) why and how countries pursue nuclear weapons and what happens when they acquire them; 2) the national policies and international regimes that have been devised to curb their spread and use, while allowing for the diffusion of energy technology, 3) the national and transnational civil society movements that have fought to roll back the nuclear age or limit its harmful effects, and 4) the role of private actors such as scientists and corporations.

Instructor: Professor Dani K. Nedal
Email: dani.nedal@utoronto.ca

Student Hours: Virtual or in-person, by appointment using Calendly.
Delivery: Synchronous in-person unless otherwise noted.
Prerequisite: POL208H1/POL208Y1/POL209H5/POLB80H3

BASICS: Read the whole syllabus. Twice. Come ready for class. Participate. Be courteous. If taking notes on your computer, close all other browser windows and apps. Better yet, take notes by hand. (Science says it's better for you).

Communications policy: Before you contact me, consult the syllabus and Quercus course page, including the discussions Helpdesk thread. Accommodation letters, notifications regarding absences, and other requests should come through the course notifications/accommodations form or other official channels (see the last pages of this document). Emailing me may seem faster and less work, but invariably it ends up being more work for everyone, including yourself. If you email me before 6 PM on a weekday, I am likely to respond on the same day. If not, I will try to get to it the next working day. Short, to-the-point emails are likely to get quicker responses.

Student (Office) Hours: Email is best for some matters and fine for others, but student hours are the best venue to talk about lingering questions, discuss assignments, review material, get academic and professional advice, and so on. I expect students to use this time to address substantive questions whenever possible. Appointments can be made using Calendly (see link on Quercus). If you want to discuss a draft of an assignment or something else you have written, email it to me at least 24 hours in advance. I am generally not able to meet outside of office hours.

*When in doubt, read the syllabus. Come ready for class. Participate. Be courteous and professional.*
Learning Objectives

The course requirements are designed to exercise and build the four R's of classroom skills: Reading, Reflecting, Researching, and 'Riting. Substantively, the overarching goal of this course is to produce informed

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consumers of academic and policy debates about nuclear issues. At the end of the semester, students should be able to:
- **Identify** the underlying structure of arguments (assumptions, logical coherence, etc.) regarding different aspects of nuclear policy.
- **Recall** key concepts and arguments relating to major issues in nuclear proliferation, strategy, and energy.
- **Formulate** their own arguments based on evidence (qualitative or quantitative), logic, and theory.
- **Effectively** communicate this expert knowledge to policy-makers and the broader public.
- **Defend** and critique arguments in simulated debates.
- **Conduct** independent research and dig deeper into particular topics and questions of nuclear policy.

At the very least, when you are home for the holidays (or Zooming with your relatives) you should be able to explain to your family the importance and the challenges of a workable resolution to the confrontation over North Korea’s nuclear program, the Iran deal, or the pros and cons of nuclear energy.

**Course Format**

This course convenes in person unless extraneous circumstances force us to switch to a virtual or hybrid format. There's a non-zero chance that will happen. This course will often touch on sensitive, politically divisive, and emotionally and normatively charged subjects. My preferred approach is to deal with them head-on and to keep it as light as possible, but we will inevitably confront some issues that require a more somber tone and may be upsetting to some. Learning how to deal with these challenges is part of the journey. If at any point you feel uncomfortable and/or need to recuse yourself, do not hesitate to reach out to me discreetly.

**Evaluations and Course Grade**

General notes on grades:
- The final course grade reflects your demonstrated achievement of the course Learning Objectives listed above. Evaluations provide feedback on your progress toward the final course grade. I do not grade on a curve. Your grade should reflect the amount of effort you put into the class. Nothing would make me happier than to only hand out As.
- **Ouriginal will be used in this course** and can be done via Quercus. You do not need to sign in to Ouriginal separately.
- If you get 65% or below on a given assignment, I expect you to come talk to me about how to improve going forward. If you get less than 50% on an assignment you must come talk to me during office hours.
- Grading errors are normally distributed. Or, in plain English: if you think I made a mistake in grading your assignment, I am open to reviewing it, but be aware that grades can be revised down just as easily as they can be revised up.

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### Evaluation Criteria

**Participation**

- *Active and substantive participation in classes* is a critical component of the learning experience for this class. By active I mean that you are expected not only to attend all sessions but also to do the readings ahead of time, bring questions, and be prepared to answer prompts, quizzes, polls, and all other in-class activities. By substantive I mean that quality is weighed more heavily than quantity. This means that just showing up and talking a lot will not earn you an A/A+ and that you can get an A/A+ even if you're not the most outgoing student, as long as you approach class proceedings with the right attitude and make your contributions count.

- We will have a few directed in-class activities throughout the course. For many of these activities, students will be clustered in groups of 2-3 or 4-5. Some of these activities will be more involved and will be treated as separate graded components (see below).

- Students who, for whatever reason, don’t feel like their in-class participation reflects their level of engagement with the material and interest in class, are also free to submit reaction papers for sessions they attended, including their thoughts or questions they wish they had asked, and to post questions for discussion, share relevant news stories on the Quercus discussion board, come to office hours, etc.

- Students are expected to read all pieces assigned before the class. There is a fair bit of reading. Reading effectively and efficiently in university is not about reading word for word, but instead about reading for arguments, evidence, context, and subtext. This means reading less than everything on the page, but also reading more than what's on the page, and taking good notes. Good notes will help you keep track of the different ideas during class and will prove an indispensable resource for other assignments. See Quercus for resources on effective and efficient reading and note-taking, including a critical reading template.

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Reflection Paper: 13 Days

Students will play a game in class. After playing the game, each student will submit a short (1000 words, including footnotes) reflection in their own words, connecting the experience in the game with the course materials. Additional details on Quercus.

Nuclear Energy Memo

Students will produce a short policy memo related to nuclear energy and (non-)proliferation. Additional details, including examples and a template, on Quercus.

Individual Op-Ed/Explainer

Students will produce one Op-Ed or "Explainer" piece (max 900 words). See Quercus for additional details, as well as resources on writing and formatting.

Late Penalty

Written assignments turned in up to 24 hours after the deadline will be eligible for 95% of the grade. Assignments turned in up to 48 hours after the deadline will be eligible for 85% of the grade. Assignments turned in up to 72 hours after the deadline will be eligible for 75% of the grade. Assignments turned in more than 72 hours after the deadline will not be graded. Extensions may be granted if requested AHEAD OF TIME with a properly documented reason, using the course communications form. Extensions will only be granted ex post facto in extreme circumstances.

Sources of General Nuclear Interest


Some people to follow on X (Twitter)

@atomic_pickles | @cherylrofer | @rdavisgibbons | @malfrid_bh | @MiraRappHooper | @atomicanalyst | @wellerstein | @narangvipin | @armscontrolwonk | @nucleardiner | @james_acton32 | @nuclearanthro | @kroenig | @mcfuhrmann | @nktpnd @joshua_pollack

Class Schedule and Readings

All required readings are accessible digitally, either through the UofT library by clicking on the link in the syllabus or, in the case of certain book chapters and articles, by downloading them from Quercus. I also

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included a few suggestions for movies and TV shows that pair well with each week's theme. Students are encouraged to contribute their own suggestions. NOTE ON MOVIE LINKS: All movies linked in the syllabus are available using the Criterion-on-Demand service to which UofT subscribes. If the link doesn't work for you, try searching for the movie on the UofT library website.

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic and Key Concepts</th>
<th>Readings</th>
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</table>
| Session 1 (May 7 2024) | **Introduction and Definitions** | **Required:**  
  - READ THIS SYLLABUS!  
  - Fetter-Vorm, Jonathan. 2012. Trinity: A Graphic History of the First Atomic Bomb (at least 2 hours quicker than watching Oppenheimer!)  
  - While reading, listen to: Rush “Manhattan Project” and Iron Maiden "Brighter than a Thousand Suns"  

**Some questions:**  
What is nuclear energy?  
What is a nuclear bomb?  
What does it do? How do we know?  
What is order? Is there a Global Nuclear Order?  
How orderly is it? What are its core elements?  

**Recommended:**  
- The Manhattan Project: An Interactive History, OSTI  
- Listen to Black Sabbath, “Children of the Grave” and “Electric Funeral”

**Movie Night Recommendations:**  
Godzilla (1954)  
Barefoot Gen (1983)  
Akira (1988)  
Oppenheimer (2023)  

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<th>Session 2</th>
<th>Deterrence and its critics</th>
<th>Required:</th>
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*When in doubt, read the syllabus. Come ready for class. Participate. Be courteous and professional.*
Some questions:

Is there a Nuclear Long Peace? Are nuclear weapons a force for stability or a harbinger of doom?
What is deterrence?
What are the requirements for deterrence?
What are some of the underlying assumptions for deterrence?
What is nuclear strategy?
What is it for?
Is there a stability-instability paradox?
Can nuclear war be won?

- Watch: Dr. Strangelove (1964)

Recommended:
- Schelling, Thomas C. 1966. Arms and Influence. Ch 1 (pp. 1-34). Skim ch 2 (pp. 35-91.)
- Bell, Mark and Nicholas Miller. 2013. “Questioning the effects of nuclear weapons on conflict”. Journal of Conflict Resolution.

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### Session 3 (May 14 2024)

**Nuclear Armageddon: What would happen if nuclear war broke out?**

Some questions: What are the likely physical consequences of a major nuclear exchange? What about a minor nuclear exchange? What are the political implications?

**Required:**
- Listen to: Ozzy Osbourne, 1986, “Thank God for the Bomb”, *The Ultimate Sin*

**Movie Night Recommendations:**
- *The Mouse That Roared 1959 Peter Sellers Comedy*
- Battlestar Galactica (Miniseries), 2003.

**Recommended:**
- Watch “The Day After” (1983)

**Required:**

**Movie Night Recommendations:**
- On the Beach (1959)

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### Managing Nuclear Crises

**Some questions:**
What are nuclear crises? How are they? How is escalation limited? Can countries cooperate their way out of a crisis?

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**Required:**
- Watch: *Thirteen Days (2000)*
- Munton, Don and David Welch. 2012. The Cuban Missile Crisis: A Concise History. Chapters 1-4. It's short and a quick read!
- Browse the National Security Archive's [declassified archival documents on the Cuban Missile Crisis](https://nsarchive.gwu.edu/coldwar/cubanmissile).
- Primary Sources on Quercus
- Watch: Interview with Benoît Pelopidas.

**Recommended:**
- Lebow, Richard Ned and Janice Gross-Stein. 1994. We All Lost the Cold War. Chapters 13 and 14.
- Ghent, Jocelyn Maynard. 1979. “Canada, the United States, and the Cuban Missile Crisis”. Pacific Historical Review, 48(2): 159-184
- Garthoff, Raymond L. “US Intelligence in the Cuban Missile Crisis.” Intelligence and National Security 13, no. 3 (September 1, 1998): 18–63.

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<table>
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<tr>
<th>Session 5 (May 21 2024)</th>
<th>Nuclear Proliferation: Demand and Supply</th>
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<tbody>
<tr>
<td><strong>Some questions:</strong></td>
<td>Who Wants Nuclear Weapons?</td>
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<td></td>
<td>Why? What for?</td>
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<td>Who Gets Nuclear Weapons?</td>
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<td>What are the paths to the bomb?</td>
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<td>What makes for an effective nuclear-weapons program?</td>
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**Required:**

- Watch interviews with Matias Spektor and Rupal Mehta

**Recommended:**

- Hymans, Jacques. Psychology of Nuclear Proliferation

*When in doubt, read the syllabus. Come ready for class. Participate. Be courteous and professional.*
<table>
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<tr>
<th>Session 6 (May 23 2024)</th>
<th><strong>Civilian Nuclear Programs</strong></th>
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<tr>
<td><strong>Why do countries pursue nuclear power? Who supplies it? Is nuclear energy a weapons-proliferation risk? Is nuclear energy <strong>safe</strong>? Is it <strong>secure</strong>? What are the risks? Can it be made safer and more secure?</strong></td>
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**Required:**
- Watch: Video Interviews with Alexander Montgomery and Warren Stern.

**Recommended:**
- Nuclear Threat Initiative Index on Theft and Sabotage, link on Canvas.

**Movie night recommendations:**
- The China Syndrome (1979)
- Red Alert (1977)
- Chernobyl (2019)

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<tr>
<th>Session 7</th>
<th><strong>Individuals, Corporations, Bureaucracies and</strong></th>
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**Required:**
- Hymans, Jacques. 2012. Achieving Nuclear Ambitions. Ch. 6
- Kutchesfahani, Sara. Politics and the Bomb. pp. 23-49

*When in doubt, read the syllabus. Come ready for class. Participate. Be courteous and professional.*
### nuclear (non-)proliferation

#### Some questions:
What role do individuals and organizations play in promoting and preventing nuclear proliferation? What are the roles of scientists, corporations, and NGOs?

- Watch “The Origins of Nuclear Cooperation: A Critical Oral History Between Argentina and Brazil”.

### Recommended:

### Movie night recommendations:
The Sum of All Fears (2002)

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<tr>
<th>Session 8 (May 30 2024)</th>
<th><strong>Norms, Non-Proliferation, and Non-Use</strong></th>
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<td>Some Questions: Is there a nuclear taboo? What is a taboo? Do states follow nuclear norms?</td>
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**Required:**
- Listen to: Randy Newman, “Political Science”

**Recommended:**
- Watch Eisenhower’s UNGA “Atoms for Peace” speech. Link on Canvas.
- Primary source: *Conference of The Eighteen-Nation Committee on Disarmament, 5/18/67*.
- Weichselbraun, Anna Maria. 2018. “Producing Credible Nuclear Knowledge: Bureaucratic Objectivity at the IAEA”

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<table>
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<tr>
<th>Session 9  (June 4 2024)</th>
<th><strong>Preventing Proliferation: Institutions, Diplomacy, and Sanctions.</strong></th>
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<td><strong>Some questions:</strong></td>
<td>How do nuclear powers maintain their nuclear oligopoly? What are the different means at their disposal? What are non-proliferation sanctions? How are they used?</td>
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**Required:**


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<th>Session 10  (June 6 2024)</th>
<th><strong>Bungling Non-Proliferation. Intelligence Failures, Policy Backfires</strong></th>
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<td><strong>Some questions:</strong></td>
<td>When is an intelligence failure not a failure of intelligence? What explains</td>
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**Required:**

the overconfident estimates about Iraq's weapons of mass destruction program in 2002?

Case Study: Assessing Iraqi Weapons of Mass Destruction (2002-3)

"There's an old saying that victory has a hundred fathers and defeat is an orphan."

- John F. Kennedy

"The problem here is that there will always be some uncertainty about how quickly he can acquire nuclear weapons. But we don't want the smoking gun to be a mushroom cloud."

- Condoleezza Rice "CNN Interview"

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<th>Recommended:</th>
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<tr>
<td>● Joshua Rovner, “Fixing the Facts or Missing the Mark? Intelligence, Policy, and the War in Iraq,”” Foreign Policy Research Institute (October 2011)</td>
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**Movie Night Recommendations:**

Team America (2004)
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<th>Session 11 (June 11 2024)</th>
<th>Disarmament and Denuclearization</th>
<th>Required:</th>
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|                          | Some questions: Why do countries abandon nuclear programs or give up their weapons? Is there a single model for denuclearization? Can states be coaxed into denuclearization? | - Saunders, Elizabeth. 2018. *This is why North Korea reacted so strongly to Bolton’s mention of the ‘Libya model’*. *The Monkey Cage*  
- Watch "*Inheriting the Bomb* with Mariana Budjeryn" |
| Session 12 | The Future of the Global Nuclear Order | Required: |
|            | Recommended: |
- Vaynman, Jane and Vipin Narang. June 2018. There are signs North Korea is still working on its nuclear program. Here’s why ‘denuclearization’ is so problematic. *The Monkey Cage*.  
Some questions:
Is the Nuclear Order unraveling? Are norms weakening? Are institutions fraying? Is nuclear war imminent?

- Tannenwald, Nina. The Vanishing Nuclear Taboo? Foreign Affairs. Nov/Dec 2018

Recommended:
- Thakur, Ramesh, Jane Boulden and Thomas G. Weiss. 2008. “Can the NPT Regime be fixed or should it be abandoned?” FES Dialogues on Globalization
Schoolhouse Rules and Resources

Grading and Assessment
Final Grades in the course are given as letter grades. They reflect your overall performance in achieving the stated course learning objectives. Assessment on interim evaluations can take many forms and are intended to give you an indication of where you stand relative to others. This will allow you to make adjustments to your approach, your expectations, and your performance.

Ouriginal and AI Detection
Normally, students will be required to submit their course essays to the University’s plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool’s reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University’s use of this tool are described on the Centre for Teaching Support & Innovation website (https://uoft.me/pdt-faq). Essays and reports may also be subjected to AI detection software (see the section below on AI and academic integrity).

Class Attendance
Students are expected to attend every class. Those who miss more than one-sixth of a course due to illness or personal circumstances should inform their instructor immediately. Students who are regularly absent from class will be referred to their registrar.

Accessibility Services
Academic accommodations and resources are available should you experience disability-related barriers that prohibit the demonstration of the knowledge and skills required to complete your academic program. These accommodations and resources are designed to provide equitable opportunities for students with disabilities to achieve their academic goals.

Disability-related accommodations are available through registration with the University of Toronto’s Accessibility Services. This helps maintain privacy and confidentiality and provides students with support when requesting and accessing accommodations. Students who register with Accessibility Services may also be eligible for disability-related services/equipment.

Instructors will direct students who make disability-related accommodation requests to register with Accessibility Services. Once you complete the registration process, you will work with an Advisor who can set you up with reasonable, disability-related accommodations and/or resources.

Students with accommodations have access to Letters of Accommodation that should be provided to course instructors outlining specific accommodations they can request within that course. For example, if a student is given more time to work on an assignment this would be outlined in their Letter of Accommodation. Any

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accommodations not outlined in the letter from Accessibility Services are up to the instructor’s discretion. Students can connect with their Accessibility Advisor to discuss their accommodations throughout the year.

Information about registering with Accessibility Services is available on the website and in the office’s Program Handbook: https://studentlife.utoronto.ca/task/read-the-handbook/ There’s also a short video: https://www.youtube.com/watch?v=hAq62IF4IPg&t=2s If you’re unsure whether you have a disability, please don’t hesitate to connect with the office to discuss: accessibility.services@utoronto.ca

Other Academic Accommodations

Students may need to apply for academic accommodations due to a disability, illness, religious observance, or personal emergency.

Students who require consideration for missed academic work for any non-disability related reason (e.g., COVID, cold, flu and other illness or injury, family situation) should report their absence through the online absence declaration tool via ACORN – until otherwise indicated by the University. A Verification of Illness form is not currently required, but may become required should the public health situation change.

If a non-disability-related accommodation request is made along with an absence declaration on ACORN, a resolution will be determined by the instructor. This may take the form of any alternate deliverable, deadline extension, re-weighted course grade calculation, make-up exam, or another solution deemed appropriate by the instructor. If an accommodation request is not made along with an absence declaration, the missed or late deliverable will be subject to an academic penalty. The extent of the penalty is at the discretion of the instructor.

Note: Students are expected to request accommodations in advance of assignments or tests. Failure to do so may result in a late penalty being applied.

Mental Health and Wellness

The University of Toronto’s Student Mental Health Resource Guide is an online tool where students can access various on-campus and off-campus mental health resources, including those listed below. Appointments may be booked with them by contacting the Health and Wellness Centre at 416-978-8030 or info.hwc@utoronto.ca

Other Mental Health Resources

Feeling distressed? Are you in crisis? There’s help. Call Good2Talk: 1-866-925-5454 (Ontario); text GOOD2TALK to 686868. Free, confidential helpline with professional counselling, information and referrals for mental health, addictions and well-being, 24/7/365. You can also contact My Student Support Program (MySSP) 1-844-451-9700 (North America); 001-416-380-6575 (Outside of North America) or the U of T Employee & Family Assistance Program (EFAP).
1-800-663-1142 (toll-free); 1-866-398-9505 (TTY); 604-689-1717 (collect). Visit “Feeling Distressed?” for more resources.

Are you in immediate danger? For Personal Safety – Call 911, then Campus Community Police*

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Code of Behaviour on Academic Matters

Please read the University’s Code of Behaviour on Academic Matters. It applies to all your academic activities and courses. The Code prohibits all forms of academic dishonesty including, but not limited to, cheating, plagiarism, and the use of unauthorized aids. Violating the Code may lead to penalties up to and including suspension or expulsion from the University. You are expected to know the Code and inform yourself of acceptable academic practices – ignorance of the Code or the acceptable academic practices is not a valid defense if you are accused of a violation.

Academic Integrity

Case write-ups, papers, assignments, and all other deliverables must be original work, giving credit to the work of others where appropriate. Using work done by others without due credit—this includes the use of AI (Large Language Models etc.)—will be considered a violation of academic integrity. This applies to individual and group deliverables. All members of a group are accountable for the academic integrity of their submissions. You are encouraged to consult the following websites to ensure that you follow the appropriate rules. Ignorance of these rules is not a defense in cases of violations, which can result in very serious academic sanctions. Please visit the University of Toronto Academic Integrity and the UofT Writing Centre Resources websites for further details and help on the proper use of citations.

Group Work and Behaviour

You are expected to treat teamwork the same way as you would in any professional organization. This includes but is not limited to:

- Contributing substantially and proportionally to each project
- Committing to a standard of work and level of participation agreed upon by the group
- Ensuring familiarity with the entire content of a group deliverable so that you can sign off on it with your name in its entirety as original work
- Accepting and acknowledging that assignments that are found to be plagiarized in any way will be subject to sanctions for all group members under the University’s Code of Behaviour on Academic Matters
- Ensuring that all team members voice their opinions, thoughts, and concerns openly and in an inclusive and considerate environment
- Taking personal responsibility for voicing your own thoughts to enhance and contribute to team learning

If you encounter difficulties with any group member that cannot be resolved within the group, please contact your instructor for guidance.

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Use of Technology
Like any professional setting, the University of Toronto expects all of its members to behave responsibly and with courtesy and respect for others when using technology. UofT is committed to equity, human rights, and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another’s differences. Please read the University’s Student Code of Conduct and policy on the Appropriate Use of Information and Communication Technology.

A note on Generative AI
In this course, we embrace the integration of AI-enabled tools, like ChatGPT, as valuable components of your professional toolkit. Instead of foreswearing them, we will work together to develop the skills to use them responsibly and effectively. Just like you would utilize statistical software like Stata or R in a statistics course, a calculator in a physics class, or spell-check when writing a paper, AI-powered tools can serve as valuable aids for specific tasks. **HOWEVER**, while they can enhance efficiency and assist with lower-order tasks, they are not substitutes for the essential higher-order thinking and creative skills that are at the heart of your university journey.

Just as you would seek guidance from academic writing labs or collaborate with peers to bounce ideas and refine your work, AI-enabled tools can offer insights, help brainstorm, or assist in proofreading, but you **should not rely on them to do your work for you**. Not only is that considered a violation of academic integrity norms (see above) it is also a terrible idea, since AI can't yet reliably produce quality content at the level that is expected of someone in your position as a student or a professional. Particularly in the realms of summarizing and analyzing existing work or historical data or discussing policy and current events, AI tools exhibit **serious shortcomings**. Their algorithms, though powerful, can sometimes "hallucinate," extrapolating from the data to generate content that may not accurately represent the original context or intention of written work and manufacture facts about people, places, and things. These tools are also limited by the data on which they are trained, which can be constrained by geography and time (content produced in certain languages and certain places are overrepresented, some training data may not include data before or after a certain cut-off point) or be otherwise biased. Language Models will reproduce existing biases and possibly accentuate them. Think of the Microsoft Twitter bot, Tay, which was quickly shut down after it became a misogynistic, violent, racist, holocaust denier. Or take a look at [how hard it is for Dall-E and Midjourney to draw human hands](https://www.theguardian.com/technology/2021/may/24/ai-cant-draw-human-hands). This highlights the importance of your role as a discerning thinker who understands when and how to leverage AI effectively, while also recognizing when human judgment and expertise are still irreplaceable.

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