

University of Toronto Scarborough
Department of Physical and Environmental Sciences
ESTC35H3 Environmental Sciences and Technology in Society
Winter 2023

Instructor: Micah J. Hewer
Email: micah.hewer@utoronto.ca
Teaching Assistant : Miriam Castillo
miriam.castillo@mail.utoronto.ca
Lecture: Monday 12-2pm, BV 363
Tutorials: Monday 2-3pm, BV 363
Office hours: Monday, 9-11am, EV 350

1. Course Details

Course Description

In this course students will engage critically, practically and creatively with environmental controversies and urgent environmental issues from the standpoint of the sociology of science and technology (STS). This course will contribute to a better understanding of the social and political dimensions of the production and applications of environmental science and technology in society.

The lectures and class discussions will cover the following topics: urbanization, climate change, nuclear energy, ecosystem engineering, biotechnology and genetically altered foods, and other environmental ‘hot topics’ issues that may arise during the course.

Course Objectives

By completing this course, students will:

- (1) Learn about different perspectives on the role of science and technology in addressing environmental problems;
- (2) Gain a better understanding of how science and technology is (or is not) used in environmental decision-making and the politics of knowledge production and technology use to solve environmental problems; and
- (3) Practice necessary critical thinking, dialogical and writing skills.

Attendance and Participation Policy

This is a discussion-based course that requires participation in tutorials and a class presentation.

Textbooks

Stewart Brand. 2009. Whole Earth Discipline. Penguin Books. **You can view it online via the Hathi Trust ETAS though -**

https://request.library.utoronto.ca/index.php/request/index?cat_id=6981819

James Smith. 2009. Science and Technology for Development. ZED Books. <https://ebookcentral-proquest-com.myaccess.library.utoronto.ca/lib/utoronto/detail.action?docID=474817>

Sheila Jasanoff. 2016. *The Ethics of Invention. Technology and the Human Future.* Norton & Cie.
 You must purchase this book or find a copy at the University of Toronto Library.

2. Coursework and Assignment Policies

Grading Scheme

In this course you will write four assignments and participate in a class debate. Full details for the assignments are provided at the end of the syllabus.

Course Component	Value	Due
Weekly reading assignments	15 %	Weekly starting January 23 (total of 10 reading assignments)
Assignment 1: Rhetorical analysis	20 %	February 13
Assignment 2: Knowledge integration essay	25 %	April 3
Debate assignment	Total 30 %	
Task 1: annotated list of articles	4 %	Week of January 23
Task 2: draft of main arguments	4 %	Week of January 30
Task 3: draft of counter arguments	2 %	Week of February 6
Debate presentation	15 %	Starting February 27
Final written report of debate	5 %	Starting February 27
Debate assessment	10%	April 5th

Class debates:

The class will be divided into teams of 4-5 students. Teams will debate an environmental issue from the following list of current debates:

- Wind turbines should be situated far from habitations due to their adverse health impacts
- Genetically engineered organisms used in bioremediation of contaminated soil pose no significant risk to native microbial communities
- The use of engineered wood is better for the environment than using cement in new building construction
- The use of oxidative water treatment of ballast water by ocean-going ships is an environmentally benign solution to controlling the spread of aquatic invasive species
- No-till agricultural systems require more chemicals and thus are worse for the environment than conventional tillage systems
- Universities should not allow meat ingredients to be sold in cafeterias as part of their sustainability and climate change mitigation plans
- Sustainable aquaculture is not possible
- Your organic cotton t-shirt is worse for the environment than regular cotton
- It is better for the environment to wear wool than microfiber fleece
- Genetically engineered crops pose no health risks
- Nuclear energy the best energy pathways to mitigating climate change

- Hydroelectricity is an environmentally friendly way of generating energy
- Nuclear waste should be stored deep underground
- We should inject sulfur in the upper atmosphere to offset the warming effects caused by rising levels of greenhouse gases
- Individual action is the most impactful way to mitigate climate change

The debate assignment tasks

Each team will need to complete the following tasks and meet with the TA during weekly tutorials (schedule TBD) to prepare for the debate.

1. Tutorial week of January 17: teams are allocated a debate topic from the list above; each team splits themselves into two sides of the debate (2-3 students per side); teams decide who will work on each side of the debate; teams allocate responsibilities for doing the literature search.
2. Tutorial week of January 24: teams submit an annotated reference list of scientific articles to the TA. Each team needs to gather 10 scientific articles (these may be reviews, empirical studies, policy analyses) and to provide a short description of the information each article contributes to the debate. (4 points: no length specified)
3. Tutorial week of January 31: Teams submit a draft of the arguments they intend to use for each side of the debate and teams specify what information from the literature supports their arguments (4 points: 2 pages per side of the debate, double spaced, 12-point font, 1 inch margins).
4. Tutorial week of February 7: Teams submit draft of counter-arguments for their rebuttals (2 points: 1 page per side of the debate, double spaced, 12-point font, 1 inch margins.)
5. Starting week of February 28: Teams debate presentation (15%) and submit their report (5%) the same day. Each team will have 10 minutes to argue their two perspectives on the issue (each side of the issue gets 5 minutes to present arguments for their perspective and proposed policy options), followed by a 2-minute rebuttal (1 minute for each perspective). This will be followed by 3 minutes of questions from the audience. The instructor will enforce strict time limits for the debate. Written report: summary of the arguments each team made during the debate, linking each of the points they make to the literature they have read. (5 points: 6 pages, double spaced, 12-point font, 1 inch margins.)

Debate format		
	Side 1	Side 2
Round 1	5 minutes of arguments	5 minutes of arguments
Round 2	Rebuttal of Side 2's arguments: 2 minutes	Rebuttal of Side 1's arguments: 2 minutes
Round 3	Answer audience questions: 3 minutes	Answer audience questions: 3 minutes

Grading: Teams will be graded on the quality of their arguments, their ability to communicate arguments in a clear, concise, and compelling manner, and the relevance and use of the literature they selected.

Handing in Your Assignments:

Written assignments for this course are to **be submitted via Quercus**.

Extensions

Students **MUST** submit a request for extension in **ADVANCE** of the deadline in order to receive a decision. For extensions of time beyond the examination period you must submit a petition through the [Office of the Registrar](#).

Please follow the University of Toronto procedure to be completed in order to be considered for academic accommodation for any course work such as missed tests or late assignments. Verification of Student Illness or Injury forms can be found on the [Office of the Registrar's webpage](#).

Late penalties

No due dates will be extended unless discussed with and agreed upon by the TA. Penalty for late assignments will be 2% of the assignment mark per day late, including weekends. Late assignments will be accepted only for one week after the due dates. Assignments submitted later will not be reviewed and assessed.

Weekly responses to readings are due by 12 pm EST on Mondays (Lectures 3-12) and will be used for the class discussion. Responses to readings submitted after this deadline will not be reviewed and assessed.

The only exemption from these penalties will be for work that is late for health reasons, provided that students submit the proper documentation by way of the Absence Declaration Tool on ACORN.

A Note on Marking

Feel free to contact me at any time to discuss the requirements of this course. If you disagree with the mark you received on an assignment, please email me and the TA with a written response to the comments on your assignment.

3. Academic Integrity

The University treats cases of cheating and plagiarism very seriously. The University of Toronto's [Code of Behaviour on Academic Matters](#) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Please be sure to review the Code of Behaviour.

Potential offences in papers and assignments include using someone else's ideas or words without appropriate acknowledgement, submitting your own work in more than one course without the permission of the instructor, making up sources or facts, obtaining or providing unauthorized assistance on any assignment. On tests and exams cheating includes using or possessing unauthorized aids, looking at someone else's answers during an exam or test, misrepresenting your

identity, or falsifying or altering any documentation required by the University, including (but not limited to) doctor’s notes.

Please avoid academic dishonesty, have confidence in your own ability to learn, and grow academically by doing your own thinking and writing!

4. Accessibility and Communication Policies

Accessibility: Students with **diverse learning styles and needs are welcome in this course! In particular, if you have a disability/health consideration that may require accommodations, please feel free to the Accessibility Services Office as soon as possible. I will work with you and AccessAbility Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC AccessAbility Services staff (located in SW302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or ability@utsc.utoronnto.ca**

Communicating With You

The best way to communicate with me is during office hours. However, I also respond to student emails within two business days (Monday-Friday) and within business hours (9am-4pm). Please note that emails sent to me Friday after 4pm and during the weekends will be responded to on Monday during business hours.

5. Course schedule

Date	Topic	Content/Practice
Jan 9	Lecture 1: Introduction No Tutorial	Introduce you to the learning objectives and structure of the course
Jan 16	Lecture 2: Science in society: opportunities, risks and responsibilities Tutorial: debate explanation	Jasanoff chapters 1-2
Jan 23	Lecture 3: Anatomy of urgent environmental problems and disasters Tutorial: debate preparation *Reading assignment 1 due: Jasanoff chapter 3, Brand chapter 1	Jasanoff chapter 3 Brand chapter 1
Jan 30	Lecture 4: Opening-up and closing-down policy options Tutorial: debate preparation *Reading assignment 2 due: Stirling 2008, Stilgoe et al 2013	Stirling 2008, Stilgoe et al 2013

Date	Topic	Content/Practice
Feb 6	Lecture 5: Urban hopes and dreams Tutorial: debate preparation *Reading assignment 3 due: Brand chapters 2 - 3, Smaje 2011	Brand chapters 2 - 3 Smaje 2011
Feb 13	Lecture 6: Nuclear Energy Tutorial: debate preparation *Reading assignment 4 due: Brand chapter 4, Vainio et al 2016 **Assignment 1 due: Rhetorical analysis	Brand chapter 4 Vainio et al 2016
Feb 20	Family Day/Reading week	
Feb 27	Lecture 7: Genetic engineering Debate presentation *Reading assignment 5 due: Brand chapters 5 - 6, Jasanoff chapter 4	Brand chapters 5 - 6 Jasanoff chapter 4
March 6	Lecture 8: Geoengineering Debate presentation *Reading assignment 6 due: Brand chapters 7- 9, Stilgoe 2016	Brand chapters 7- 9 Stilgoe 2016
March 13	Lecture 9: Big Science Debate presentation *Reading assignment 7 due: Smith chapters 1-2, Jasanoff chapter 5	Smith Introduction and chapters 1-2 Jasanoff chapter 5
March 20	Lecture 10: Mundane science Debate presentation *Reading assignment 8 due: Smith chapter 3, Kammen and Dove 1997	Smith chapter 3 Kammen and Dove 1997
March 27	Lecture 11: Science and technology for whom and for what? Debate presentation *Reading assignment 9 due: Smith chapter 4, Jasanoff chapters 6 - 7	Smith chapter 4 Jasanoff chapters 6 - 7

Date	Topic	Content/Practice
April 3	<p>Lecture 12: Feral futures</p> <p>Debate presentation</p> <p>*Reading assignment 10 due: Smith chapter 5, Jasanoff chapter 8 - 9</p> <p>**Assignment 2 due: Knowledge integration essay</p>	<p>Smith Conclusion Jasanoff chapter 8 - 9</p>

Reading assignments

Worth 15% of overall mark

There are 10 reading assignments, each worth 1.5%

Due Mondays at 12 pm EST, various dates, no late assignments accepted.

Length: 500 words, no need to provide reference cited page

Formatting requirements: no title page, double spaced, 12 point font, 1 inch margins

Learning objectives

In this assignment you will demonstrate your ability to concisely and clearly summarize the main arguments in the class readings.

General directive

In this assignment, you are required to read, understand and summarize the weekly readings.

Steps

1. Summarize each reading, e.g. explain what the readings are about.
2. Identify what you think is the single most interesting idea/concept from the readings and explain why you think this idea/concept is interesting.

Assignment 1: Rhetorical analysis

Worth 20% of overall mark

Due February 13, 2023

Length: 8 pages

Formatting requirements: no title page, double spaced, 12 point font, 1 inch margins

Learning objectives

In this assignment you will demonstrate your ability to notice, explain and assess rhetorical features of a text, which will help you build your critical reading and thinking skills.

General directive

In this assignment, you are required to read, understand and conduct a rhetorical analysis of The Dark Mountain Project Manifesto. A rhetorical analysis examines how and why an author chose to write a text the way he/she has. A rhetorical analysis explains the target audience of and the potential motivations for writing the text, and describes the persuasive qualities of the structure of a text and its compositional techniques and figures of speech. In your rhetorical analysis you should critically assess the means by which the authors of each manifesto has tried to influence or persuade readers.

Steps

1. To begin your rhetorical analysis, construct a table of rhetorical features you will analyze and divide the table into two columns to help you distinguish between what the author wrote and why he/she wrote it in this way. For example, you may consider all or some of the questions in the worksheet below.
2. Develop your own thesis statement for your rhetorical analysis.
3. In your essay compare the rhetorical features of each text in a logical way. For example, you could start by identifying the author's main thesis, his/her purpose in writing this piece and his/her intended audience. Next, you could explain the rhetorical features of the text, the reason for their use and the extent to which they are effective writing strategies. Make sure not to simply summarize the rhetorical strategies the author uses often, but assess the extent to which they are compelling and effective.
4. Each paragraph should contain a strong topic sentence declaring the purpose of the rhetorical strategy you will discuss. The order of the paragraphs should be logical and support your thesis statement.

A rhetorical analysis is not a summary. In a rhetorical analysis you have to analyze and assess not only what an author wrote, but why he/she wrote it in a certain way.

Rhetorical Analysis Worksheet

What the author wrote	Why the author wrote this, and wrote it in this way.
What is the author's main thesis?	Why did the author choose this thesis to study?
What is the author's purpose? To inform, criticize, persuade? Some other purpose?	What seems to have prompted the writer to present this argument?
Who is the author's target audience? What academic discipline are they likely to come from?	Why did the author choose to write for this particular audience?
What is the author's background? What, if any, is the writer's history of work on this topic?	How does the author build his credibility with the target audience? In what ways does the author appeal to authority, emotion or logic? Does the author connect with the reader and if so, does this level of connection help the essay? Why?
Does the author consider opposing points of views? How does he present them?	What purpose does the presentation of opposing views serve?
What is the author's mode of writing? Description, definition, dialogue, cause/effect, compare/contrast, formal/informal?	Why did the author use this mode of writing? What features of the text make it a more persuasive argument? What parts are most appealing? Why?
Rhetorical devices	Does the author use rhetorical devices such as metaphor, simile, symbolism, humour, irony, parody? Why?

(Adapted from:

<http://writing.colostate.edu/guides/teaching/co301aman/pop7b13.cfm>; <http://tutorial.ncsu.edu/sites/tutorial.ncsu.edu/files/RhetoricalAnalysis.pdf>;
http://www.english.lsu.edu/English_UWriting/English1001Teachers/Assignments/item34042.html

Assignment 2: Knowledge Integration Essay

Worth 25% of overall mark

Due April 3 2023

Length: 10 pages excluding references

Formatting requirements: double spaced, 12 point font, 1 inch margins

Choose one of the following essay questions:

A. What are the benefits and limitations of relying on private sector funding and research partnerships to address environmental problems?

In your essay I expect you to refer to the three textbooks (Brand, Jasanoff and Smith). You may only refer to readings assigned in this course. Finally, please refer to all of the following concepts in your essay:

- progress
- technological determinism
- justice
- responsibility
- local knowledge

or

B. What makes geoengineering a controversial approach to address climate change and why is it more complicated to govern than nuclear energy?

In your essay I expect you to draw from, without being limited to, Brand, Jasanoff and Smith's perspectives on technocracy, sociotechnical risks and the governance of science and technology in addressing social-environmental issues.

You can find useful essay writing guidance here:

<https://utsc.utoronto.ca/twc/sites/utsc.utoronto.ca.twc/files/resource-files/AnalyticEssay.pdf>

<http://advice.writing.utoronto.ca/general/general-advice/>

Debate Assessment

Worth 10% of overall mark

Due April 5, 2023

Google Form: <https://forms.gle/719mYR5NxXmM2dLX9>

Each student is expected to assess the debates presented in class by filling out a Google Form. The assessments will be compiled to identify and discuss the most and the least persuasive debates during the final lecture. Students are responsible for completing this assessment for each debate, except their own.

Each debate will be assessed by the class using a Google Form so that aggregate results can be analyzed. The questions for the audience are:

1. In one sentence describe the environmental issue the debate is addressing.
2. In one sentence describe how the team addresses the environmental issue.
3. In one sentence state what was the most compelling argument in the debate.
4. Rank the *strength of arguments of the "for" side* of the debate from 1 to 7
5. Rank the *strength of arguments of the "against" side* of the debate from 1 to 7
6. Rank the *credibility and knowledge of the "for" side* of the debate from 1 to 7
7. Rank the *credibility and knowledge of the "against" side* of the debate from 1 to 7
8. Rank the *emotional appeal of the "for" side* of the debate from 1 to 7
9. Rank the *emotional appeal of the "against" side* of the debate from 1 to 7