

Simon Fraser University
Political Science Departments
Syllabus: SCIENCE, POLICY, AND INNOVATION
(POL 150) updated Mar. 17, 2020

Summer 2020
M, W 10:30-12:20
Location
Office: AQ6048
Tutorials: time/location
TA: TBD

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Objectives

This course is designed to introduce students to the intersection of public policy and science, to better understand the ways that policy both affects and is affected by science. The learning objectives are to:

1. Develop skills in time management, reading, writing, critical thinking, and oral argumentation through the examination of seminal issues in science and technology policy. The course will provide a foundation of skills through hands on exercises that will help students to succeed in their academic and professional careers.
2. Understand the possibilities and limitations for the scientific and social scientific methods to inform policy decision-making.
3. Examine the interaction among scientists, policymakers, and the public, including gaps in communication and understanding and how they might be filled.
4. Test out the theories of science policymaking on a wide variety of controversial and current cases, from intellectual property rights to climate change.

Science and technology intersect with myriad areas of public policy. The valid premise of Western society is that scientific progress underpins our quality of life. Yet, we consistently perceive that scientific research on solutions to human problems such as climate change is underfunded and does not translate directly into policy decisions. We also see that scientific and technological progress often outpaces policy development, such as the development of cryptocurrencies. In some cases, such as genetically modified crops, scientific progress comes under attack for underestimating the risks of implementing new technologies.

This course examines such questions by surveying the variety of interactions among science, technology, and policy, including cases from Canada and around the world. The approach is multidisciplinary, drawing upon literature in a wide range of disciplines including political science, philosophy, economics, sociology, and history.

Required Books and Software

Because this is a large lecture course, you are required to purchase access to **Learning Catalytics**, an on-line program that will allow us to have quizzes and discussion questions during the lectures. You can register as a student for \$12 at the following website:
<https://www.pearsonhighered.com/products-and-services/course-content-and-digital-resources/learning-applications/learning-catalytics.html>

If you have previously purchased Pearson materials (textbooks), you may already have access to this as one of their learning tools.

I have written a textbook for the course explaining the core concepts as well as a set of case study resources with readings to reinforce the concepts you are learning for the tutorials. You can find these and additional course resources, such as grading templates and study guides, on the **Canvas** course site. You can find additional learning resources on writing at my personal website noted above.

Assignments

The keys to success in any course for both the professor and student are thorough preparation and active participation. **Students should come prepared for discussion in every session with a strong knowledge of the readings.** In order to accomplish this, students should prepare an outline of the readings and memorize the key concepts for each meeting and work ahead of time on writing assignments. In addition, students should work ahead of time on the writing assignment and use the tutorials to improve the quality of their work. The mid-term exam is based upon the core concepts laid out in the textbook, explained in the lecture, and practiced in the tutorial.

The class is set up around core concepts, covered and discussed in the lecture, and skill development and case study application, covered largely in the tutorial.

All writing assignments are due at the beginning of the tutorial. Late work will suffer a cumulative penalty over time, unless a valid doctor's note that provides evidence of a debilitating condition is presented.

The assignments are the following:

- 1- Thorough preparation and active participation in every class. Students should make notes from the readings and come prepared to discuss them in class. The powerpoint lecture slides along with the study guide are available on canvas and are the basis for the quizzes and discussion questions. **Only verified medical notes are acceptable for excusing absences.** Participation in lectures is graded by filling out the on-line quizzes and discussion questions. Attendance is taken in tutorials by the TA.
- 2- **Quizzes** based on the readings and previous lectures. These will be given at the **beginning of every class** using **Learning Catalytics**, which will also be used to guide and mark participation. The quizzes will not include the case study materials for the tutorials (but they will be useful for the tutorials, essays, and the exam). Quizzes will be based on students' ability to understand and use the main ideas and key concepts from the readings as highlighted in the lecture slides and study guide. On Canvas, students will find an additional grammar and writing tutorials, to help skill development, that they can do for bonus marks. Read the grammar material under "modules" and then do all of the quizzes in Canvas. These must be done by class 5. They are worth a bonus of 1% of your overall grade.
- 3- A mid-term in class examination to test out students' understanding of the core concepts of the course, as presented in the first 5 classes and the textbook.

- 4- One short policy brief of 5-7 pages/question, on one of the questions noted below. Instructions and a grading template for the policy brief are available on Canvas and will be reviewed in class. Students can visit the writing centre in the learning commons (submit a client report from SLC to your TA with the assignment) for bonus marks on each assignment (consider booking in advance). Verification must be provided at the time the paper is handed in. Students who visit the SLC and provide verified notes will receive a boost in the letter grade up to the next mark (eg. C+→B-). We will have the SLC come into the tutorials to help you with the writing and editing process.

Grading

The assignments will be graded proportionally as follows:

Participation in lecture	10%
Participation in tutorials	10%
Quizzes in lecture	20%
Mid-term exam	25%
Peer Review Exercise	5%
Policy Brief	30%

Notes: -Participation in lecture is graded by answering the discussion questions via Learning Catalytics, and by recognizing frequent participation to classroom discussion.

-You will be given an A, B, or C for participation in each of the tutorials. An “A” reflects thorough preparation and pro-active participation in every tutorial; eg someone who is prepared to lead discussions/groups and brings good questions. A “B” reflects participation and readiness with the material and attendance at every tutorial. A “C” is assigned for late attendance and haphazard participation, and/or lack of preparation.

-The mid-term exam tests knowledge of the core concepts of the course, as laid out in classes 1-5 and the textbook. It will have multiple choice and short definition questions for terms in the textbook guide (similar to quiz questions from the lecture).

-Policy briefs are marked on the basis of the grading template available on Canvas. Read the grading template before you write your paper! An “A” paper meets all excellent or good criteria. A “B” essay meets mostly excellent or good criteria.

Office Hours I am generally available 9-3 M-F for you to drop in or e-mail, except for teaching and meeting times. I recommend you send me an e-mail beforehand to set up a time. I do not check e-mail on weekends or evenings

See tutorial plan document for what you will be doing in each tutorial. Note: I will be giving the lecture for each class the week before it’s listed, so that you are ready for the quiz and discussion in the next class.

Schedule

--Part 1: Core Concepts---

I. Introduction to Course, Importance of the Scientific Method (W, July 1)

-About the Professor, the TA, the students, and the course; Using Canvas and learning catalytics

-Why Take this Course? The importance of science to public policy and vice versa

-Theme: the importance of science and technological progress to quality of life

Readings: Textbook, Chapter 1

No tutorials this class

II. Humanities View of the Scientific Method; Risk Analysis (M, Jul. 6)

-Practice quiz for learning catalytics on Chapter 1

-Theme 1: critical perspectives on how science has affected society; illustration via a review of art history and warfare; Risk Analysis

Theme 2: What is acceptable risk and how can it be assessed? When and how is it appropriate to allow for the mass introduction of new technologies?

Readings: Textbook, Chapter 2,

-Judith A. Bradbury, The Policy Implications of Differing Concepts of Risk, *Science, Technology & Human Values*, 14,4(1989): 380-99.

-Brian Wynne, Uncertainty and environmental learning: Reconceiving science and policy in the preventive paradigm, *Global Environmental Change*, 1992 (June): 111-27.

Discussion Questions: How did risk assessment for nuclear power go wrong in Fukushima. What are the implications for current and future management of nuclear energy? See: Sebastian M. Pfotenhauer, Christopher F. Jones, Krishanu Saha and Sheila Jasaanoff, Learning from Fukushima, *Issues in Science and Technology*, 2012, 79-84.

III. The Limits of Scientific Approaches to Social Behaviour and Policymaking (W, Jul 8)

-Quiz on Risk Analysis

Readings: Textbook Chapter 3

-Theme: limitations of the scientific and social science methods to informing policy issues

-Gary A. Cziko, 1989. Unpredictability and Indeterminism in Human Behavior, *Educational Researcher*, 18,3: 17-25.

-Tutorial reading: -Makridakis, Spyros, Robin M. Hogarth, and Anil Gaba. 2009. Forecasting and uncertainty in the economic and business world. *International Journal of Forecasting* 25 (2009) 794–812.

-Discussion Questions: Do scientists and society adequately acknowledge the limits of the scientific method? What are the issues that get in the way of using the scientific method for social behaviour? Why are political and economic predictions so fraught?

IV. The Role of the State in Funding Technology (M, Jul 13)

-Quiz on the Limitations of Scientific Approaches

-Theme: -What is the appropriate role of the state in developing technology and promoting companies?

Readings: Textbook, chapter 4

-Mariana Mazzucato, *The Entrepreneurial State*, Demos report, 29-62,
www.demos.co.uk/files/Entrepreneurial_State_-_web.pdf

-Tutorial: Donald C. Story and Russell Isinger, The origins of the cancellation of Canada's Avro CF-105 arrow fighter program: A failure of strategy, *Journal of Strategic Studies*, 30,6: 1025-50.

-Discussion Q.s: Examine the famous story of the failure of the Avro Arrow. Was it a failure typical of all state projects, and/or a failure of inadequate support and/or of implementation?

V. The Role of the Scientist (W, Jul 15)

-Quiz on Scientific Funding

-Themes: Policymaking- relationships among Policymakers, experts, and the public. How can citizen input be improved to allow for a more consultative scientific policy process?

Readings: Textbook, Chapter 5

-Roger A. Pielke, Jr., c. 2, 8-21 in *the Honest Broker: Making Sense of Science in Policy and Politics*, NY: Cambridge U. Press, Q 180.55 S62 P54 2007

-Dirk J. Rioux, Kevin H. Rogers, Harry C. Biggs, Peter J. Ashton, and Anne Sergeant, Bridging the Science–Management Divide: Moving from Unidirectional Knowledge Transfer to Knowledge Interfacing and Sharing, *Ecology and Society* 11(1): 4-24.

Tutorial: -Cristin E. Kearns, Laura A. Schmidt, and Stanton A. Glantz. Sugar Industry and Coronary Heart Disease Research: A Historical Analysis of Internal Industry Documents. 2016. *JAMA Internal Medicine: Special Communication*. E1-E6.

Questions for discussion: What does the article about corporate funding of sugar research say about the possibilities for neutrality in scientific reporting? Does it make sense for us to try to become more democratic in science, or does it require too much expertise? Consider the problems of warnings about unhealthy food- should there be higher taxes on sugar-based drinks and fatty foods, like we have warning labels for cigarettes?

VI. Mid-term: In Class (M, Jul 20)

-no tutorials

---Part II: Case Studies---

VII. Intellectual Property Rights (W, Jul 22)

-Return and discussion of mid-terms

Theme: Controversies about intellectual property rights in an internet age

Readings: -Edmund W. Kitch, The Nature and Function of the Patent System, *The Journal of Law & Economics*, 20,2 (1977): 265-90.

- Michele Boldrin and Daniel K. Levine, The Case Against Patents, *Journal of Economic Perspectives*, 27, 1: 3-22.

Recommended Video Link: <http://www.pbs.org/newshour/videos/page/2/#181962>

Tutorial: Tom McCourt and Patrick Burkart, When creators, corporations and consumers collide: Napster and the development of on-line music distribution. *Media, Culture & Society*, Vol. 25: 333–350

Tutorial: Review the instructions on how to write a policy brief. Exercise using two examples.

VIII. Privacy (M, Jul 27)

Quiz: IPR

Theme: who owns your data? What safeguards are appropriate?

Readings: Alesandro Acquisti, Curtis Taylor and Liad Wagman, 2016, The Economics of Privacy, *Journal of Economic Literature*, 54(2): 442-92. **Read** pp. 442-50 & 462-84.

Tutorial: Review examples and logic of policy briefs. Finding and organizing appropriate sources for your research. Narrowing your scope to write a feasible research question.

IX. Genetic Mapping and Modification (W, Jul 29)

Quiz: Privacy

Theme: What are the appropriate regulations and limitations on the emerging science of genetic modification? Issues on the horizon loom large: from transgenic species to cloning to designer human to reviving extinct species.

Readings:

-Donald M. Bruce, A Social Contract for Biotechnology: Shared Visions for Risky Technologies? *Journal of Agricultural and Environmental Ethics*, 15 (2002): 279-89.

-Fernando P. Carvalho, Agriculture, pesticides, food security and food safety, *Environmental Science and Policy*, 2006: 685-90.

-Tutorial: Developing an annotated bibliography for your policy brief.

X. Climate Change (M, Aug. 3)

-Quiz: Genetics

-Theme: Why is it so hard to get action on climate change?

Readings: - IPCC Special Report for Policymakers: Summary of report Global Warming of 1.5 C; found at: <https://www.ipcc.ch/sr15/>, accessed Mar. 17, 2020.

-Matthew J. Hornsey, Emily A. Harris, Paul G. Bain, and Kelly S. Fielding, Meta-analyses of the determinants and outcomes of belief in climate change. *Nature: climate change*. 6 (2016): 622-7.

-Tutorial: Developing a well-organized outline for your policy brief.

XI. Automation and A.I. (W, Aug 5)

Quiz: Climate Change

Themes: -What are the possibilities of massive job loss by automation and what can be done about it?

-What is A.I. and is it a real or imagined threat

Readings: -David H. Autor. Why are there still so many jobs? The history and future of workplace automation. *Journal of Economic Perspectives*. 29,3 (2015): 3-30.

- Erick Brynjolfsson and Tom Mitchell, What can machine learning do? Workforce implications. *Science*. 358, 6370 (2017): 1530-4.
- Tutorial: In class peer review of your policy brief.

XII. Wrap up discussion (W, Aug 10)

Fill out class evaluation on-line

Policy Briefs due

No tutorials

AN IMPORTANT REMINDER:

Plagiarism involves using another author's words without attribution or otherwise presenting another person's work as one's own. It is a fraudulent and serious academic offence that will result in a severe academic penalty. Also, close paraphrasing of another author's work & self-plagiarism, including submitting the same, or substantively the same, work for academic evaluation more than once, are unacceptable practices that will result in a severe academic penalty.

The university policies on academic honesty are available at:

<http://www.sfu.ca/policies/gazette/student.html>

The Department of Political Science's interpretation of this policy can be found at:

<http://www.sfu.ca/content/dam/sfu/politics/undergraduate%20docs/PLAGIARISM%20Policy%20-%20%20Pol%20Dept.%20Jan.pdf>, and is available in hard copy format outside our General Office. All students are responsible for familiarising themselves with these policies.

A helpful SFU Library tutorial on plagiarism is at

<http://www.lib.sfu.ca/researchhelp/tutorials/interactive/plagiarism/tutorial/introduction.htm>

The DOs and DON'Ts of AVOIDING PLAGIARISM

Do not:

- submit an entire paper or part(s) of a paper or papers that has been written or researched by any other person(s);
- submit a paper as an assignment that has been bought from another person or from a 'paper mill' or essay service;
- submit a paper or other written assignment that has been submitted at another time or for a different course by yourself or any other student or former student;
- submit material that has been downloaded from a website, without acknowledging (using appropriate citation style) that you have done so;
- take someone else's idea(s) and represent it/them as your own;
- copy any text verbatim, or with only slight variation from the original text, without using quotation marks and documenting the source with proper citation style;
- do not closely paraphrase another's material; either paraphrase completely in your own words, or cite as a direct quotation using quotation marks (in either case, give full credit and details regarding authorship and location of the original material);

Do:

- learn how to cite material properly (there are many good guides on this, including the departmental one);
- use a recognized citation style (eg. APA, MLA, Chicago), according to instructions given by the course instructor, and be consistent in the use of the style throughout any single piece of written work;
- carefully read and make sure you understand the university's policy on academic honesty;
- ask the instructor of this course or other faculty members if you have any questions about plagiarism.