

PSCI 1500: Technology, Nature, Power

Lectures: Friday 8:35-10:25 in the Kailash Mital Theatre, Southam Hall
Weekly discussion classes: times and places as assigned

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Course content, objectives and outcomes

This course focuses on interactions among technological change, the evolution of social and political order, and the transformation of the environment. The course will examine specific technologies, including those that helped to define modernity (the printing press, firearms, chemical fertilizers, automobiles), and those that are shaping the future (the internet, artificial intelligence, bio-science). It will consider how technological trajectories have influenced, and been influenced by, political experiences and institutions including bureaucracy, human rights, inequality, and globalization. And it will link this to the dramatic remolding of our planet (through process such as climate change), and the altering of the human experience of nature.

The course will emphasize the connections among technology, nature and power -- with power understood in multiple dimensions: including relations among humans, between humans and their technological creations, and between humans and the non-human natural world

It is open to students from a variety of degree programs, and it is intended to encourage dialogue among those who are pursuing different fields of study and contemplating varied career choices. The course will encourage students to develop their critical thinking in relation to these challenging topics, as well as to develop their skills in research and academic writing.

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

- demonstrate an understanding of the complex interconnections among technology, social and political order and the transformation of the natural environment;
- demonstrate appropriate cognitive, communicative and transferable skills, including the exercise of critical judgement, utilising academic literature, developing an independent analysis and argument, writing an appropriately formatted and referenced research paper, and deepening their capacity for independent learning.

Organisation

Two hour weekly lectures to be held Friday 8:35 to 10:25.

One hour weekly discussion classes (times and locations as assigned). Questions to guide discussion at these weekly sessions will be posted to CULearn. Please note that the lectures, readings and classes are *complementary*. To get a good mark on this course you have to engage actively with each of these distinct elements.

Assessment

Assessment is based on the following:

15%	Discussion group participation
20%	Short written assignment, due 9 February 2018.
35%	Research paper, due 6 April 2018
30%	Final examination

Class participation: This mark reflects the contribution made to the discussion classes. Attendance, keeping up with the readings, and the quality and consistency of participation are all relevant. Students are expected to read the assigned material **before** class, think about the discussion questions, and attend all sessions. Students should be prepared to discuss ideas raised by the lectures, readings and questions and contribute their own perspective. Students may miss no more than one discussion class without suffering any penalty. After that, any absences that are not supported by documentary evidence of extenuating circumstances (for example, illness, bereavement, etc) will result in a reduction of participation marks.

Short assignment: This will involve writing a brief report or commentary (1500 words) on a theme explored in the first four weeks of the semester. Students will be able to select a topic from a list provided by the instructor. The written report must include appropriately formatted references. In preparing this assignment the focus should be on developing an argument about the topic -- presenting a perspective supported by evidence, and not just description or summaries of the readings. Assignments are due February 9 and are to be submitted through CULearn.

Research paper: This is to be an original piece of work on a theme related to the course. Topics must be approved by your Teaching Assistant before the end of February. In preparing this research paper students are expected to examine material on a specialist subject that goes beyond that cited in the reading list. The research paper should have a clear analytical orientation. Further guidance on acceptable topics and good essay techniques will be provided over the semester. The paper is due on April 6 and is to be submitted through CULearn.

Final Exam: This will be a three hour exam, scheduled during the formal exam period. It will cover all the material presented in the lectures and associated readings. The paper will contain three equally weighted parts: (a) short answer questions, where students will be asked to provide short (5-10 line) responses to a list of specific questions; b) essay questions where students will write a brief essay answer on two topics (selected from a list of four) and c) a long essay question, where

students write a developed response on one topic (selected from a list of at least four alternatives).

All four assessed components must be completed if credit is to be awarded for this course. Late assignments without documented leave will be penalized at the rate of 3% per day. All work should be properly referenced and annotated.

Reading and other course materials

There is no textbook for this course. Readings and other course materials are available through CULearn. There are two kinds of course materials:

- *Core readings:* these are mostly academic articles, book chapters, and reports. There are two readings each week to provide an introduction to the issues, an anchor for class discussion, and a basis from which students can extend their investigations.
- *Supplemental material:* these are additional readings, short commentaries, media sites, and video clips. These provide alternative points of entry into the issues and link to current events and debates.

To get the most from this course, students should explore *both* the core academic readings *and* the additional learning resources. Students may find some of the core academic readings challenging. This is to be expected. Don't be discouraged. You are not meant to memorize all the content, or grasp all the points of an intricate argument. Rather these readings are intended to broaden your horizons and get you thinking about complex issues in different ways. If you have trouble with some of the core readings, dig into the Supplemental material for that week -- which approaches the main theme in a more accessible manner.

Weekly core readings are listed later in this course outline. The supplemental material (and appropriate web links) can be found on CULearn.

The program of lectures and discussion classes is fully integrated, so the same set of readings and media apply to both lectures and classes. Students should ensure that they have done the associated readings **BEFORE** each lecture and class. Reading the assigned material is the only way that you will benefit fully from the lectures and the discussion classes.

Administrative Rules

Email communication: all email communication sent to the professor and teaching assistants should have as its subject heading: PSCI 1500. Carleton requires that students, staff and faculty use Carleton email accounts when conducting University business.

Electronic devices: Please note that the classrooms for this course will be a laptop, tablet and mobile phone free zone. Previous experience suggests students using laptops and phones can disturb concentration during class. So students will be asked to use pen and paper for notes. There

will be a break midway through class where students can check their electronic devices. Exceptions to the policy on laptops, tablets and phones will be made for any student with a note from the Paul Menton Center.

Teaching Assistants

The teaching assistants assigned to this course are graduate students with specialist knowledge related to the environment, technology and politics. Their role is to enrich your experience with this course. They should be your first port of call with questions about classes, readings, assignments, marks and the organization of the course.

Course Overview

Week 1: Technology, nature power: an introduction (January 12)

Week 2: A brief history of technology (January 19).

Discussion class 1

Week 3: The evolution of societal organization and power (January 26).

Discussion class 2

Week 4: The transformation of nature (February 2).

Discussion class 3

Week 5: The automobile (February 9).

Discussion class. 4

First assignment due.

Week 6: Agriculture and the food system (February 16).

Discussion class 5

Week 7: *Winter break: no class (February 23).*

Week 8: Fossil fuels and climate change (March 2).

Discussion class 6

Week 9: Sanitation, medicines, and health (March 9).

Discussion class 7

Week 10: Conflict and war (March 16).

Discussion class 8

Week 11: The internet, communications and information technologies (March 23).

Discussion class 9

Week 12: *Good Friday: no class (March 30).*

Week 13: Shaping technological futures: robots, AI, designer babies, geoengineering and space travel? (April 6).

Discussion class 10

Final essay due

Week 14: Technology, nature, power: a review. Exam preparation (April 11).

(Note this last class is on a Wednesday)

Final Exam during official period. Date to be determined

Detailed course program

PART 1 (weeks 1-4)

The first part of this course offers an overview of linkages among the development of technology, societal organization, and the transformation of the environment. The first lecture introduces the course as a whole. The following three lectures offer a tour of human development: first, from the standpoint of technological advance; second, tracking the evolution of social structures and power; and third, in terms of environmental transformations. In each case, the starting point serves to introduce interactions across the other two domains.

Week 1: Technology, nature power: an introduction (January 12)

This session presents the structure of the course and initiates preliminary reflection on substantive issues. The lecture will focus on what this course is about.

'Can we define technology'. In *Technology Matters*: David E. Nye. MIT Press, 2007, pp. 1-15.

'Technology and history: "Kranzberg's laws"'. Melvin Kranzberg. *Technology and Culture* 27 (1986): 544-560.

No discussion class this week

Week 2: A brief history of technology (January 19)

This session traces the historical development of human technology. It will introduce important concepts applied in understanding socio-technological systems, the social construction of technology and technological change.

Skills element: reading and taking notes. Using the supplementary course material.

'Technological systems and industrial society'. In *A Social History of American Technology*. Ruth Cowan and Matthew Hersch. Oxford University Press, 2nd edition, 2018, pp. 107-131.

'World history and energy'. Vaclav Smil. In the *Encyclopedia of Energy*, volume 6. Elsevier, 2004, pp. 549-61.

Supplementary material: see CULearn

Discussion class 1: see questions for the week on CULearn.

Week 3: The evolution of societal organization and power (January 26)

The week examines the evolution of human societies and power. The lecture will explore different forms of social power, how social organization influences technological pathways, and the ways technologies help define economic, social and political power.

Skills element: writing a short paper. How to write the first assignment.

'The nitrate wars'. Extract from *The Alchemy of Air*. Thomas Hager. Broadway Books, 2008, pp. 25-62.

'Do artefacts have politics?'. Langdon Winner. *Daedalus* 109 (1980): 121-136.

Supplementary material: see CULearn.

Discussion class 2: see questions for the week on CULearn.

Week 4: The transformation of nature (February 2)

This lecture explores the transformation of the global biosphere associated with the social and technological development of humankind. It will demonstrate that human societies have always (intentionally and unintentionally) transformed their environments. And it will examine the changing scale and scope of the impacts since the second half of the twentieth century.

Skills element: Academic writing: references and plagiarism

'Prologue: peculiarities of a prodigal century'. In *Something New Under the Sun: an Environmental History of the Twentieth-century World*, J. R. McNeill. W.W. Norton and Company, 2000, pp. 3-17.

'The Anthropocene is functionally and stratigraphically distinct from the Holocene'. Colin Waters, *et. al. Science* 351 (2016) (6260). DOI: 10.1126/science.aad2622.

Supplementary material: see CULearn.

Discussion class 3: see questions for the week on CULearn.

PART 2: (weeks 5-11)

The second part of this course focuses on integrating technical, social and environmental dimensions around six specific cases defined by: the automobile; agriculture and food systems; fossil fuels and climate change; sanitation, medicines and health; conflict and war; and the internet, communications and information technologies.

Week 5: The automobile (February 9)

This week explores the automobile -- a critical twentieth century technological artefact, whose rise was associated with the advent of modern consumer society and the affirmation of US geopolitical

power. It will consider transformations currently shaking this industry including vehicle electrification, autonomous vehicles, and alternative mobility regimes.

'The city and the car'. Mimi Sheller and John Urry. *International Journal of Urban and Regional Research* 24 (2000): 737-757.

'Cars and second order consequences'. Benedict Evans. Comment: March 29, 2017. Available at: <https://www.ben-evans.com/benedictevans/2017/3/20/cars-and-second-order-consequences>

Supplementary material: see CULearn.

Discussion class 4: see questions for the week on CULearn.

Week 6: Agriculture and the food system (February 16)

This week focuses on agriculture as a system of production and consumption. Advances in agricultural techniques have allowed a massive expansion of human numbers and transformed global ecosystems.

Skills element: developing a topic for a research essay. Determining a research strategy.

'The Columbian exchange: a history of disease, food, and ideas'. Nathan Nunn and Nancy Qian. *The Journal of Economic Perspectives* 24 (2) (2010): 163-188.

'How sustainable agriculture can address the environmental and human health harms of industrial agriculture'. Leo Horrigan, Robert S. Lawrence, and Polly Walker. *Environmental Health Perspectives* 110 (2002): 445-456. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240832/pdf/ehp0110-000445.pdf>

Supplementary material: see CULearn.

Discussion class 5: see questions for the week on CULearn.

Week 7: *Winter break: no class* (February 23)

Week 8: Fossil fuels and climate change (March 2)

This week focuses on climate change, examining its historical emergence, the geopolitical structure of the problem, progress to date and potential solutions. It explores technological options and political strategies.

Skills element: writing a good research paper.

'Climate change: evidence and causes'. Royal Society of the United Kingdom and the US National Academy of Sciences. 2014. Available at: <http://dels.nas.edu/resources/static-assets/exec-office-other/climate-change-full.pdf>

'The pace of governed energy transitions: Agency, international dynamics and the global Paris agreement accelerating decarbonisation processes?' Florian Kern and Karoline Rogge. *Energy Research and Social Science* 22 (2016): 13-17.

Supplementary material: see CULearn.

Discussion class 6: see questions for the week on CULearn.

Week 9: Sanitation, medicines, and health (March 9)

Developments in sanitation, medicine and health care have been critical to extending human life expectancy, shaping demographic patterns, and influencing life experiences. This week engages with knowledge, technologies and power in this domain, dealing with issues ranging from water and sewage systems, to drugs and pharmaceutical companies.

'A new global sanitary revolution: lessons from the past'. Ben Fawcett and Maggie Black. 33rd Water, Engineering and Development Centre International Conference, Accra, Ghana, 2008, pp 41-45.

Two readings from Marc Andre Gagnon on the pharmaceutical industry: (a) 'New drug pricing: does it make any sense'. *Revue Prescrire*, June 2015; 35 (380): 457-461. AND (b) 'Corporate influence over clinical research: considering the alternatives' *Revue Prescrire*, April 2012; 32 (342): 311-314.

Supplementary material: see CULearn.

Discussion class 7: see questions for the week on CULearn.

Week 10: Conflict and war (March 16)

Conflict has been a continuous feature of human society, and warfare and technologies related to war have played a critical role in the development of social systems and ultimately the transformation of the non-human natural world. This class will examine the entwining of civilian and military technologies, considering issues such as the civilian and military applications of nuclear technologies, and the 'military industrial complex'.

'Introduction'. In *War and Nature: Fighting Humans and Insects with Chemicals from World War I to Silent Spring*. Edmund Russel. Cambridge University Press, 2001, pp 1-16.

'Liberal Preferences as an Explanation for Technology Choices. The Case of Military Robots as a Solution to the West's Casualty Aversion'. Niklas Schornig. In *The Global Politics of Science and Technology*, volume 2, Maximilian Mayer, Mariana Carpes, and Ruth Knoblich, Springer-Verlag, 2014, pp. 67-82.

Supplementary material: see CULearn.

Discussion class 8: see questions for the week on CULearn.

Week 11: The internet, communications and information technologies (March 23)

This week deals with the internet, and the information and communication revolution more generally, looking at the technological trajectory that gave it birth and the social transformations with which it is associated. It will deal with issues such as the power of the 'tech giants', democracy and the manipulation of information, surveillance, on line shopping, social media, the sharing economy', and so on.

'Liberation versus control: the future of cyberspace'. Ronald Deibert and Rafal Rohozinski, *Journal of Democracy* 21 (2010), pp. 43-57.

'The "sharing" economy: labour, inequality and social connection on for-profit platforms'. Julliet B. Schor and William Attwood-Charles. *Sociology Compass* 11 (2017) e12393.

DOI: 10.1111/soc4.12493

Supplementary material: see CULearn.

Discussion class 9: see questions for the week on CULearn.

Week 12: *Good Friday: no class (March 30)*

PART 3 (weeks 13-14)

The final part of the course will focus on technologies which are remaking contemporary society and likely to become even more important in the future. This includes biotechnology, robotics and Artificial Intelligence (AI) , the internet of things, geoengineering and space travel.

Week 13: Shaping technological futures? Robots, AI, designer babies, geoengineering and space travel (April 6).

This will examine technological futures and the extent to which it is possible to control technological development pathways. It will engage with a variety of novel technologies that are reshaping the modern world and that will help define the future: including bio technology, nano technology, AI and robotics, space travel, and radically extending the human life span.

'Opening up the politics of knowledge and power in bioscience'. Andy Stirling. *PLoS Biology* 10 (1) (2012) e1001233 doi:10.1371/journal.pbio.1001233.

Four short readings on emerging technologies:

Designer babies: <https://www.theguardian.com/science/2017/jan/08/designer-babies-ethical-horror-waiting-to-happen>

Geoengineering: <https://news.harvard.edu/gazette/story/2013/10/geoengineering-opportunity-or-folly/>

Artificial Intelligence: <https://futureoflife.org/background/benefits-risks-of-artificial-intelligence/>

Extending the human lifespan: <https://www.newyorker.com/magazine/2017/04/03/silicon-valleys-quest-to-live-forever>

Supplementary material: see CULearn.

Discussion class 10: see questions for the week on CULearn.

Week 14: Technology, nature, power: a review (April 11).

This lecture will draw lessons from the discussion over the preceding weeks. It will include a review for the final exam.

Skills element: exam techniques.

'Technological revolutions and techno-economic paradigms'. Carlota Perez. *Cambridge Journal of Economics* 34 (2010): 185–202. doi:10.1093/cje/bep051

Planetary boundaries: Guiding human development on a changing planet. Will Steffan et al. *Science* 347, 1259855 (2015). DOI: 10.1126/science.1259855

Supplementary material: see CULearn.

No discussion class this week.

Academic Accommodation

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your **Letter of Accommodation** at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (*if applicable*).

For Religious Observance: Students requesting accommodation for religious observances should apply in writing to their instructor for alternate dates and/or means of satisfying academic requirements. Such requests should be made during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist, but no later than two weeks before the compulsory academic event. Accommodation is to be worked out directly and on an individual basis between the student and the instructor(s) involved. Instructors will make accommodations in

a way that avoids academic disadvantage to the student. Instructors and students may contact an Equity Services Advisor for assistance (www.carleton.ca/equity).

For Pregnancy: Pregnant students requiring academic accommodations are encouraged to contact an Equity Advisor in Equity Services to complete a *letter of accommodation*. Then, make an appointment to discuss your needs with the instructor at least two weeks prior to the first academic event in which it is anticipated the accommodation will be required.

Plagiarism: The University Senate defines plagiarism as “presenting, whether intentional or not, the ideas, expression of ideas or work of others as one’s own.” This can include:

- reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another’s data or research findings;
- failing to acknowledge sources through the use of proper citations when using another’s works and/or failing to use quotation marks;
- handing in "substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs.

Plagiarism is a serious offence which cannot be resolved directly with the course’s instructor. The Associate Deans of the Faculty conduct a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They may include a mark of zero for the plagiarized work or a final grade of "F" for the course.

Submission and Return of Term Work: Papers must be submitted directly to the instructor according to the instructions in the course outline and will not be date-stamped in the departmental office. Late assignments may be submitted to the drop box in the corridor outside B640 Loeb. Assignments will be retrieved every business day at **4 p.m.**, stamped with that day's date, and then distributed to the instructor. For essays not returned in class please attach a **stamped, self-addressed envelope** if you wish to have your assignment returned by mail. Final exams are intended solely for the purpose of evaluation and will not be returned.

Grading: Standing in a course is determined by the course instructor, subject to the approval of the faculty Dean. Final standing in courses will be shown by alphabetical grades. The system of grades used, with corresponding grade points is:

Percentage	Letter grade	12-point scale	Percentage	Letter grade	12-point scale
90-100	A+	12	67-69	C+	6
85-89	A	11	63-66	C	5
80-84	A-	10	60-62	C-	4
77-79	B+	9	57-59	D+	3
73-76	B	8	53-56	D	2
70-72	B-	7	50-52	D-	1

Approval of final grades: Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by an instructor may be subject to revision. No grades are final until they have been approved by the Dean.

Carleton E-mail Accounts: All email communication to students from the Department of Political Science will be via official Carleton university e-mail accounts and/or cuLearn. As important course and University information is distributed this way, it is the student's responsibility to monitor their Carleton and cuLearn accounts.

Carleton Political Science Society: The Carleton Political Science Society (CPSS) has made its mission to provide a social environment for politically inclined students and faculty. Holding social events, debates, and panel discussions, CPSS aims to involve all political science students at Carleton University. Our mandate is to arrange social and academic activities in order to instill a sense of belonging within the Department and the larger University community. Members can benefit through numerous opportunities which will complement both academic and social life at Carleton University. To find out more, visit <https://www.facebook.com/groups/politicalsciencesociety/> or come to our office in Loeb D688.

Official Course Outline: The course outline posted to the Political Science website is the official course outline.