

**PSCI 1500B: Technology, Nature, Power**

Lectures: Friday 9:35-11:25

Please confirm location on Carleton Central

Weekly discussion classes: times and places as assigned

Professor: James Meadowcroft  
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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 independent analysis

and argument, writing an appropriately formatted and referenced research paper, and deepening the capacity for independent learning.

### Organisation

Two hour weekly lectures to be held Friday 9:35 to 11:25

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 intended to complement each other. *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:

- 20% Discussion group participation
- 20% Reading responses and on-line quizzes
- 30% Short research paper, due April 3, 2020
- 30% Final examination

Discussion group 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.

Reading responses: This will involve writing brief commentaries (700 words each) on class readings over the course of the semester. Each student will be assigned three weeks for which they are responsible for preparing the commentaries. They are to be written in clear language and engage with the core readings. They should go beyond summarizing the readings to *critically assess arguments, and provide pertinent observations on the issues. The commentary should give evidence of thought.* Students with student numbers ending in 1, 2, 3 should do weeks 2, 5, 9. Those with student numbers ending in 4, 5, 6 should do week 3, 6, 10. And those with numbers ending in 7, 8, 9, 0 should do weeks 4, 8, 11. *The commentaries must be submitted on CULearn by midnight on the Wednesday before the Friday class for which the readings are assigned.* (Eg: by midnight on Wednesday January 15, for the class of Friday January 17).

On-line quizzes: Two on-line quizzes will be administered during the semester. These are intended to provide students with feedback about their progress in assimilating course material. These will be held during weeks 5 and 9. Additional details will be provided later in the semester

*The lowest mark among the three reading responses and two quizzes will be set aside when compiling the final grade. So the four elements that remain (reading responses and quizzes) will each contribute 5% to the final grade.*

Short research paper: This is to be an original piece of work on a theme related to the course. In preparing this research paper students are expected to examine material on a specialist subject that goes beyond the course reading list. The paper should have a clear analytical orientation. It is to be no more than 2,500 words long.

To ensure success with this project students are expected to meet their Teaching Assistant (by March 6) to discuss their potential topic. They will then submit a short outline of the paper together with an annotated bibliography of initial sources; this is to be no more than two pages in total and submitted by March 13. Successful engagement in this planning/preparatory process will be accorded a 20% weighting in determining the final mark for the research paper component of the final grade. Further guidance on acceptable topics and good research essay techniques will be provided over the semester. The paper is due on April 3 and is to be submitted through CULearn.

References should adopt the format of the American Psychological Association. See material on how to reference your paper on the CuLearn course page.

Essays should be uploaded in **WORD** format to the CuLearn site. Essays will not be accepted in PDF format.

Final Exam: This will be a two 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 two equally weighted parts: (a) short answer questions, where students will be asked to provide short (5-6 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 five).

Late assignments without documented leave will be penalized at the rate of three percent 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.
- *On-line 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 on-line learning resources. Students may find some of the core academic readings challenging. This is to be expected. Do not 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 on-line material for that week -- which typically approach the main theme in a more accessible manner.

Weekly core readings are listed later in this course outline. The supplemental on-line 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 lectures where students can check their electronic devices. Exceptions to the policy on laptops, tablets and phones can be made on a case by case basis.

### **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 10)

Week 2: A brief history of technology (January 17).

Discussion class 1

Week 3: The evolution of societal organization and power (January 24).

Discussion class 2

Week 4: The transformation of nature (January 31).

- Discussion class 3
- Week 5: The automobile (February 7).  
Discussion class. 4
- Week 6: Agriculture and food systems (February 14).  
Discussion class 5
- Week 7: *Winter break: no class (February 21).*
- Week 8: Fossil fuels and climate change (February 28).  
Discussion class 6
- Week 9: Sanitation, medicines, and health (March 6).  
Discussion class 7
- Week 10: Conflict and war (March 13).  
Discussion class 8
- Week 11: The internet, communications and information technologies (March 20).  
Discussion class 9
- Week 12: Shaping technological futures: robots, AI, designer babies, geoengineering and space travel? (March 27).  
Discussion class 10
- Week 13: Technology, nature, power: a synthesis. Exam preparation (April 3)
- Research paper due April 3  
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 10)

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 17)**

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 24)**

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.

- '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 (January 31)**

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 biosphere'. Mark Williams, Jan Zalasiewicz, PK Haff, Christian Schwägerl, Anthony Barnosky and Erle Ellis. *The Anthropocene Review* 2015, Vol. 2(3) 196–219.

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 7)**

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 food systems (February 14)**

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 21)***

**Week 8: Fossil fuels and climate change (February 28)**

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.*

'The climate mitigation gap: education and government recommendations miss the most effective individual actions'. Seth Wynes and Kimberly A Nicholas 2017 *Environ. Res. Lett.* **12** 074024.

'Let's get this transition moving', *Canadian Public Policy/Analyse de politiques*, 42Sup1 (2016): 10-17.

Supplementary material: see CULearn.

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

**Week 9: Sanitation, medicines, and health (March 6)**

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 13)**

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 20)**

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.

### **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 12: Shaping technological futures? Robots, AI, designer babies, geoengineering and space travel (March 27).**

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 13: Technology, nature, power: a synthesis (April 3).**

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.*

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## Academic Accommodations

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### Requests for Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

#### Pregnancy obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: [carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)

#### Religious obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: [carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)

### Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC 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 your instructor as soon as possible to ensure accommodation arrangements are made. [carleton.ca/pmc](https://carleton.ca/pmc)

### Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: [carleton.ca/sexual-violence-support](https://carleton.ca/sexual-violence-support)

### Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

For more information on academic accommodation, please contact the departmental administrator or visit: [students.carleton.ca/course-outline](https://students.carleton.ca/course-outline)

### **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.

Student or professor materials created for this course (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).

### **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. By hosting social events, including Model Parliament, debates, professional development sessions and more, 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 our networking opportunities, academic engagement initiatives and numerous events which aim to complement both academic and social life at Carleton University.

To find out more, visit us on Facebook

<https://www.facebook.com/CarletonPoliticalScienceSociety/> and our website

<https://carletonpss.com/>, or stop by our office in Loeb D688!"

### **Official Course Outline**

The course outline posted to the Political Science website is the official course outline.