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Institute for the History and Philosophy of Science and Technology  
University of Toronto

**HPS283 - The Engineer in History**  
Syllabus, Winter 2019

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**Course Instructor:** Jeni Barton, [jeni.barton@mail.utoronto.ca](mailto:jeni.barton@mail.utoronto.ca)

**Office Hours:** Tuesdays, 2-3PM, VC 308 (Victoria College), or by appointment

**Lectures:** Thursdays, 4-6PM, GB 220

**Teaching Assistant:** Fan Zhang, [f.zhang@utoronto.ca](mailto:f.zhang@utoronto.ca); office hours: by appointment

**Tutorial Sections:** Each section will meet five times (schedule below).

Tut 0101, Mondays 12-1PM, BA 2179

Tut 0102, Mondays 12-1PM, BA B026

Tut 0103, Mondays 9-10AM, BA 2179

Tut 0104, Mondays 9-10AM, BA B026

**Course Description:** In the simplest and broadest sense, an engineer is someone who designs and/or builds something to achieve a goal. This course examines engineers—professional and amateur—as they and their practices have developed and transformed over time. It presents a cultural history that focuses primarily on engineers in the west from the Industrial Revolution up to the present, situating them in the broader social, cultural, political, and economic contexts in which their work has taken place. These contexts shift over time, as does the meaning of engineering and the role of the engineer. Though sometimes focusing on specific engineers, the course's emphasis will be on engineers as part of a broader community of practitioners, and the heterogeneous networks of people, artifacts, organizations, political arrangements, and legal apparatus that comprise technological design and development. It will look at both the successful creation of these engineering networks, as well as engineering failures. Through an examination of historical case studies, important issues emerge regarding engineers' place in society, their relationships to the state, societal reactions to engineers and their work, professionalization, institutional cultures, education, gender dynamics, and the environmental impact of engineering projects. By studying these past contexts and issues we can better understand how they continue to shape understandings of the engineer and engineering practices today.

**Mark Distribution:**

Assignment #1 (due Feb. 12):	20%
Assignment #2 (due Mar. 19):	30%
Final Exam:	40%
Tutorials:	10%

**Course Website:** Accessible through the University of Toronto's Quercus website (<https://q.utoronto.ca/>).

**Lectures:** This course consists of two hours of lectures per week. Attendance is strongly encouraged. Lecture slides will be made available, but they will not contain all of the material covered in lectures.

**Readings:** There is no class textbook. All readings will be available on the course's Quercus website (in the "Modules" tab). There are generally two readings listed per week (and occasionally a video or podcast). You are expected to review this material before the start of each lecture.

**Tutorials:** Each tutorial section will meet **five** times over the semester to discuss in small group settings a selection of the course readings. ***Tutorial dates for each section are listed at the end of the syllabus.*** Each tutorial will focus on one (or more) of the lecture readings. The TA will indicate which reading(s) to focus on before each tutorial. Attendance is mandatory and participation is encouraged. The tutorial mark will reflect a combination of attendance and participation.

**Assignment #1:** Assignment #1 is a 750-1000 word essay due **February 12**. Assignments must be uploaded to Quercus in .doc, .docx, or .pdf format. No other formats will be accepted. Please use proper footnote/bibliographic citations, including page numbers, as listed in the *Chicago Manual of Style* ([https://www.chicagomanualofstyle.org/tools\\_citationguide/citation-guide-1.html](https://www.chicagomanualofstyle.org/tools_citationguide/citation-guide-1.html)).

Using course readings and lecture material, students are required to respond to the following:

*How have engineers and others attempted to develop and use technologies and technological systems to achieve political, economic, and/or social goals? How successful have these efforts been? What kinds of relationships have developed amongst engineers, and/or between engineers and other groups in society (e.g. members of the state, the nobility, labourers)?*

In their response, students must formulate a position (in the form of a thesis statement) and then defend that position using specific examples from course readings and lecture material as evidence supporting that position. Students must cite **at least three** course readings in their response. No outside research is required.

**Assignment #2:** Assignment #2 is a 1000-1250 word critical analysis of an academic book that focuses on the engineer in history. It is due on **March 19**. Assignments must be uploaded to Quercus in .doc, .docx, or .pdf format. No other formats will be accepted. Please use proper footnote/bibliographic citations, including page numbers, as listed in the *Chicago Manual of Style* ([https://www.chicagomanualofstyle.org/tools\\_citationguide/citation-guide-1.html](https://www.chicagomanualofstyle.org/tools_citationguide/citation-guide-1.html)). A list of pre-approved books is included below. Students must analyze one of these books. It is possible to choose a book not on the list, but it must be approved by the instructor *at least two weeks* before the due date (i.e. before March 5). Only assignments on pre-approved books will be accepted.

Students are required to provide a detailed summary of the book's argument(s) and evidence, critically analyze the book's argument(s), and relate the analysis to major themes in the course. In addition, students must use and cite **at least one** of the course readings in their analysis. The overall emphasis in the assignment should be on analysis, not summary.

Pre-approved books:

Amy Sue Bix, *Girls Coming to Tech: A History of American Engineering Education for Women* (Cambridge, MA: MIT Press, 2014).

Lino Camprubí, *Engineers and the Making of the Francoist Regime* (Cambridge, MA: MIT Press, 2014).

Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity After World War II* (Cambridge, MA: MIT Press, 1998).

Thomas P. Hughes, *Networks of Power: Electrification in Western Society 1880-1930* (Baltimore, MD: Johns Hopkins University Press, 1983).

Sara S. Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône* (Cambridge, MA: Harvard University Press, 2011).

Amy Slaton, *Race, Rigor, and Selectivity in US Engineering: The History of an Occupational Color Line* (Cambridge, MA: Harvard University Press, 2010).

John Tresch, *The Romantic Machine: Utopian Science and Technology After Napoleon* (Chicago: University of Chicago Press, 2014).

Matthew Wisnioski, *Engineers for Change: Competing Visions of Technology in 1960s America* (Cambridge, MA: MIT Press, 2012).

**Final Exam:** The final exam will be comprised of short answer and essay questions drawn from the course lectures and readings. The University of Toronto will post the winter exam timetable no later than February 28.

**Assignment Submission Policy:** All assignments must be submitted electronically via the course's Quercus website in .doc or .pdf format. Email or paper submissions will not be accepted.

**Late Policy:** Late assignments will have 10% deducted from the final mark for each day late. Extensions for medical reasons and other considerations require proper documentation. The following are acceptable documents:

- 1) University of Toronto Verification of Illness or Injury Form
- 2) Student Health or Disability Related Certificate
- 3) A College Registrar's Letter
- 4) Accessibility Services Letter

**Plagiarism and Academic Integrity:** Please consult the University of Toronto's Code of Behaviour on Academic Matters (<http://www.artsci.utoronto.ca/osai/The-rules/code/the-code-of-behaviour-on-academic-matters>) for all issues dealing with academic integrity, including plagiarism. If you have any questions or concerns, please contact the course instructor. The university takes cases of cheating and plagiarism very seriously. Academic offenses can result in a student being expelled and other severe penalties.

**Communications Policy:** Emails will be answered within 48 hours, excluding weekends. Please use your University of Toronto email address for all communications. This is university policy.

**Accessibility Services:** This course welcomes students with diverse learning styles and needs. Please contact Accessibility Services (<https://www.studentlife.utoronto.ca/as>) to coordinate any academic accommodation arrangements.

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## **Course Lecture Outline and Readings:**

**January 10** — Introduction / Pre-Industrial “Engineers”

**January 17** — Engineers and the State: Nation-Building, Industrialization, and Imperialism

*Readings:*

Chandra Mukerji, “The New Rome: Infrastructure and National Identity on the Canal du Midi,” *Osiris* 24 (2009): 15-32.

Marta Macedo, “Standard Cocoa: Transnational Networks and Technoscientific Regimes in West African Plantations,” *Technology and Culture* 57 (2016): 557-579.

**January 24** — Engineering Identity and Professionalization / Large Technological Systems

*Readings:*

Paul Dobraszczyk, “Image and Audience: Contractual Representation and London’s Main Drainage System,” *Technology and Culture* 49 (2008): 568-598.

Thomas P. Hughes, “The Evolution of Large Technological Systems,” in *The Social Construction of Technological Systems* (1987): 51-80.

**January 31** — Engineering Management and Modernity

*Readings:*

Sharon Corwin, “Picturing Efficiency: Precisionism, Scientific Management, and the Effacement of Labor,” *Representations* 84 (2003): 139-160.

Sean F. Johnston, “Technological Parables and Iconic Illustrations: American Technocracy and the Rhetoric of the Technological Fix,” *History and Technology* 33 (2017): 196-212.

## February 7 — Engineering War

### Readings:

Michael J. Neufeld, "Wernher von Braun, the SS, and Concentration Camp Labor: Questions of Moral, Political, and Criminal Responsibility," *German Studies Review* 25 (2002): 57-73.

Donald MacKenzie, "Missile Accuracy: A Case Study in the Social Processes of Technological Change," in *The Social Construction of Technological Systems* (1987): 195-218.

## February 14 — The Politics of Engineering and Design / Engineering Tools

### Readings:

Langdon Winner, "Do Artifacts Have Politics?" in *The Whale and the Reactor* (1986): 19-39.

Henry Petroski, "From Slide Rule to Computer: Forgetting How It Used To Be Done," in *To Engineer is Human: The Role of Failure in Successful Design* (1985): 189-203.

## February 21 — Reading Week, **NO CLASSES**

## February 28 — Gender and Engineering

### Readings:

Lois Mandel, "The Computer Girls," *Cosmopolitan* (April 1967): 52-56.

Nathan Ensmenger, "Making Programming Masculine," in *Gender Codes: Why Women are Leaving Computing* (2010): 115-138.

"When Women Stopped Coding," *Planet Money* Podcast,  
<https://www.npr.org/sections/money/2016/07/22/487069271/episode-576-when-women-stopped-coding>

## March 7 — Countercultural Engineers

### Readings:

Matthew Wisnioski, "'Liberal Education Has Failed': Reading Like an Engineer in 1960s America," *Technology and Culture* 50 (2009): 753-782.

Carroll Pursell, "The Rise and Fall of the Appropriate Technology Movement in the United States, 1965-1985," *Technology and Culture* 34 (1993): 629-637.

"The New Alchemists," *National Film Board* Documentary,  
[https://www.nfb.ca/film/new\\_alchemists/](https://www.nfb.ca/film/new_alchemists/)

## March 14 — Engineering Society

### Readings:

Neil Maher, "Spaceship Earth: Civil Rights and NASA's War on Poverty," in *Apollo in the Age of Aquarius* (2017): 11-53.

Eden Medina, "Designing Freedom, Regulating a Nation: Socialist Cybernetics in Allende's Chile," *Journal of Latin American Studies* 38 (2006): 571-606.

## March 21 — Institutional Cultures / Normal Accidents

### Readings:

Eda Kranakis, "Fixing the Blame: Organizational Culture and the Quebec Bridge Collapse," *Technology and Culture* 45 (2004): 487-518.

Harry Collins and Trevor Pinch, "The Naked Launch: Assigning Blame for the *Challenger* Explosion," in *The Golem at Large: What You Should Know About Technology* (2002), 30-56.

## March 28 — Engineers and the Environment

### Readings:

Kristian H. Nielsen and Matthias Heymann, "Winds of Change: Communication and Wind Power Technology Development in Denmark and Germany from 1973 to ca. 1985," *Engineering Studies* 4 (2012): 11-29.

Sara B. Pritchard, "An Envirotechnical Disaster: Nature, Technology, and Politics at Fukushima," *Environmental History* 17 (2012): 219-233.

## April 4 — Engineering Present and Future

### Readings:

Henry Petroski, "The Obligation of an Engineer," in *To Forgive Design* (2012): 175-198.

"Should We Dim the Skies to Save the World?" *The Atlantic's Crazy/Genius* Podcast,  
<https://www.theatlantic.com/ideas/archive/2018/08/should-we-dim-the-skies-to-save-the-world/568969/>

**Tutorial Schedule:** Each tutorial section will meet **five** times.

### *Tutorial #1*

Tut 0101, 0103 — January 21

Tut 0102, 0104 — January 28

### *Tutorial #2*

Tut 0101, 0103 — February 4

Tut 0102, 0104 — February 11

### *Tutorial #3*

Tut 0101, 0103 — February 25

Tut 0102, 0104 — March 4

*Tutorial #4*

Tut 0101, 0103 — March 11

Tut 0102, 0104 — March 18

*Tutorial #5*

Tut 0101, 0103 — March 25

Tut 0102, 0104 — April 1