

HTS 2084, Spring 2018
Technology and Society (3 cr)
MWF 1:55 pm – 2:45 pm, Old Civil Engineering G10

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Description. This course deals with key ideas about technology through historical case studies that connect technology with other human activities. I use these case studies to challenge widely held misperceptions about technology and how it operates in the modern world.

I argue that technology is a human product, not an autonomous force. Technology makes nothing happen by itself, but only as the result of human action. We can, therefore, only make sense of technology by understanding it as an integral part of human history.

There are three major parts to the course. The first part focuses on the factors that shape technological change. The second part examines technology in relation to society and culture, treating issues of gender, work, and war. The third part concentrates on ethics of technology, with case studies on fear of robots, automobile safety, and the shuttle *Challenger*.

Course Goals and Learning Outcomes. This course fulfills USG Core Area E, Social Studies, which means that students "will demonstrate the ability to describe the social, political, and economic forces that influence social behavior."

More specifically, by the end of this course, students should be able to:

- Give a broad definition of "technology" with examples of various types;
- Describe technological change as a complex, nonlinear, and indeterminate process;
- Analyze how human choices and social factors shape technological change;
- Explain the ethical implications of technological choice

HTS 2084 also fulfills the Georgia Tech ethics requirement that exists in some majors.

Requirements

Lecture. Attendance at lecture is necessary if you want to succeed in the course. Many of the key ideas are presented only in lectures. See under "Grades" for the attendance policy.

Readings. There is a significant reading assignment every week. A few readings are short and easy, but many are long and challenging. Some readings will overwhelm you with information. When doing the reading, you need to keep specific questions in mind to help you focus on the most important information. Use the weekly email for guidance.

Discussion. Most Fridays will be devoted to discussion. Please come prepared to talk. Preparation will require doing the readings for the week and thinking about the discussion questions distributed by email.

Weekly assessments. Most weeks will include a brief assignment or a quiz based on the readings and lectures. These exercises will help you prepare for discussion and keep up with the readings.

Take-home essays. There will be two short take-home essay exams due 2/12, 3/26, and a longer take-home final due 5/3. The first two take-home essays require use of material from both lectures and readings. The take-home final will require some additional research outside of class.

Grades. First two take-home essays, 20% each; final essay, 25%; weekly assignments and quizzes, 20%; discussion, 15%.

The *essays* will be graded on both writing and content. In order to receive an A, the essay must have the following: 1) a clearly stated thesis making a non-trivial point in response to the questions posed; 2) properly focused paragraphs each contributing to the thesis; 3) specific evidence, drawn from the readings, supporting the thesis; 4) direct, concise prose that conveys your meaning with specific, carefully chosen words; 5) correct spelling, grammar, and punctuation.

The *discussion* grade will be based on attendance and class participation. Ideally, everyone should try to make roughly two meaningful comments in each full-class discussion. Discussion will be graded on a scale of 0 to 3, as follows: 0: missed discussion; 1: present but minimal participation; 2: at least one decent comment based on engagement with the readings; 3: two or more intelligent comments. Students who have more than three unauthorized absences from non-discussion classes will have one point deducted from the discussion grade for each class missed.

Percentage grades will be converted to letter grades as follows: $100 \geq A \geq 90$; $90 > B \geq 80$; $80 > C \geq 70$; $70 > D \geq 60$; $F < 60$.

Course Web Site and Email List

The website for this course is available on Canvas. I will also send out reminders and assignment prompts by email.

Course Books and Reader. The following books will be available from the campus bookstore. I will send an email when the books are available for purchase.

Karel Čapek, *R.U.R. (Rossum's Universal Robots)*, trans. Claudia Novack (New York: Penguin, 2004).

Richard P. Feynman, "*What Do You Care What Other People Think?*" (New York: Bantam, 1988).

Other assigned readings will be posted to Canvas.

Academic Integrity. I expect students to maintain the highest ethical standards in this course. Each student is responsible for knowing the rules about academic misconduct listed here: <http://b.gatech.edu/2CjF1Ro>.

For this course, the most important rules concern written work done outside of class. Here's a summary. Don't copy stuff without 1) citing the original source you used for the ideas, and 2) putting it in quotation marks if you use the exact words. For a guide about what counts as plagiarism, see <http://b.gatech.edu/2DtNroN>; for more detail, see <http://unc.live/2CiHag9>.

You are encouraged to study and discuss course content with your classmates and friends, but your writing must be your own. Once you start writing, stop talking with classmates. You can, however, ask friends outside the class to check your written work for clarity and grammar.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities. If you have a disability that might affect your performance in this course, please contact the Office of Disability Services at (404) 894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible. Let me know about your learning needs as well and I'll do my best to accommodate you.

Religious Holidays. You can take off any religious holidays you want, as long as you make up the work and tell me you will miss in advance, preferably by the second week of class. For more detail see <http://catalog.gatech.edu/rules/4/>, ¶B.6.

Freacking Out. College life often involves a lot of stress. If you feel like things are getting out of hand, either for personal or academic reasons, please stop by the Georgia Tech Counseling Center, located in the Smithgall Building, 353 Ferst Dr NW, 404-894-2575. After hours phone 404-894-2204. For more information, see <http://counseling.gatech.edu>.

Course Outline

Part 1: Understanding Technological Change

Week 1 (Jan. 8, 10, 12) Introduction - Thinking Differently About Technology

Outline of course; definitions of technology; technological determinism. Discussion on Wednesday.

Reading: Langdon Winner, "Prophets of Inevitability," *MIT's Technology Review* 101 (Mar/Apr 1998): 62;

"Exxon Mobil Meets Amazon.com," *Business Week*, 14 Dec. 1998, 178; reprinted in *New York Times*, 5 Dec. 1998, A13.

Assignment: 1) Complete the two short readings for the Wednesday discussion. 2) Search the web for definitions of "technology." Bring interesting definitions that you find to class and be prepared to discuss them.

Martin Luther King Day (Jan. 15)

Week 2 (Jan. 17, 19) Invention as a Process

Invention and creativity; Edison's system of electric light and power.

Reading: Thomas P. Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm, 1870-1970* (Chicago, University of Chicago Press, 1989), 13-81;

Alex Bell, et al., "Who Becomes an Inventor in America? The Importance of Exposure to Innovation, Executive Summary," Dec. 2017, http://www.equality-of-opportunity.org/assets/documents/inventors_summary.pdf

Week 3 (Jan. 22, 24, 26) Development, Innovation, and Failure

The difficult and often unsuccessful path from concept to use.

Reading: James L. Adams, *Flying Buttresses, Entropy, And O-Rings: The World of an Engineer* (Cambridge: Harvard University Press, 1993), 150-168;

Stuart W. Leslie, "Charles F. Kettering and the Copper-Cooled Engine," in *The Engineer in America*, ed. Terry S. Reynolds (Chicago: University of Chicago Press, 1991), 283-307.

Week 4 (Jan. 29, 31, Feb. 2) Science and Technological Change

The invention of the steam engine as a case study.

Reading: D. S. L. Cardwell, *Turning Points in Western Technology* (New York: Science History, 1972), 51-59, 66-72;

Svante Lindqvist, *Technology on Trial: The Introduction of Steam Power Technology into Sweden, 1715-1736* (Stockholm: Almqvist & Wiksell, 1984), 108-17;

Otto Mayr, "The Science-Technology Relationship as a Historiographic Problem," *Technology and Culture* 17 (1976): 663-673.

Week 5 (Feb. 5, 7, 9) Markets and the Economics of Innovation

Systems, markets, and the QWERTY keyboard.

Reading: Ha-Joon Chang, "There is No Such Thing As a Free Market," chap. 1 in *Twenty-Three Things They Don't Tell You About Capitalism* (New York: Bloomsbury Press, 2010), 1-10;

W. Brian Arthur, "Positive Feedbacks in the Economy," chap. 1 in *Increasing Returns and Path Dependence in the Economy* (Ann Arbor: University of Michigan Press, 1994), 1-12;

Paul A. David, "Understanding the Economics of QWERTY: The Necessity of History," in *Economic History and the Modern Economist*, ed. William N. Parker (Oxford: Basil Blackwell, 1986), 30-49.

Assignment: First take-home essay due Monday, 2/12.

Part 2: Technology, Society, and Culture

Week 6 (Feb. 12, 14, 16) Technology, War, and the Military

Military roots of key modern technologies; computers as a case study.

Reading: David Edgerton, "War," chap. 6 in *Shock of the Old* (Oxford: Oxford University Press, 2007), 138-159;

Paul Edwards, "Why Build Computers: The Military Role in Computer Research," chap 2 in *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge: MIT Press, 1996), 42-73, 376-384.

Week 7 (Feb. 19, 21, 23) Technology and Gender 1: Women Drivers

Gender roles and the early automobile. Video Wednesday, *America on Wheels*.

Reading: Virginia Scharff, *Taking the Wheel: Women and the Coming of the Motor Age* (Albuquerque: University of New Mexico Press, 1991), 1-88.

Week 8 (Feb. 26, 28, Mar. 2) Technology and Gender 2: Women at Tech, Housework

More on how gender shapes technology.

Reading: Ruth Schwartz Cowan, "Twentieth Century Changes in Household Technology," chapter 4 in *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave* (New York: Basic Books, 1985), 69-101;

Amy Sue Bix, "Coeducation Via Lawsuit: Georgia Tech," chap. 4 in *Girls Coming to Tech: A History of American Engineering Education for Women* (Cambridge: MIT Press, 2013), 131-190.

Week 9 (Mar. 5, 7, 9) Technology and Work: Scientific Management and Mass Production

Managers, workers, and factories in the early 20th century.

Reading: Harry Braverman, "Scientific Management," chap. 4 in *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*, 25th anniversary ed. (New York: Monthly Review Press, 1998), 59-85;

David Hounshell, "The Ford Motor Company and the Rise of Mass Production in America," chap 6 in *From the American System to Mass Production, 1800-1932: The Development of Manufacturing Technology in the United States* (Johns Hopkins University Press, 1985), 217-261

Henry Ford, selection from "The Terror of the Machine," chap. 7 in *My Life and Work* (Garden City, NY: Doubleday, Page, 1922), 103-111.

Week 10 (Mar. 12, 14, 16) Automation, Makerspaces, and the Future of Work

Mass unemployment or high-tech for the masses?

Reading: Erik Brynjolfsson and Andrew McAfee, "Will Humans Go the Way of Horses?" *Foreign Affairs* 94 (2015): 8-14;

Martin Wolf, "Same as It Ever Was: Why the Techno-optimists Are Wrong," *Foreign Affairs* 94 (2015): 15-22;

Evgeny Morozov, "Making It," *The New Yorker* 13 (Jan. 23, 2014): 69-75.

Assignment: second take-home essay due Monday, 3/26.

Spring Break

Part 3: Ethical and Cultural Dimensions of Technology

Week 11 (Mar. 26, 28, 30) Automations Fears: Are Robots Taking Over?

Technology as a threat to humanity.

Reading: Čapek, *R.U.R. (Rossum's Universal Robots)*, 1-84.

Week 12 (Apr. 2, 4, 6) Automobiles, Engineers, and Corporate Responsibility

The Chevrolet Corvair and its implications for engineering ethics.

Reading: Ralph Nader, *Unsafe at Any Speed: The Designed-In Dangers of the American Automobile* (New York: Grossman, 1965), vii-x, 1-32, 138-170.

Week 13 (Apr. 9, 11, 13) The Space Race and the Origin of the Space Shuttle

From Sputnik to the Shuttle program.

Reading: Gerard J. DeGroot, *The Dark Side of the Moon* (New York: New York University Press, 2006), 45-78, 121-52 (chaps. 4-5, 8);

Alex Roland, "The Shuttle: Triumph or Turkey?" *Discover*, Nov. 1985, 29-49.

Week 14 (Apr. 16, 18, 20) The Challenger Disaster

A study in engineering ethics.

Reading: Russel P. Boisjoly, Ellen F. Curtis, and Eugene Mellican, "Roger Boisjoly and the Challenger Disaster," *Journal of Business Ethics* 8 (1989): 217-30;

Feynman, "What Do You Care What Other People Think?" (1988), 114-247.

Week 15 (Apr. 23) Technological Determinism, Revisited

A look at one of the leading advocates of technological determinism, along with one of his critics.

Kevin Kelly, "Understanding Technological Evolution and Diversity," *Futurist* 45 (March/April 2011): 44-48;

Evgeny Morozov, "e-Salvation," *New Republic* 242 (March 24, 2011): 28-31.

Final Essay Due - Thursday, May 3, 5:40 PM

Third take-home essay to be submitted via the course web site, and the end of the schedule final exam period.