

PLEASE READ THE SYLLABUS!

HTS 2083, Special Topics (3 cr.)
History of Technology: A Thousand-Year Survey
1:30 pm – 2:45 pm TuTh, Clough Commons 146

Professor: Eric Schatzberg Office: Old Civil Engineering 108C	Office hours: Tuesdays 3-4 pm or by appt. Contact: eric.schatzberg@hsoc.gatech.edu
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Description. In this course, I argue that technology is a human activity, not an external force that drives human progress. Technology makes nothing happen by itself, but only as the result of human choices. We can only make sense of technology by examining it as an integral part of human history.

This course seeks to understand the place of technology in the history of the West over roughly 1000 years ending about 1945, from the medieval cathedral to the atomic bomb. The course does not examine technology in isolation, but rather in connection with economics, politics, labor, and culture. I make no attempt to be comprehensive. Rather, I focus on a series of chronologically arranged topics, which include medieval technology, Western expansion, the Industrial Revolution, and the rise of the United States as a technological power. Along the way we will learn a bit about clocks and cannons, spinning wheels and steam engines, electric lights and atomic bombs.

The primary theme of the course is a critique of the concept of technological determinism. This concept has two parts. The first part is the belief that technological change follows its own logic, isolated from politics and culture. Second is the idea that technological change automatically produces social change, regardless of what people want. *Both these claims are false*, even though they contain an element of truth that makes them seem plausible.

Two secondary themes run through the course. First is the role of the state as an agent of technological change, most often through the military. Many present-day technologies have their roots in the military, from mass production to the Internet. The second theme concerns the role of culture and symbolic meanings in the development of technology. Technologies are significant not just for what they can accomplish, but also for what they mean, for the way they express cultural values.

Course Goals and Learning Outcomes. This course does not fulfill any USG Core Area requirements. But it does have specific goals.

By the end of this course, students should be able to:

- Explain the historical forces that shape technological change;
- Describe specific examples of major technological changes and their historical effects;
- Provide a critical analysis of the interactions between technology and society.

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, keep specific questions in mind to help you focus on key ideas. Use the weekly instructions for guidance.

Discussion. Because this class is small, we will devote time each week to discussion, typically on Thursdays. Please come prepared to talk. Preparation will require doing the readings for the week and thinking about the discussion questions distributed through Canvas.

Weekly assessments. Many weeks will include a short writing assignment based on the readings and lectures.

Take-home essays. There will be two take-home essay exams due 9/25, and 10/23, and a take-home final due 12/10. The first two take-home essays require the use of material from both lectures and readings. The take-home final may require some additional research outside of class.

Grades. First two take-home essays, 20% each; final essay, 25%; other weekly assignments, 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 from the readings and lectures supporting the thesis; 4) direct, concise prose that conveys your meaning with specific, carefully chosen words; 5) correct spelling, grammar, and punctuation. Deficiencies in any of these categories will reduce the number of points received.

The *discussion* grade will be based on attendance and class participation. Ideally, everyone should try to make roughly one or two meaningful comments, in each discussion. Discussions will be graded on a scale from 0 to 3, with 0 for an unexcused absence and 3 for full participation. For each unexcused absence from class meetings without graded discussions, I will deduct one point from the cumulative discussion grade.

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 Website 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. There was a problem with the order, so they are not in the bookstore yet. I will let you know when they are ready.

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

Patrick M. Malone, *The Skulking Way of War: Technology and Tactics Among the New England Indians* (Baltimore: Johns Hopkins University Press, 1991);

Wolfgang Schivelbusch, *Railway Journey: The Industrialization of Time and Space in the 19th Century* (Berkeley: University of California Press, 1986);

Loren R. Graham, *Ghost of the Executed Engineer: Technology and the Fall of the Soviet Union* (Cambridge: Harvard University Press, 1993).

Other assigned readings will be posted to Canvas as a pdf file.

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 in advance, preferably by the second week of class. For more detail see <http://catalog.gatech.edu/rules/4/>, ¶B.5.

Freaking 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

Week 1 (8/21, 8/23): Introduction – What is Technology, and Why Care About Its History?

Overview of the course; defining technology; questioning technological determinism.

Reading: David Edgerton, "Introduction," *Shock of the Old*, ix-xviii.

Assignment due Thursday 8/23: 50-word micro-essay on the central argument of the Edgerton reading.

Week 2 (8/28, 8/30): Symbolic Technologies of the Middle Ages

Symbolic versus utilitarian technologies—Gothic cathedrals and mechanical clocks.

Reading: Arnold Pacey, "The Cathedral Builders," 1-28;
David Landes, *Revolution in Time*, 53-82.

Week 3 (9/4, 9/6): Western Expansion, 1

Printing and gunpowder weapons; the technological basis of Western imperialism.

Reading: William H. McNeill, *The Pursuit of Power*, 63-143 (chaps. 3-4).

Assignment due Thursday 9/6: one-page reading response; be prepared for discussion.

Week 4 (9/11, 9/13): Western Expansion, 2

Europe becomes a global power: the role of military technology overseas.

Reading: Geoffrey Parker, *The Military Revolution*, 82-145 (chaps. 3-4);

Ronald Findlay, "The Roots of Divergence: Western Economic History in Comparative Perspective," 158-61.

Week 5 (9/18, 9/20): Western Expansion, 3

Encounters with the "new" world; the technological basis of the Atlantic economy.

Reading: Malone, *The Skulking Way of War*, 8-128.

Assignment due next Tuesday 9/25: first take-home essay; discussion of Malone book.

Week 6 (9/25, 9/27): Industrial Revolution–Economics and Technology

Tuesday: Malone discussion; Thursday: Nature of industrialization; key technological changes in textiles, iron and steam power.

Reading: Thomas J. Misa, "Geographies of Industry," 59-96;

Joel Mokyr, "The Years of Miracles," 81-112

Week 7 (10/2, 10/4): Industrial Revolution–Explanations

Science, Atlantic trade, and slavery.

Reading: E. J. Hobsbawm, "Origin of the Industrial Revolution," 20-39 (chap. 2);

Richard Olson, "Science, Technology and the Industrial Revolution," 316-44;

Barbara Solow, "Capitalism and Slavery in Exceedingly Long Run," 711-37.

Assignment due Thursday 10/4: one-page reading response.

Fall Break (10/9)

Week 8 (10/11): Industrial Revolution–Social Impact

Workers, the factory system, and resistance to skill-destroying machinery.

Reading: J. L. Hammond and Barbara Hammond, "The Shadow of the Slave Trade," 190-209;

Kirkpatrick Sale, *Rebels Against the Future*, 1-59, 126-151.

Video Thursday: "The Luddites"

Week 9 (10/16 10/18): Industrialization and Western Culture

Railroads and their impact on Western consciousness.

Reading: Schivelbusch, *Railway Journey*, 1-123 (45-51 optional).

Assignment due next Tuesday 10/23: second take-home essay.

Week 10 (10/23, 10/25): American Inventiveness and the Second Industrial Revolution

Technology in the late-19th century; heroic inventors and the rise of the industrial corporation.

Reading: Thomas P. Hughes, *American Genesis*, 1-95 (Introduction, chaps. 1-2).

Week 11 (10/30, 11/1): Source of Innovation: Military and Big Business

The rise of the industrial research laboratory; military origins of mass production.

Reading: Hughes, *American Genesis*, 96-183 (chaps. 3-4).

Assignment due Thursday 11/1: 100-word essay on the military and technology.

Week 12 (11/6, 11/8): Mass Production, the Faustian Bargain

Controlling workers; the assembly line; big technological systems.

Reading: Hughes, *American Genesis*, 184-248 (chap. 5);

Stephen Meyer, "The Evolution of the New Industrial Technology," 9-36.

Assignment due Thursday 11/8: 100-word essay on mass production; be prepared for discussion.

Week 13 (11/13, 11/15): Technology and Aesthetic Modernism

Technology as inspiration for art and architecture between the World Wars.

Reading: Hughes, *American Genesis*, 295-352 (chap. 7);

Le Corbusier, *Towards a New Architecture*, 9-31.

Week 14 (11/20): Technology, Ideology and the State

Technology under Stalinism.

Reading: Loren Graham, *Ghost of the Executed Engineer*, 1-106;

Optional: Hughes, *American Genesis*, 249-294 (chap. 6).

Assignment next Tuesday 11/27: one-page reading response on Graham; be prepared for discussion.

Thanksgiving (11/22)

Week 15 (11/27, 11/29): The Manhattan Project

Tuesday: Graham discussion. Thursday: How to build an atomic bomb.

Reading: Hughes, *American Genesis*, 353-442 (chap. 8).

Week 16 (12/4): The Postwar Order

Origins of the military-university-industry-science-technology complex.

Final Essay Due, Monday, Dec. 10, 5:30 pm

Submit final essay online through Canvas.

Packet Contents

1. David Edgerton, *Shock of the Old* (Oxford: Oxford University Press, 2007), ix-xviii (Introduction).
2. Arnold Pacey, "The Cathedral Builders," in *The Maze of Ingenuity: Ideas and Idealism in the Development of Technology*, 2nd ed. (Cambridge: MIT Press, 1992), 1-28.
3. David Landes, *Revolution in Time: Clocks and the Making of the Modern World* (Cambridge: Harvard University Press, 1983), 53-82 (chaps. 3-4).
4. William H. McNeill, *The Pursuit of Power: Technology, Armed Force, and Society Since A.D.1000* (Chicago: University of Chicago Press, 1982), 63-143 (chaps 3 and 4).
5. Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500-1800*, 2nd ed. (Cambridge: Cambridge University Press, 1996), 82-145 (chaps. 3, 4).
6. Ronald Findlay, "The Roots of Divergence: Western Economic History in Comparative Perspective," *American Economic Review* 82, no. 2 (1992): 158-61.
7. Thomas J. Misa, "Geographies of Industry," chap. 3 in *Leonardo to the Internet: Technology and Culture from the Renaissance to the Present* (Baltimore: Johns Hopkins University Press, 2004), 59-96.
8. Joel Mokyr, "The Years of Miracles," in *The Lever of Riches: Technological Creativity and Economic Progress* (Oxford: Oxford University Press, 1990), 81-112.
9. J. L. Hammond and Barbara Hammond, "The Shadow of the Slave Trade," in *The Rise of Modern Industry*, 9th ed. (London: Methuen, 1966), 190-209.
10. Kirkpatrick Sale, *Rebels Against the Future: The Luddites and their War on the Industrial Revolution, Lessons for the Computer Age* (Reading, Mass., Addison-Wesley, 1995), 1-59, 126-151.
11. E. J. Hobsbawm, "The Origin of the Industrial Revolution," and "The Industrial Revolution, 1780-1840," in *Industry and Empire* (London: Weidenfeld & Nicolson, 1968), 23-39 (chap. 2).
12. Richard Olson, "Science, Technology and the Industrial Revolution," in *Science Deified & Science Defied*, vol. 2 (Berkeley: University of California Press, 1990), 316-44.
13. Barbara Solow, "Capitalism and Slavery in Exceedingly Long Run," *Journal of Interdisciplinary History* 17 (Spring 1987): 711-37.
14. Stephen Meyer, "The Evolution of the New Industrial Technology," chap. 2 in *The Five Dollar Day: Labor Management and Social Control in the Ford Motor Company, 1908-1921* (Albany: State University of New York Press, 1981), 9-36.
15. Le Corbusier, *Towards a New Architecture* (New York, Brewer & Warren 1927), 9-31.