

HSTR 207 CS
Science and Technology in World History
mountainsandminds.org/hstr-207

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Office Hours: Wednesday 2:00-4:00 or by appointment



Science and Technology are powerful and formative forces in the modern world. They are culture-bearing and fully intertwined with other forces such as religion, politics, and economics. The aim of the course is to understand how using a humanistic approach to analyze science and technology can help solve some of the most pressing problems in our world. The first part of the course will focus on our approach: how we are going to use the humanities to tackle extremely complex issues. The second part of the course will explore specific case studies by placing scientific and technological developments within their historical and cultural context. You will learn a base of knowledge that will enable you to critically analyze science and technology, and enter, with an informed judgment, into the fascinating debate taking place today concerning their increasing role in our society.

REQUIRED TEXTS

Yuval Noah Harari, *Sapiens: A Brief History of Humankind* (Harper, 2016)
Steven Johnson, *The Invention of Air* (Riverhead Books, 2008)
Michael Frayn, *Copenhagen*

Additional Readings

In addition to the above texts, we will also place additional readings on our course website according to the week in which they are due. Visit www.mountainsandminds.org/hstr-207. I may place additional readings on the website and syllabus as the semester progresses.

Mechanics:

The emphasis of the course – and thus your grade – will be on critically analyzing science and technology through readings and discussion. **THUS, IT IS IMPERATIVE THAT YOU ATTEND CLASS.** You must have the readings completed before class to contribute meaningfully to class discussion. Each week, you may be responsible for small in-class or take-home assignments that may include written analysis of the readings. A comprehensive final exam will be given on **Tuesday, Dec. 10th from 6:00 – 7:50 p.m.**

CS Assignment – Science in the 21st Century:

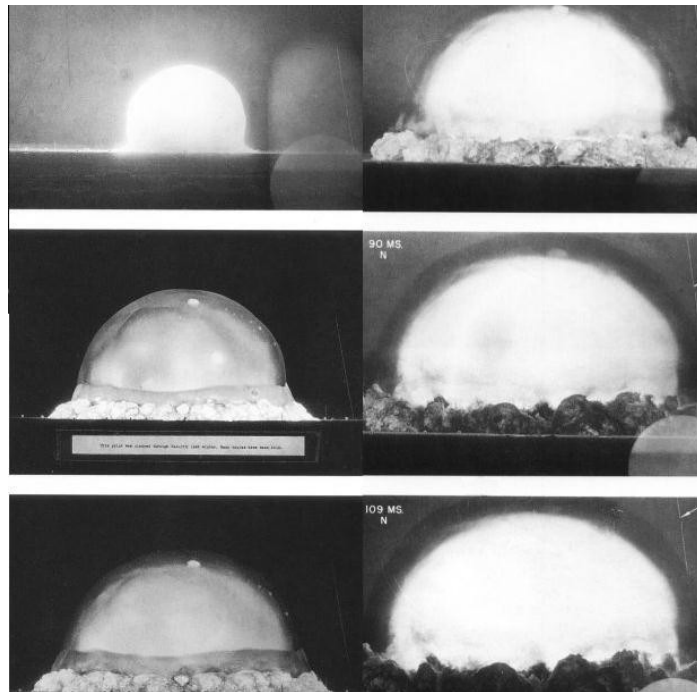
In addition to studying the history of advances in science and technology from a global perspective, this is also a Contemporary Issues in Science (CS) course. The CS assignment will require you to put a contemporary issue in science or technology – one that will affect humanity in the century to come, such as climate change or gene manipulation – into an historical framework. Students will be broken into teams and asked to choose a current problem under one of the major case studies of the course – (a) revolutions, (b) industrialization, (c) climate science and the Anthropocene, (d) modern biology, or (e) modern physics – or from the major themes and discussions of the two texts for the course. We will work on this project through stages, with assignments due throughout the semester, working closely with the Writing Center... Much more information on this to follow later in the course.

Grades:

Class Writing: 40%

CS Paper: 30%

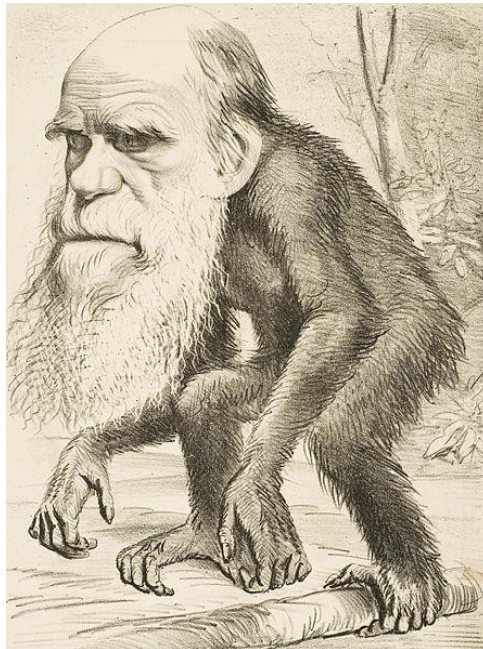
Final Exam: 30%



Goals for the Course:

In addition to studying advances in science and technology within world history, this course will also help develop your critical thinking skills. Throughout the semester, we will emphasize:

- *the ability to understand and evaluate opposing viewpoints.* Differing viewpoints are common in science. Making an educated judgment requires a clear understanding of various claims and an ability to discern which one is most valid.
- *the ability to assess the quality of evidence and discern general patterns.* People may have different viewpoints on scientific issues, and the quality of evidence supporting these views can vary considerably. Scientific thinking entails evaluating the caliber of evidence and developing plausible conclusions based on that material.
- *to understand the value and role of the humanities in modern culture.* Science and technology do not occur in a bubble. They affect, and are affected by, our cultural beliefs. This course will demonstrate the numerous ways in which scientific and technological advance has influenced society, and how society has influenced science and technology.
- *to show a healthy skepticism toward scientific claims and technological advance.* Unlike other ways of knowing the world, skepticism and the questioning of assumptions make up an essential part of the scientific process. You will develop a deeper understanding of what science can and can't do; what science is and what it isn't; which types of questions science can answer and which types it can't; and finally, what is valid science and what is not.
- *an ability to discuss these topics in front of an engaged intellectual community of scholars.* Often times, knowing something is the easy part. Being able to explain that knowledge and communicate your viewpoint within a framework that others can understand and trust is often much more difficult.
- *Don't mistake belief for knowledge (or, don't always believe what you think).* Be skeptical, particularly of your own beliefs.



TENTATIVE SCHEDULE OF TOPICS, READINGS, AND ASSIGNMENTS

Section 1: Methods

WEEK ONE

T Aug 27: What We Will Be Doing; Science and the Humanities

WEEK TWO

Readings: Jared Diamond, "Yali's Question," *Guns, Germs, and Steel*, pp. 13-32
Jared Diamond, "Under Montana's Big Sky," *Collapse*, pp. 27-75

T Sep 3: World History and Southwest Montana

WEEK THREE

Readings: Joel Achenbach, "Why Do So Many Reasonable People Doubt Science," *National Geographic*, March 2015
Michael Shermer, *The Baloney Detection Kit*, (2014), video
Jeff Douthwaite, "The Terrible Temptation of the Technological Fix," *Science, Technology, & Human Values*, Winter 1983, pp. 31-32
Sean F. Johnston, "The Technological Fix as Social Cure-All," *IEEE Technology and Society Magazine*, March 2018, pp. 47-54
Michael Huesemann and Joyce Huesemann, "The Inherent Unavoidability and Unpredictability of Unintended Consequences," in *Techno-Fix: Why Technology Won't Save Us or the Environment*, 2011, pp. 3 – 15

T Sep 10: Science, Risk, and Perception; Technological Fixes

Guest Speaker – Jen Dunn

Case Study One: Revolutions

WEEK FOUR

Readings: Yuval Noah Harari, *Sapiens*, pp. 1-159

T Sep 17: NO CLASS – Provost Distinguished Lecture Series – Museum of the Rockies

WEEK FIVE

Readings: Yuval Noah Harari, *Sapiens*, pp. 245-415

T Sep 24: Cognitive Revolution; Agricultural Revolution; Scientific Revolution

6:15 – 6:30: **Writing Studio Orientation**

6:30 – 7:30: Cognitive Revolution

7:30 – 8:30: Guest Speaker – Will Wright, Agricultural Revolution

WEEK SIX

Readings: Yuval Noah Harari, *Sapiens*, pp. 245-415

T Oct 1: The Scientific Revolution

5:30 to 6:45: Hauser Lecture, Museum of the Rockies, “Will Autonomous Vehicles Ever Be Safe Enough”

7:00 – 9:00: Class

Writing Studio I

Case Study Two: The Industrial World

WEEK SEVEN

Readings: Steven Johnson, *The Invention of Air*

T Oct 8: Why Should Governments Fear Air Pumps and Electrical Machines?

6:10 – 7:15: Class

7:30 – 8:30: Irving Weissman, Museum of the Rockies, “Stem Cells in Regenerative Medicine”

WEEK EIGHT

Readings: Timothy J. LeCain, “Between the Heavens and the Earth” in *Mass Destruction: The Men and Giant Mines that Wired America and Scarred the Planet*, pp. 24-63

John Sandos and Arn Keeling, “Zombie Mines and the (Over)burden of History,” *Solutions* 4, no. 3 (June 2013): 80-83

Jason Jones, *Bad Pit* (*The Daily Show with Jon Stewart*, June 22, 2006), video

John Blodgett, “Libby, Montana, Tries to Shake Its ‘Superfund Stigma’,” *High Country News*, January 18, 2018

Justin Nobel, “Postcards From the Edge,” *Topic* 14 (August 2018)

Timothy LeCain, “When Everybody Wins Does the Environment Lose? The Environmental Techno-Fix in Twentieth-Century American Mining,” in *The Technological Fix: How People Use Technology to Create and Solve Problems*, Lisa Rosner, ed., 2004, pp. 137-153

T Oct 15: The Future of Industrial Landscapes

Writing Studio II

Case Study Three: Climate Science

WEEK NINE

Readings: Michael Reidy, "The Strange Deaths, Varied Lives, and Ultimate Resurrection of John Tyndall," *Montana Professor*, 2015
Thomas Easton, "Is Anthropogenic Global Warming Real and Dangerous," in *Taking Sides: Clashing Views on Environmental Issues*, 2015, pp. 101-120
Intergovernmental Panel on Climate Change

T Oct 22: The Age of Climate Change

WEEK TEN

Readings: Will Steffen, et. al., "The Anthropocene," *Ambio*, December 2007, pp. 614-621
Elizabeth Kolbert, "Enter the Anthropocene – The Age of Man," *National Geographic*, March 2011, pp. 60-85
Andreas Malm, "The Anthropocene Myth," *Jacobin Magazine*, March 2015.
Dan Kahan, "Why We Are Poles Apart on Climate Change," *Nature*, August 16, 2012, p. 255.

T Oct 29: The Anthropocene

Writing Studio III

Case Study Four: Modern Biology – Sociobiology and CRISPR

WEEK ELEVEN

Readings: Charles Darwin, "Recapitulation and Conclusion," *Origin of Species*, pp. 482-513

T Nov 5: The Darwinian Revolution

WEEK TWELVE

Readings: E. O. Wilson, "Sociobiology"
Stephen Jay Gould, "Sociobiology: The Art of Storytelling," *New Scientist*, November 1978, pp. 530-533
Michael Specter, "How the DNA Revolution is Changing Us," *National Geographic*, August 2016
John Harris and Marcy Darnovsky, "Pro and Con: Should Gene Editing Be Performed on Human Embryos," *National Geographic*, 2016

6:10 – 7:00 Writing Studio

7:10 – 8:00 Writing Studio

8:10 – 9:00 Group Class and Discussion

T Nov 12: The Modern Synthesis to the New Synthesis

Writing Studio IV

Case Study Five: Modern Physics and the State

WEEK THIRTEEN

Readings: Yuval Noah Harari, *Sapiens*, pp. 350-414
“The Military-Industrial-University Complex,” *Major Problems in American Technology*, pp. 427-441

T Nov 19: The Rise of the Academic-Military-Industrial Complex

Guest Speaker – Kirke Elsass

WEEK FOURTEEN

Readings: Michael Frayn, *Copenhagen*

T Nov 26: Physics in the Twentieth Century

Writing Studio V (During the Week)

WEEK FIFTEEN

Readings: Review for Final

T Dec 3: Final Papers Discussion; Final Exam Review

T Dec 10: **FINAL EXAM, 6:00 – 7:50**