



HIST 2100 Science and Technology in the Modern World

Professor: Germán Vergara

Meeting Place: Summer 2024

Office Hours: By appointment

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Course Description

The purpose of this course is to examine and reflect on the history of science and technology in the modern era (ca. 1500-present). We will explore major themes, including the relationship between science and technology; the ways in which the global economy, science, and technology have shaped each other over time; the complex dynamic between science, technology, and industrial civilization; the reasons behind the increasingly rapid rates of scientific and technological change over the past two centuries; the effects, intended and unforeseen, that scientific and technological innovations have had on the global environment; and the multiple and sometimes contradictory ways that modern societies view, represent, and think about science and technology. To fully understand this history, the course takes a global approach. In essence, the course suggests that modern science and technology resulted from the complex exchange and interaction between different regions and peoples around the world, rather than from events that took place only in Europe and the U.S.

Objectives

Every reading assignment and classroom activity has been designed to improve your literacy on the global history of science and technology. Throughout the course, you will develop a good understanding of the main patterns and changes in the history of the relationship between human societies, science, and technology. You will also familiarize yourself with the key concepts, arguments, and debates in the scholarship on the topic as well as with the basics of how, where, when, and why science and technologies have changed (or not) in the past few centuries. Foremost, you will end this course better prepared to make informed ethical decisions about scientific and technological issues, a fundamental skill to have at a time when our choices and values have the potential to shape our planet for generations to come. Throughout the course, *we will use history to discuss the critical issue of what kind of ethical, social, and environmental responsibilities engineers and scientists have to their communities and the world as a whole.*

The other objective of the course is to develop your skills for engaging critically with reading material, be it primary or secondary sources. Course meetings will involve discussions of readings and other material covered in class. Our weekly readings, meetings, and discussions are central to this course. You should come to class each week having completed all assigned reading and reflected upon its relationship to previous course meetings, as well as its relationship to larger themes of the course.

Requirements/Evaluation

Your course grade, based on a 100-point scale, will be determined by **attendance, the quality and regularity of your participation, and the completion and quality of assignments**. This is how I will break it down:

1. Class participation and attendance (15 points). Students are expected to participate actively, thoughtfully, and respectfully in class. You should come to every class having done *all* the reading assignments. If you find participating in class discussion difficult, come talk to me and we can discuss strategies to help you jump in. Attendance: Students may have only two unjustified absences. Every additional unjustified absence after the two "free" absences will lower your final grade 5 points. If you miss 4 classes (or a total of 6), you will fail the course.
2. Written responses (3 points each; 45 points total). Each week, students will turn in a written response on Canvas under the "Assignments" tab. The objective for these assignments will be to paraphrase the readings' main argument(s) and summarize the stories told in them (yes, historians like to make arguments about the past through narrative). With pieces that are largely analytical, paraphrasing the text's main points will suffice. The written response will also provide students with an opportunity to engage in economic writing, as responses will have to be between 450 and 550 words long.
3. Final exam (40 points). The exam will cover materials from lectures and readings and will consist primarily of IDs and short and long essay questions. I will give you a study guide before the exam. The exam will take place in the week of December 7-December 14.

Office Hours

You may meet with me throughout the semester as you progress with your reading and assignments. Please feel free to talk with me about any questions, concerns, time management or workload issues, writer's block or any other obstacles that may affect your work. I will answer emails within 24 hours, except during the weekend.

Course Website

A course website is available through Canvas. There you will find course-related information, including the syllabus, paper assignments, required readings, and supplemental materials such as current newspaper and magazine articles related to the course content. This site also features a board (in the "Assignments" tab), where you will post your weekly reading responses. Additionally, in the "Resources" tab you will find a variety of materials to assist you with the complexities of historical reading, research, and writing.

Plagiarism

Plagiarism means using the words AND ideas of others without giving them due credit. **The use of ChatGPT or any other essay-writing chatbot will be considered plagiarism.** Please review Georgia Tech's statement on plagiarism on <http://osi.gatech.edu/content/honor-code>

Computing Devices

Yes, this is a course on the history of science and technology, but unless you have a formal, sanctioned accommodation that requires it, laptops, smart phones, tablets, and other electronic devices are not allowed in the classroom. Unless a classroom activity requires that you use your laptop, we will rely on discussion, old-fashioned paper note-taking, and a variety of classroom techniques to enhance our understanding of the course material. The reason for this measure has nothing to do with Luddism and everything to do with common sense. Computing devices tend to be a source of distraction for the student using them and for the rest of the class.

This course fulfills the Ethics Requirement, International Relations (IP), Social Science Requirement.

Course Readings:

James Poskett, *Horizons: The Global Origins of Modern Science*, Mariner Books, Boston, 2022.

This is the course "textbook" and it's **the only book you'll have to buy**. Other than the main text, course readings will be available through the Canvas class website as PDF files.

Course Schedule

Week 1: Introduction

M, Aug 21: Introduction to the Course-Syllabus

W, Aug 23: What is the History of Science?

Readings:

Lynn Nyhart, ““Historiography of the History of Science,” In *A Companion to the History of Science*, 2016.

Lorraine Daston, “History of Science,” *International Encyclopedia of the Social & Behavioral Sciences*, 2001.

Thomas Kuhn, *The Structure of Scientific Revolutions*, Introduction, 1962.

Week 2: A New World of Science

M, Aug 28: The Spanish Empire and Science

W, Aug 30: Natural History and Empiricism

Readings:

Antonio Barrera-Osorio, *Experiencing Nature: The Spanish American Empire and the Early Scientific Revolution*, 2006, Introduction, chapters 4 and 5.

William Burns, *The Scientific Revolution in Global Perspective*, 2016, chapter 3.

Week 3: The Global Scientific Revolution

M, Sept 4: **Labor Day (No Class)**

W, Sept 6: The Global Scientific Revolution

Readings:

Jorge Cañizares-Esguerra, “On Ignored Global “Scientific Revolutions,” *Journal of Early Modern History*, 21 (2017) 420-432.

James Poskett, *Horizons: The Global Origins of Modern Science*, 2022, Introduction, chapters 1 and 2.

Week 4: Empires and Enlightenment

M, Sept 11: Global Commerce and Science

W, Sept 13: Scientific Expeditions, Empire, and Natural History

Readings:

James Poskett, *Horizons: The Global Origins of Modern Science*, chapters 3 and 4.

Week 5: Science, Technology, and Industrialization in the 19th Century

M, Sept 18: Steam, Textiles, and Geological Luck

W, Sept 20: Railroads, Steamships, and Industrial Warfare

Readings:

James McLellan, *Science and Technology in World History*, 2015, chapters 14 and 15.

Arnold Pacey, *Technology in World Civilization*, 2021, chapters 7, 8, and 9.

Week 6: Science in the Nineteenth Century: Geology

M, Sept 25: A New Scientific Genre

W, Sept 27: The Expansion of Planetary Time

Readings:

Martin Rudwick, *Earth's Deep History: How it Was Discovered and Why it Matters*, 2014, Introduction, chapters 1, 2, and 5

Week 7: Paradigm Shift: The Darwinian Revolution

M, Oct 2: Evolutionary Thought

W, Oct 4: Global Darwin

Readings:

Peter Bowler, *Evolution: The History of an Idea*, 2003, chapters 1, 4, and 5

Poskett, *Horizons*, chapter 5

Week 8: The Emergence of the Human and Social Sciences

M, Oct 9: **No Class**

W, Oct 11: Sociology and History

Readings:

Roger Backhouse, *The History of the Social Sciences Since 1945*, chapters 3 and 5.

Eugene Goodheart, "Is History a Science?," *Philosophy and Literature*, Volume 29, Number 2, October 2005, pp. 477-488

Week 9: History of Economics

M, Oct 16: The Classics

W, Oct 18: The Twentieth Century

Readings:

Heinz Kurz, *Economic Thought: A Brief History*, 2016, Introduction and chapters 2 and 3.

Mary Morgan, "Economics," *The Cambridge History of Science*, 2003.

Week 10: History of Environmental Sciences

M, Oct 23: Science and the Limits to Growth

W, Oct 25: Climate and Environmental Science/Planetary Boundaries

Readings:

Paul Warde, et al, *The Environment: A History of the Idea*, 2018, chapter 4

Peter Bowler, *The Earth Encompassed: A History of the Environmental Sciences*, 2003, chapters 10 and 11.

Week 11: Science, Technology, and the Cold War

M, Oct 30: The Cold War

W, Nov 1: Climate Science and the Cold War

Readings:

Naomi Oreskes and John Krige, *Science and Technology in the Global Cold War*, 2014, Introduction and chapters 1 and 5.

Everett Mendelsohn, "Science, Scientists, and the Military," in Krige, *Companion to Science in the Twentieth Century*, 2003.

Week 12: Climate Science

M, Nov 6: Brief History of the Climate

W, Nov 8: Climate Science/Climate Politics and Science

Readings:

Joshua Howe, *Behind the Curve: Science and the Politics of Global Warming*, 2014, Introduction and chapters 1, 2, 3, 4, and Epilogue.

Week 13: Merchants of Doubt

M, Nov 13: Film

W, Nov 15: Film/Discussion

Readings:

Naomi Oreskes, *The Collapse of Western Civilization*, 2014, entire essay.

Week 14: **Recess**

M, Nov 20: **No Class**

W, Nov 22: **No Class**

Week 15: Science and Technology in the Anthropocene

M, Nov 27: Techno-Fixing Global Warming?

W, Nov 29: Biodiversity Crisis and Technology: The Perils of De-Extinction

Readings:

Jürgen Renn, "The Evolution of Knowledge: Rethinking Science in the Anthropocene," *Journal of History of Science and Technology*, 12, pp. 1-22

Joyce and Michael Huesemann, *Techno-Fix: Why Technology Won't Save Us or the Environment*, 2011, chapters 1, 2, and 7

Week 16: Course Review

M, Dec 4: Review Session

Week 17: Finals Week

Dec 7-Dec 14

Final Exam