Science and the Modern World

History 20 – FALL 2022

Prof. Elena Aronova

History Department

HSSB 4215

[earonova@ucsb.edu](mailto:earonova@ucsb.edu)

Class Hours: M W 5 – 6:15 PM

EMBAR HALL 1171

Office Hours: Th 2 – 3 PM or by appointment

**“THE HISTORIAN’S FIRST TASK IS FINDING THE EVIDENCE”**

1. COURSE DESCRIPTION

In the years since the Scientiﬁc Revolution of the 17th century, science has come to occupy a position of enormous importance in Western culture. This course explores how science rose to such a high position in modern society, looking at new ways of understanding the natural world and at the ways that these new ideas have become parts of our lives. The course has at its heart one central idea: scientiﬁc ideas and practices are not isolated from the rest of society. Rather, they are created in certain historical contexts and inevitably reﬂect the conditions of their origin, even as they change the world. Scientiﬁc ideas and practices do not always reinforce the existing order—in fact, they often undercut it—but they are never independent of it. Thus, in order to understand the development of modern science and modern society, one must understand how they shaped each other.

**Learning Outcomes:**

Our goals for the course include:

* Demonstrate how to understand and think critically about the past.
* Demonstrate an understanding of key events, ideas, themes in the history of modern science.
* Display ability to read and analyze primary sources; be able to synthesize this knowledge orally and in writing with secondary sources and course material. Also, display clear understanding of difference between these two types of sources.
* Be able to develop and support historical arguments that draw on both primary as well as secondary sources.
* This class fulfills an Area E (Culture and Thought) as well as a Writing Requirement.

1. REQUIRED TEXTS AND READINGS

This is a lower division history class. You should expect to read up to about 60 pages per week. If you don’t think this is something you can do, you should drop the class. You are responsible for all readings listed on the syllabus and all materials posted on the course website on GauchoSpace except those explicitly labeled as optional. Please acquire the following textbook available at UCSB bookstore or from online retailers:

* Andrew Ede and Lesley B. Cormack, *A History of Science in Society: From the Scientific Revolution to the Present*  Toronto: University of Toronto Press. Any edition.

All other readings will be available as PDFs on the GauchoSpace.

1. LOGISTICS

**Teaching Assistants and Discussion Sections:**

There are three teaching assistants for this course. They are: **Alexandra Noi** ([alexandra\_noi@ucsb.edu](mailto:alexandra_noi@ucsb.edu)), **Abylay Stambayev** ([abylaystambayev@ucsb.edu](mailto:abylaystambayev@ucsb.edu)) and **Kandra Polatis** ([kpolatis@ucsb.edu](mailto:kpolatis@ucsb.edu)). Each of them has a wide range of teaching experience and a great interest in the history of science. Together, they serve as a crucial link between you and me. Take some time to get to know your TA. They will provide you with more details about how your discussion section will run. Discussion sections attendance is mandatory (see ‘Grading’ below).

**Expectations and requirements:**

I expect you to come to class, and do the assigned readings. You will probably find the readings most manageable if you do them consistently after each lecture.

**Late make-up policy:**

It’s simple: Don’t be late and don’t miss exams! I do not offer make-up assignments except in case of illness or personal crisis, as documented by an appropriate official (dean, doctor, oral surgeon, ambulance driver…). If you anticipate a problem, contact me right away. It is much easier to find a solution and make arrangements at the start of the term than to address a problem retroactively at the end.

1. GRADING

* Section performance and participation – **20% of your final grade** will be determined by your TA based on your performance and contribution to weekly section meeting. As your TA will explain, more than two unexcused absences will result in a zero for your section grade.
* Midterm Exam – There will be one in-class closed-book midterm exam. The format will be a combination of historical IDs, short responses, and a short essay. This will be **15% of your final grade**.
* Take Home Essays – There will be two paper assignments. The rubric that the TAs and I use to assign grades is posted on the course GauchoSpace page. Each of these essay assignments will be 3-5 pages in length. The percentage of your final grade that each essay will count for is: **Essay #1 = 15% of your final grade; Essay # 2 = 20% of your final grade**.
* Final Exam – Several longer synthetic/analytical essays that cover the entire course; it will be take-home and open book and is **30% of your final grade**.

**Regarding Written Assignments:**

I have the highest expectations of you regarding academic honesty and integrity. UCSB’s standard policies for Academic Dishonesty, Attendance, and Assessment apply. Assignments found to contain plagiarized passages (i.e. you have included material written by others without giving proper credit or citing the source) will be given an automatic F and referred for disciplinary action. If you ever find yourself in such a panic that plagiarism starts to look like an appealing option, *get in touch with your TA (or me) instead.* A late, less-than-perfect paper is better than a paper that gets you expelled.

**Regarding Writing**

If your writing skills are poor, seek help on campus at CLAS. If you have questions about how to properly cite articles, books, web sites, and so forth – refer to the [Chicago Manual of Style](mailto:https://www.chicagomanualofstyle.org/tools_citationguide/citation-guide-1.html) or see the document on the course website called “Footnotes, Bibliographies, and Citations.”

**Regarding Grade Discussions**

I am always happy to speak with you if you think your work was not graded properly. However, before we enter into such a conversation, be aware that this means starting the grading process for that particular assignment anew and your grade could always go down if I believe that your TA was too generous in allocating credit.

**Last but not least:**

*My lectures and course materials, including PowerPoint presentations, tests, outlines, and similar materials, are protected by U.S. copyright law and by*[*University policy*](http://copyright.universityofcalifornia.edu/resources/ownership-course-materials.html)*. I am the exclusive owner of the copyright in those materials I create. You may take notes and make copies of course materials for your own use. You may also share those materials with another student who is enrolled in or auditing this course.* *You may not*[*reproduce, distribute or display (post/upload)*](http://copyright.universityofcalifornia.edu/resources/recorded-presentations.html)*lecture notes or recordings or course materials in any other way — whether or not a fee is charged — without my express prior written consent. You also may not allow others to do so.* *If you do so, you may be subject to student conduct proceedings under the UC Santa Barbara Student Code of Conduct.*

SCHEDULE OF LECTURES AND READINGS

WEEK 1

Part I. The Emergence of Modern Science

**M 9/26 Introduction: Science and the Modern World**

**Readings:**

* Steven Shapin, “Invisible Science,” *The Hedgehog Review* (Fall 2016)

**W 9/28 The Scientific Revolution**

**Readings:**

* *History of Science in Society*, Introduction, start reading chap. 5 “The Scientific Revolution” (pp. xii-xv; 143-179)[[1]](#footnote-1)\*

WEEK 2

**M 10/3 The Homes for New Science**

**Readings:**

* + *History of Science in Society*, finish chap. 5 “The Scientific Revolution”
  + “How to Read the Primary Sources” (handout on GS)
* Selections from Galileo Galilei, *Sidereus Nuntius* (“The Starry Messenger”) [1610].
  + For background on Galileo and the princely court: Excerpt from *History of Science in Society*, vol. 1, ch. 4 (9 pages, on GS)

**W 10/5 The Practitioners of Science**

**Readings:**

* Selections from Robert Boyle, *New Experiments Physico-Mechanical* [1660].
* *In Our Time,* podcast on Robert Boyle. Link on GS

WEEK 3

**M 10/10 Evolution and Darwin**

**Readings:**

* *History of Science in Society* , ch. 7 “Science and Empire” ( read sections “The Question of the Origin of Species”, “Darwin and Evolution by Natural Selection”, “Spencer and Social Darwinism, and “Opposition to Darwin’s Theory”: pp. 229-239)
  + Explore online: Darwin Correspondence Project <https://www.darwinproject.ac.uk/>

**W 10/12 Science and Empire**

**Readings:**

* *History of Science in Society* , ch. 6 “The Enlightenment and the Enterprise” (start reading from section “Museum Collections and Scientific Expeditions” till end of chapter: pp. 201-218), and ch. 7 “Science and Empire” ( read section “Collecting and Classifying”: pp. 221-224)
  + James Delbourgo; Sir Hans Sloane's Milk Chocolate and the Whole History of the Cacao. *Social Text* 29 (March 2011): 71–101)
  + Explore online: Darwin Correspondence Project – “Race, Civilization, and Progress” <https://www.darwinproject.ac.uk/learning/universities/darwin-and-human-nature/race-civilization-and-progress>

WEEK 4

WRITING ASSIGNMENT # 1 IS DUE

Part II. New Century, New Sciences, and Old Questions

**M 10/17 From the Mechanical World View to Relativity**

**Readings:**

* *History of Science in Society* , read ch. 8 “Entering the Atomic Age” (pp. 261-291) and start ch. 9 “Science and War” (read first two sections, “The Unfinished Business of Light” and “Einstein’s Theory of Relativity”, pp. 293-299)

**W 10/18 Where did Relativity Come From?**

**Readings:**

* + Peter Galison, “Einstein’s Clocks: The Place of Time,” *Critical Inquiry,* vol. 26, no. 2 (2000): 355-389

WEEK 5

**M 10/24 Science and War: Einstein, Quantum Mechanics, and the “Forman Thesis”**

**Readings:**

* *History of Science in Society* , ch. 10 “The Death of Certainty” (read introduction and section “The New Physics: Indeterminacy”: pp. 317-322)
  + Matt Stanley, “The 1919 Eclipse: A Celebrity is Born” *Physics World* (2005): 25-26
* Review the materials from weeks 1 through 4 for the midterm exam.

**W 10/26** CLOSED BOOK ONE HOUR MIDTERM EXAM IN CLASS

**Reading:**

* No reading. Rest, Relax.

WEEK 6

**M 10/31 Birth of Genetics**

**Readings:**

* + *History of Science in Society* : from ch. 9 “Science and War”: read sections “Mendel and the Mechanism of Evolution” and “Mendel’s Plant-Breeding Experiments” (pp. 300-304)
* Explore online: The Eugenics Archives: <http://www.eugenicsarchive.org/eugenics/list3.pl>

**W 11/2 Eugenics**

**Readings:**

* + *History of Science in Society* : from ch. 10 “The Death of Certainty”: read section “Reactions to Evolution: Social Darwinism and Eugenics” (pp. 326-328)
  + A.M. Stern, “Eugenics, Sterilization, and Historical Memory in the United States,” *História, Ciências, Saúde – Manguinhos, Rio de Janeiro,* v.23, supl., dez. (2016):195-212.
  + AM Stern, Novak NL, Lira N, O’Connor K, Harlow S, Kardia S., “California’s Sterilization Survivors: An Estimate and Call for Redress,” *Am J Public Health*. 107, no. 1 (2017):50-54.

WEEK 7

**M 11/7 The Modern Synthesis**

**Readings:**

* *History of Science in Society* : from ch. 10 “The Death of Certainty”: read sections “Evolution, Cellular Biology, and the New Synthesis”, and “The New Synthesis” (pp. 322-326)
* John Beatty, “Dobzhansky and the Biology of Democracy: The Moral and Political Significance of Genetic Variation,” in *The Evolution of Theodosius Dobzhansky: Essays on His Life and Thought in Russia and America*, ed. by Mark B. Adams (Princeton University Press, 1994), pp. 195-216.

**W 11/9 The Molecular Vision of Life**

**Readings:**

* *History of Science in Society* : from ch. 10 “The Death of Certainty”: read section “Discovering DNA” (pp. 341-347)
  + Dorothy Nelkin and Susan Lindee, “The DNA Mystique: The Gene as a Cultural Icon,” Perspectives in Medical Sociology, ed. Phil Brown (Waveland Press, 2000), pp. 406-424
  + Explore online: <https://www.23andme.com/howitworks/>

WEEK 8

WRITING ASSIGNMENT # 2 IS DUE

Part III. Science in the Shadow of the Bomb

**M 11/14 The Manhattan Project**

**Readings:**

* *History of Science in Society* : from ch. 10 “The Death of Certainty”: read sections “Science and the State: The Atomic Bomb”, “The Manhattan Project”, “National Security and Science Policy” (pp. 329-341)
* “The Day after Trinity”, dir. by Jon H. Else. PBS - 1981. (1 h 29 m)
* Explore online: Voices of the Manhattan Project: <https://www.manhattanprojectvoices.org/>

**W 11/16 Soviet Science and Soviet Atom**

**Readings:**

* Kate Brown, *Plutopia: Nuclear Families, Atomic Cities, and the Great Soviet and American Plutonium Disasters* (Oxford University Press, 2013),selections on GS
* “City 40,” dir. by Samira Goetschel. Cinephil - 2016. (1 h 13 m)

WEEK 9

**M 11/21 Cold War Internationalism and Space Race**

**Readings:**

* *History of Science in Society* : ch. 11 “1957: The Year The World Became a Planet” read whole chapter (pp. 349-377)

**W 11/23 Cold War University**

**Readings:**

* + Rebecca S. Lowen, *Creating the Cold War University: The Transformation of Stanford* (University of California Press, 1997), selections on GS

WEEK 10

**M 11/28 Environmentalism, Vietnam, and the Universities’ Backlash**

**Readings:**

* Cyrus Mody, “Santa Barbara Physicists in the Vietnam Era,” in Patrick McCray and David Kaiser, eds., *Groovy Science* (The MIT Press, 2016), pp. 70-99
  + Explore online: UCSB Living History Project: <https://livinghistory.as.ucsb.edu/>

*Vietnam war protests at UCSB, 1960s:*

<https://livinghistory.as.ucsb.edu/2019/10/10/vietnam-war-protests/>

*North Hall takeover,* *October 14th, 1968:*

<https://livinghistory.as.ucsb.edu/2019/10/09/ofab/>

**W 11/30 Epilogue – Stories We Tell About Science**

**FINAL EXAM DATE AND TIME TBA**

1. \* The page numbers listed for *History of Science in Society* correspond to 4th edition of the book (2022). If you have a different edition of the book use the section titles to find the assigned readings from the textbook we will use in this course. [↑](#footnote-ref-1)