

McDaniel Europe, Campus in Budapest

GSC 2010 – History of Modern Science

Professor: Matthew Adamson

Contact information

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Availability

I am usually on campus in Room 228; please make an appointment if you want to be certain to find me.

Course Description

What is science? What role do philosophical, social, and political factors play in the acquisition of scientific knowledge? Are scientific organizations and conduct unique? How have scientific disciplines formed and changed over the centuries? What is the relationship between science and the state? What is the nature of scientific knowledge, and how should society put it to use? What use is biography in better understanding history, history of science included? How has science become embedded in defense and intelligence-gathering, foreign relations, and diplomacy? This course will trace the history of science from the Scientific Revolution to the end of the twentieth century. It will examine both primary texts written by scientists and secondary texts written by historians, all while bearing the questions above in mind.

Course Objectives

- Explore primary texts from the history of science, placing them in their social, philosophical, and institutional contexts;
- Examine work by a number of historians of science, considering in each text different approaches, different methods of historical observation, different contexts in which scientific work and knowledge is framed;
- Explore how experimental methods were developed, debated, proved fruitful, and were ultimately accepted in different disciplines;
- Explore the economic, social, and security frameworks in which scientific research has often been pursued;
- Examine the link between scientific research and the state;
- Consider the role of history in informing our values and collective decision-making processes.

Learning Outcomes

- Recall and describe in basic terms the important milestones of natural scientific

discovery and theory-building in the last four centuries;

- Identify the most significant figures in the history of science in the modern period and learn the basics of their achievements in physics, chemistry, biology, geology, astronomy, and so on;
- Better understand controversy *in* the scientific community, and controversy *about* scientific conclusions;
- Appreciate the dynamic, ever-changing link between scientific and technological development;
- Apprehend the growth of science and scientific disciplines as historical phenomena;
- Sharpen one's ability to analyze and contextualize historical arguments.

Required texts

- Class reading assignments available on Blackboard
- Handouts during the semester

Assignments & grading

Grading system—100 points total

Assignments

- *Discussion (10 pts)
- *'Anthropological' paper after KFKI visit (15 pts)
- *Essays, presentations, other assignments (25 pts)
- *Mid-term essay and discussion (20 pts)
- *Final essay and discussion (20 pts)
- *In-class participation (10 pts)

Anthropology paper:

One sub-genre of science studies might be termed 'anthropology of science'. For several decades, scholars have endeavored to observe and understand how scientists work at a micro-level, taking these observations from the archives into functioning laboratories and other scientific facilities. We will do the same, based on our visit to the Hungarian Central Physics Institute, the KFKI.

Standard McDaniel College scale:

100+	A+
93-100	A
90-92	A-
88-89	B+
83-87	B
80-82	B-
78-79	C+

73-78	C
70-72	C-
68-69	D+
63-67	D
60-62	D-
< 60	F

Class participation

Informed, critical exchange of ideas forms the core of the College learning experience. It should occur in every classroom. This is why in-class participation plays an important role in the final determination of your course grade. You are expected to share ideas during discussions and you are wholeheartedly encouraged to ask questions when you do not understand something. Participation implies attendance; absences will be noted and will adversely affect your final participation grade.

Creation of a proper classroom environment requires above all else respect for fellow students. We all ask that you don't be late; that you don't surf the internet on your laptop or otherwise distract everyone else during class; that you turn off your cell phone and that you do not check for messages during class. Likewise, you can expect me to end class on time, to engage you in discussion and debate, and to be respectful of all points of view.

Honor code

You are expected without question to adhere completely to the McDaniel College academic honor code. Any violation will result in a zero for the given assignment and other possible sanctions.

Course policies

You may be absent three times, no questions asked—you need not explain the cause of your absence. Following three unexcused absences, however, you will begin to lose points from your class participation grade, a grade per unexcused absence over the limit. Please note that we meet for two consecutive sessions per week. If you miss them both, that is, for you are absent for an entire day of class, that counts as two absences.

Do not be late—a tardy arrival will be counted as half an absence.

Use of phones and laptops: use of phones is strictly prohibited. Use of a phone during a class will result in an absence recorded for the session. Therefore, you are encouraged to avoid the temptation of checking your phone by putting the phone away and/or turning it off during the class. Use of a laptop during class is possible only if you need it to take notes. In this case, I kindly ask you to send me a copy of your notes after class. I will not grade those notes; rather, your notes in such a case serve not only to confirm the diligent use of your laptop, but also give me a sense of what you and other students are taking away from the course—quite an appreciated service if it turns out I should make an adjustment.

Discussions

Much hinges on students' participation in discussion, including student-led discussions. On the first day of class, we will discuss the goals we have for reading and analyzing primary and secondary sources, as well as the ground rules for conducting and participating in a discussion.

Semester schedule/topics covered

September 4:

in class (60 minutes): Introduction—the Nature of Science & History of Science;

September 11:

in class: The Scientific Revolution.

Reading due before class: David Wooten, “Modern Minds” from The Invention of Science (2015).

September 18:

in class: The Royal Society, Experiment, and the Scientific Community in 1700.

Reading due before class: Philosophical Transactions of the Royal Society, v. 1 (1665-66)

Newton, part I

September 25:

in class: Enlightenment Researches, Voyages, and Ideals

Reading due before class: Westfall (1985) Newton and His Biographer

Newton part II

October 2:

in class: Natural History and the Young Darwin

Reading due before class: Darwin (1845) Journal of the Voyage of the Beagle, excerpt (2nd edition)

October 9:

in class: Darwin and Evolution

Reading due before class: Darwin, Autobiography (first appeared 1959).

October 16:

in class: **Student mid-term take-home essays & discussions**/Institutions and the Physical Sciences in the 19th Century

October 30 :

in class: the Natural Sciences and Big Science

Reading due before class: Hughes (2002) Big Science and the Atom Bomb, excerpts

November 6:

in class: Twentieth-century biological sciences: changing life & mind
Reading due before class: Muller (1936) Letter to Stalin

November 13:

in class: *Copenhagen* and the Advent of Nuclear Weapons

November 20:

in class: Post-World War II Science, exploring space, spying on Earth
Reading due before class: Poole, "What Was Whole about the Whole Earth? Cold War and Scientific Revolution." From The Surveillance Imperative (2014).

November 27:

in class: Today's science: climate change
Reading due before class: Oreskes & Conway (2014) The Collapse of Western Civilization.

December 4:

in class: Visit to the KFKI—the Hungarian Central Institute of Physics and Research Nuclear Reactor.
Reading due before class: Traweek, "Powerful Places in the Laboratory." From Beamtimes and Lifetimes (1989).

Week 14:

Final exam—Take home essay + discussion
