McDaniel Europe, Campus in Budapest

GSC 2010 – History of Modern Science

Professor: Matthew Adamson

Contact information
mhadamson@mcdaniel.hu

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? 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 acheivements in physics, chemistry, biology, geology, astronomy, and so on;

- Better understand controversy *in* the scientific community, and controvery *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 reader
- Class reading assignments available on Blackboard
- Handouts during the semester

Assignments & grading

Grading system—100 points total

Assignments

*Term project position paper (15 pts)
*Term project participation grade (10 pts)
*Essays, presentations, other assignments (35 pts)
*Mid-term essay and discussion (15 pts)
*Final essay and discussion (15 pts)
*In-class participation (10 pts)

Term Project:

Each student will select a scientist of the period we are covering (Scientific Revolution to the Present) to study. They must be familiar with the basic biography of the given scientist. In particular, via a reading of the scientist's own writings as well as secondary texts, the student will endeavor to understand the given scientist's opinions concerning the proper role of the scientist in society. This translates to any number of important questions depending on the geographical and temporal place of the scientist in history.

- Who should provide scientists with the resources they need to pursue their research? Who should not be permitted to do so?
- Does a scientist owe their loyalty to their country? To some other group or institution?
- Who has the right to decide what sorts of questions scientists seek the answers to? Does that right change according to scientific discipline?
- Should scientists be involved in religious debates?
- Is it ethical for scientists to be involved in weapons technologies?
- Should scientists be able to make a monetary profit off their work?

- Are there certain discoveries or other information scientists are obligated to keep secret?

Etc. etc.—this is hardly a full list of such questions, and the number of such questions will multiply during the semester.

After writing a "position paper" on the views of the scientists, students will engage in a classroom debate on the proper role(s) of the scientist in society, historically and today.

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.

Semester schedule/topics covered

Week 1:

in class: Introduction—the Nature of Science & History of Science; The Beginning of the Scientific Revolution

---

Week 2:

in class: The Scientific Revolution, the Royal Society, and Experiment

---

Week 3:

in class: Isaac Newton and Biography

Week 4:

in class: Enlightenment Researches, Voyages, and Ideals

Week 5:

in class: Natural History and the Young Darwin

Week 6:

in class: Darwin and Evolution

Week 7:

in class: Student mid-term discussions/Institutions and the Physical Sciences in the 19th Century

---

Week 8:

in class: Revolutions and Institutional Contexts in 20th Century physics

---

Week 9:

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

Week 10:

in class: Big Science and the Security State

Week 11:

in class: Post-World War II Science, changing life & mind

Week 12:

in class: Post-World War II Science, exploring space, spying on Earth

---

Week 13:

in class: Today's science: climate change

Week 14:

Visit to the KFKI—the Hungarian Central Institute of Physics and Research Nuclear Reactor.

Final exam—Time(s) to be Announced
