

The Scientific Revolution

K10.0063
Fall 2009

Tues-Thurs 9:30-10:45
715 Broadway, Room 501

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Science is today one of the most powerful ways to understand the world. But there was a time when all the foundations of modern science—experiments, hypotheses, mathematics, scientific instruments—were considered radical, unreliable, and unjustified. The period when these foundations came to be accepted is known as the Scientific Revolution. This was the era of Copernicus, Newton, and Galileo pioneering dramatically new ways of thinking about the universe and humanity's place in it, and this course explores how these new ways came to be accepted. We will look at not just the great achievements of the Scientific Revolution, but also how those achievements were crucially interdependent on the contemporary context of society, politics, religion, printing, and art. We will discuss why science appeared when and where it did, how science impacted society, and how we can retain the power of science while also acknowledging that it is fundamentally a human enterprise.

Goals

- Develop an interdisciplinary understanding of science
- Develop analytical reading skills and apply them critically to a wide variety of primary and secondary sources.
- Improve and develop communication skills

The class is structured around four major units. Each unit will end with in-class group learning events where we practice our critical thinking skills. Each event will have a short writing assignment (3 pages) associated with it. You will also write “recapitulations” of readings four times, and develop an interdisciplinary map over the course of the semester – more on those later.

Everyone will be required to post a brief response to each day’s reading on the Blackboard discussion forum. The response should be about a paragraph, and can consist of your thoughts on the material, questions you have, or issues you would like to discuss. These posts must be made by 9am on each day class meets and will be used to help frame our class discussions.

The course grade will be determined as follows:

Short papers:	10% (each)
Recapitulations:	5% (each)
Blackboard responses:	10% (combined)
Interdisciplinary map:	10%
Class participation (including debates):	20%

There will be several extra credit opportunities.

Do not plagiarize. If you take more than two or three words directly from a textbook or another source (including the Internet), you must put them in quotation marks and cite their source in a footnote.

Late policy: Late assignments will lose a full letter grade for every 24 hours they are late. Assignments five days late will not be accepted.

If you have a documented disability and anticipate needing accommodations in this course, please make arrangements to meet with me soon.

We will be using these books, all available at the bookstore:

Ginzburg, Carlo, *The Cheese and the Worms*
Cohen, I. Bernard, *Newton: Texts, backgrounds, commentaries*
Schaffer, Simon, *Leviathan and the Air-Pump: Hobbes, Boyle and the
Experimental Life*
Galileo, *Sidereus Nuncius*

You may also want to get the following book for background information:

Dear, Peter, *Revolutionizing the Sciences*

These optional readings are marked on the syllabus with [square brackets].

The majority of the readings are in the course reader. On the syllabus, reading assignments in the reader are marked (R).

Class Schedule:

9/8 Introduction to the class

Unit I We Are All Philosophers

9/10 Greek thought I: “How to read a document”; Hippocrates, “Sacred disease”;
Aristotle, “Metaphysics” (R)
[Dear, 3-8]

9/15 Greek thought II: Aristotle, “Causation and movement”; Ptolemy, “Saving the

appearances”; Geminus (R); Heinrich Von Staden, “Affinities and Elisions” (R)

Recapitulation due

[Dear, 18-24]

9/17 Medieval science: “Scientific achievement in the 12th century” (handout)

First interdisciplinary map due

[Dear, 10-18]

9/22 Arabic science: A.I. Sabra, “The appropriation and subsequent naturalization of Greek science in medieval Islam”; Ibn Sina, “The Life of Ibn Sina” (R)

9/24 **Group learning:** Why Aristotle was Awesome

Unit II New Universes

9/29 *The cheese and the worms*: xiii-xvi, and chapters 1-6, 8-9, 13, 15, 18, 20-22, 24-26, 28, 33, 40, 46-7, 49, 51-53, 56, 58, 61-2

10/1 Copernicus, “On the revolutions of the heavenly spheres” (R)

[Dear, 30-37, 41-45]

10/6 Tycho Brahe, “The mutable heavens” and “The Tychonic system” (R)

Owen Hananway, “Laboratory design” (R)

Recapitulation due

10/8 Johannes Kepler, selections from *New Astronomy*, *Mystery of the Cosmos*, and *Harmonies of the World* (R)

10/13 Galileo, *Sidereus Nuncius*, 26-45, 48-51, 57-70, 83-4

Edgerton, “The strange spottedness of the moon” (R)

[Dear, 65-72]

10/15 Galileo, “Letter to the Grand Duchess” and Inquisition documents (R)

10/20 Descartes, *Meditations* (R)

[Dear, 80-100]

10/22 **Group learning:** How to Learn about the Universe

Unit III Kinds of Knowledge

10/27 What is man: Pascal, *Pensees*; Descartes, *Man* (R); Vesalius (handout)

10/29 Books: Adrian Johns, “History of the book” (R)

Interdisciplinary map v.2.0 due

11/3 From magic to science: Giambattista della Porta, *Natural Magick* (R)

[Dear, 24-28, 49-57]

11/5 Finding stuff: Bacon, “New Atlantis”; “the Great Instauration”; *Novum Organum* (selections) (R)

[Dear, 57-64]

11/10 Weird stuff: Daston and Park, *Wonders and the Order of Nature* (selections) (R)

Recapitulation due

11/12 Experiments I: *Leviathan*, 1-21, 22-40, 55-69, 72-79

11/17 Experiments II: *Leviathan* 99-109, 110-112, 129-139, 225-231, 283-4, 298-310,

320-331, 332-344

11/19 No class

11/24 **Group learning:** How do you like your knowledge?

Unit IV A Scientific World?

11/26 No class (Thanksgiving)

12/1 Ben Jonson, *The Alchemist* (on Blackboard)

12/3 Newton I: Cohen, ed., xi-xv, 51-54, 115-122, 149-154, 159-161, 226-7, 233-5,
257-262, 265-6; "Glassworks" 202-217

Recapitulation due

12/8 Newton II: Cohen, ed., 308-312, 327-9, 339-348, 356-370

12/10 Leibniz-Clarke correspondence

12/15 Newtonianism:

J.T. Desagulier, *The Newtonian System of the World, the Best Model of
Government* (R)

Dobbs, *Newton and the culture of Newtonianism* (R)
[Dear, 164-170]

Final exam date:

Group learning: Can you live on science alone?

Interdisciplinary map, v.3.0 due