The Scientific Revolution

IDSEM-UG 1790
Fall 2014

Mon-Wed 2-3:15
Silver Building, Room 404

Matthew Stanley
matt.stanley@nyu.edu
Phone: x27752
1 Washington Place 507

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 an in-class debate. Everyone will be assigned a side in the debates, and will also write an individual short assessment (4 pages) of the evidence for and argument of each party in the debate.

Everyone will be required to post a brief response to each day’s reading on the course website 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 1 pm on each day class meets and will be used to help frame our class discussions.

A final project will be due at the end of the course, on a topic of your choice relating to the themes of the class. The default form of the final project is a research
paper (12-15 pages), but I am open to other ideas. In the past students have written short stories, performed songs, investigated field sites anthropologically, and authored plays. Any project that involves outside research, has an argument, and displays intellectual rigor is acceptable.

The course grade will be determined as follows:

- Short papers: 12.5% (each)
- Forum responses: 10% (combined)
- Final project: 15%
  - Project proposal: 5%
- Class participation (including debates): 20%

It is expected that you know how to write clearly. Everything you write for this class should have an argument, a thesis statement, and sources cited with quotations marks and footnotes. If you are not confident in your ability to do these things, contact me right away.

As a Gallatin student you belong to an interdisciplinary community of artists and scholars who value honest and open intellectual inquiry. This relationship depends on mutual respect, responsibility, and integrity. Failure to uphold these values will be subject to severe sanction in accordance with the Student Discipline Rules of the Gallatin School of Individualized Study. Familiarize yourself with Gallatin's academic integrity and plagiarism policies at http://gallatin.nyu.edu/academics/policies/integrity.html

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:**

9/3  Introduction to the class

**Unit I  We Are All Philosophers**

9/8  Greek thought I: Hippocrates, “Sacred disease” (R); Aristotle, "Metaphysics" (R) 
 [Dear, 3-8]

9/10 Greek thought II: Aristotle, “Physics”; Ptolemy, “Saving the appearances”; Geminus (R); Heinrich Von Staden, “Affinities and Elisions” (R) 
 [Dear, 18-24]


9/17 Medieval science I: “Scientific achievement in the 12th century” (R) 
 [Dear, 10-18]

9/22 Medieval science II: Thomas Aquinas, "Summa contra gentiles"; Condemnations of 1277; Report of the Paris Medical Faculty (R)

9/24 **Debate:** Is the universe comprehensible?

**Unit II  New Universes**


10/1  Grafton, *New Worlds, Ancient Texts* (R); Eisenstein, *Printing Revolution in Early Modern Europe* (R)

10/6  Copernicus, “On the revolutions of the heavenly spheres” (R)  
 [Dear, 30-37, 41-45]

10/8  Tycho Brahe, "The Mutable Heavens," “The Tychonic system” (R) 
 Owen Hananway, “Laboratory design” (R)

10/13 Fall break

10/15 Johannes Kepler, selections from *New Astronomy, Mystery of the Cosmos*, and *Harmonies of the World* (R)
10/20 Galileo, *Sidereus Nuncius*, 26-45, 48-51, 57-70, 83-4
   Edgerton, “The strange spottednesse of the moon” (R)
   [Dear, 65-72]

10/22 Galileo, “Letter to the Grand Duchess” and Inquisition documents (R)

10/27 Descartes, *Discourse* (R)
   [Dear, 80-100]

10/29 Debate: How to Learn about the Universe

Unit III Kinds of Knowledge

11/3 What is man: Descartes, *Man*; Pascal, *Pensees* (R); Vesalius (handout)

11/5 From magic to science: Giambattista della Porta, *Natural Magick* (R)
   [Dear, 24-28, 49-57]

11/10 Novelty: Bacon, “New Atlantis”; “the Great Instauration”; *Novum Organum*
   (selections) (R)
   [Dear, 57-64]

11/12 Weird stuff: Daston and Park, *Wonders and the Order of Nature* (selections) (R)

11/17 Experiments I: *Leviathan*, 1-40, 55-79
   Project proposal due.

11/19 Experiments II: *Leviathan* 99-112, 129-139, 225-231, 283-4, 298-310,
   320-344

11/24 Debate: Certainty and novelty

Unit IV A Scientific World?


Thanksgiving break

12/1 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

12/3 Newton II: Cohen, ed., 308-312, 327-9, 339-348, 356-370
12/8  The Clockwork Universe: Leibniz-Clarke correspondence (R)

12/10  Newtonianism:
      Dobbs, *Newton and the culture of Newtonianism* (R)
      [Dear, 164-170]

Final exam date:
**Debate:** Living on science alone