HIST/STS/BSOC 1941 Fall ’15

History of Science in Europe
From the Ancient Legacy to Isaac Newton

TR 10:10-11:25

Prof. Peter Dear, 435 McGraw Hall; <prd3@cornell.edu>
Office hours Tuesdays, 12:00-1:00 and by appointment.

TA: Jacob Krell

How did the approaches to knowledge of nature that developed in medieval and early-modern Europe create an enterprise that associated the practical manipulation of nature with scientific truth? This course traces the development of conceptions of the natural world that, with the Scientific Revolution of the sixteenth and seventeenth centuries, would usher in an era of European global expansion. A new kind of practically applicable science attempted to demonstrate Francis Bacon’s famous claim: “Knowledge is power.”

The course consists of lecture classes, readings, and optional discussion sections. Grading will be based on performance in two in-class quizzes and one in-class prelim during the semester and an essay-format final examination (quizzes weighted as 10% each, prelim as 30%, and final exam as 50%).

NOTE: those students who participate in one of the weekly discussion sections will be offered an alternative evaluation option from that indicated on the main syllabus. Qualification for this alternative will be regular attendance in section, with no more than three absences throughout the semester. The alternative will replace the final examination with three short papers written during the course of the semester, and will include a weighting to reflect participation in section discussions; all students will still be required to take the in-class quizzes and preliminary examination.

Books for purchase, available in the Campus Store (also copies on Uris reserve):

Peter Dear, Revolutionizing the Sciences: European Knowledge and Its Ambitions, 1500-1700 (2nd ed., 2009)

All other weekly readings are to be found on the course Blackboard site under “Content.”

Academic Integrity (official Cornell policy):
Absolute integrity is expected of every Cornell student in all academic undertakings. Integrity entails a firm adherence to a set of values, and the values most essential to an academic community are grounded on the concept of honesty with respect to the intellectual efforts of oneself and others. Academic integrity is expected not only in formal coursework situations, but in all University relationships and interactions connected to the educational process, including the use of University resources.

A Cornell student's submission of work for academic credit indicates that the work is the student's own. All outside assistance should be acknowledged, and the student's academic position truthfully reported at all times. In addition, Cornell students have a right to expect academic integrity from each of their peers. If you have any questions about this policy, please see the following website or talk to me: http://cuinfo.cornell.edu/Academic/AIC.html

Auto-tutorial exercises on proper paraphrasing, quoting, and citation of the work of others may be found at: http://plagiarism.arts.cornell.edu/tutorial/index.cfm

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Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

Aug.
25 Introduction: “Science” in Europe and the “Scientific Revolution”
27 Plato and Aristotle on the Philosophy of Nature
Reading for week 1:
   Lindberg, pp.34-44; chap.3.
   Aristotle selections (On the Heavens; History of Animals). Read through these for their unfamiliar style: do they seem “scientific”?

Sept.
1 The Natural World According to Aristotle
3 The Hellenistic World and Greek Cosmopolitanism
Reading for week 2:
   Lindberg, chap.3, plus pp.12-20, 67-72

8 Greek Mathematics and the Ideal of Deductive Demonstration
10 Greek Astronomy: Mathematics or Physics?
Reading for Week 3:
   Lindberg, chap.5.
   Selections from Euclid (Elements), Archimedes (On Floating
Bodies), Ptolemy (Optics), Ptolemy (Almagest).
http://people.sc.fsu.edu/~dduke/nmars.html (Ptolemy’s basic model for Mars)

Sept.
15 Anatomy and Physiology: The Ancient Tradition
17 The Learning of Late Antiquity: Roman West, Greek East
   PLUS FIRST QUIZ

Reading for week 4:
   Lindberg, chaps.6, 7.
   Selections from Galen (On the Natural Faculties; On Anatomical Procedures),
   Pliny, “Natural History” (link), pp.389-391.

Sept.
22 Arabian Scientific Traditions: Greek Texts and New Developments
24 The Early Latin Middle Ages and the “Age of Translation”

Reading for week 5:
   Lindberg, chap.8, 9
   http://people.sc.fsu.edu/~dduke/ntusi.html (for the “Tusi couple”)
   Selections from Isidore of Seville (Etymologies); Gingerich, “Islamic
   Astronomy”; part of Jacquart, “The Influence of Arabic Medicine.”

Sept.
29 Universities and the Learned World of the High Middle Ages
Oct.
 1 Aristotle and Western Christianity
Reading for week 6:
   Lindberg, chap. 10, 11.
   Lohr, “The Medieval Interpretation of Aristotle”; Condemnation of 1277.
   Material from Aquinas (Anne Fremantle, The Age of Belief).

Oct.
 6 Mathematical Sciences of Nature in the Middle Ages
 8 Astronomy, Humanism, and Ancient Learning in the Renaissance
Reading for week 7:
   Extract from Theorica planetarum; page from Peurbach; Copernicus’s
dedicatory preface to De revolutionibus.

Oct.
13 Fall Break
15 Mid-Term Examination

Oct.
20 Exercise: The Scientific Revolution on the Web
22  Copernicus and a Renewed Astronomy (video lecture)

Reading for week 8:

Dear, “Introduction” and chaps. 1, 2.
http://people.sc.fsu.edu/~dduke/njuphelio.html  (Copernicus and Ptolemy on the outer planets)

Oct.

27  Tycho, Kepler, and a New Cosmology
29  Galileo, Aristotelianism, and a Moving Earth

Reading for week 9:

http://people.sc.fsu.edu/~dduke/ntycho.html  (Tycho’s world system)

Nov.

3   Review: The Astronomical Revolution
5   Galileo and Motion: Archimedes versus Aristotle

Reading for week 10:

Dear, chap. 4, plus pp. 127-134.
Selections from Galileo, Dialogue Concerning the Two Chief World Systems (1632), and Two New Sciences (1638);

Nov.

10  Francis Bacon: Natural Philosophy as Natural Magic
12  Descartes and the Universe as a Machine

Reading for week 11:

Dear, chap. 3, 5.
Ravetz, “Francis Bacon and the Reform of Philosophy”; selections from Bacon (New Organon).
Extract from Descartes, Principles of Philosophy.

Nov.

17  Understanding the Human Body: Galen, Vesalius, and Harvey
19  Scientific Societies and “Experimental Philosophy”

PLUS SECOND QUIZ

Reading for week 12:

Lindberg, pp.343-348.
Chapter 4 from Debus, Man and Nature in the Renaissance.
Dear, chap.6 and pp.134-144.

Nov.

24  Newton and the Light of Experiment
26  Thanksgiving
Reading for week 13:
  Dear, chap. 6.
  Selections by Henry Oldenburg and Christiaan Huygens on the Royal Society of London and the French Academy of Sciences; “Newton on Light and Colors.”

Dec.
1  Newton’s New Universe: Mechanics, Gravity, and God
3  The Shaping of Nature: Operation and Understanding

Reading for week 14:
  Dear, chap. 8 and “Conclusion.”
  Selections from Newton’s *Principia*. 
