

History of Science 201 | The Origins of Scientific Thought
Integrated Liberal Studies 201 | Western Culture: Science, Technology, and Philosophy
Fall 2016: MW 12:05-12:55PM
Sterling 1310

instructor: Florence Hsia
229 Bradley Memorial
office hours: 1:00–3:00 pm Monday & by appt.
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COURSE SUMMARY

What does science have to do with religion? What does it mean to have expertise about the natural world? And what difference do politics and funding sources make to scientific investigation? Learn how to think critically and historically about science in this course by exploring such fundamental questions across two millennia. We begin with ancient mythology and philosophy, then follow the movement of the Greek classical tradition into medieval Islam and Christendom, and finally turn to the ‘revolution’ in science of the 16th and 17th centuries with Copernicus, Galileo, Descartes, and Newton. These historical investigations provide vital insights into our ideas of the ‘natural’, scientific observation, and experiment, as well as into our expectations of scientific knowledge and the scientific enterprise.

This class emphasizes the skills of analyzing historical documents and of constructing persuasive arguments in answer to historical questions. **It is vital that you complete the readings assigned for each class session before coming to class. Bring the readings with you to all lectures and discussion sections.**

COURSE REQUIREMENTS AND GRADING

1. Attend lectures and discussion sections.
2. Prepare readings for the day they are assigned.
3. Grades will be based on class participation in discussion sections, (nearly) weekly quizzes or other exercises in discussion sections, and exams. Grades will be calculated using the following rough guidelines:

class participation in discussion sections	~10%
quizzes/exercises in discussion sections	~20%
exam 1 (in class, Monday, October 10)	~20%
exam 2 (in class, Monday, November 14)	~20%
exam 3 (take-home due Wednesday, December 21 by 5:00 pm)	~30%

COURSE POLICIES

I will make every effort to honor requests for reasonable accommodations made by persons with disabilities. If you think you may qualify for accommodation, please contact the McBurney Disability Resource Center at 263-2741 or <http://mcburney.wisc.edu/students/howto.php> to establish your eligibility for services. If you need such accommodation, please let me know as soon as possible in the semester. All requests are confidential.

If you need to reschedule an exam due to a religious observance, please let me know within the first two weeks of class. If you must miss an exam in the course of the semester due to other unavoidable circumstances (such as a university-approved athletic trip, medical problem or family emergency) you should notify me, preferably in advance, so that we can make arrangements for you to take a makeup exam within a week of the originally scheduled date. **If you miss an exam and do not contact me about a makeup exam by the following day, you will not be able to take a makeup exam.**

Academic honesty is expected of students at the University of Wisconsin-Madison in compliance with the student code of conduct. Plagiarism and other forms of academic misconduct carry penalties. **All written work that you turn in under your name should be solely your work. Both paper and internet sources must be acknowledged. Failure to understand what counts as plagiarism is not an adequate excuse.** The University's policy is outlined here: <http://www.students.wisc.edu/doso/students/>. Consult the Writing Center's guide to quoting sources: <http://writing.wisc.edu/Handbook/QuotingSources.html>.

TEXTBOOKS

All course readings are available via Learn@UW except for the following textbooks:
David C. **Lindberg**, *The beginnings of Western science* (2nd edition, 2007); purchase at the University Book Store
Peter **Dear**, *Revolutionizing the sciences* (2nd edition, 2009); purchase at the University Book Store
Textbooks may be also consulted at College Library, Helen C. White Hall.

SCHEDULE OF READINGS AND ASSIGNMENTS

Sept 7 (W)	course introduction; ancient world views Homer, <i>The Odyssey</i> , excerpts; Milesians Lindberg, pp. 1–3, 21–29
Sept 12 (M)	Greek medicine healing cults; 'The sacred disease' Lindberg, 111–19
Sept 14 (W)	Greek natural philosophy Eleatics, pluralists, & atomists Lindberg, 29–34
Sept 19	Plato Plato, <i>Republic</i> and <i>Timaeus</i> , excerpts Lindberg, 34–44
Sept 21	Aristotle I Aristotle, <i>Physics</i> , book II, chaps. 3, 7–8 excerpts Lindberg, 45–52
Sept 26	Aristotle II Aristotle, <i>Physics</i> , book II, chaps. 3, 7–8 excerpts Lindberg, 52–66
Sept 28	Greek cosmology daily phenomena (photo, diagrams); Ptolemy, <i>Almagest</i> , book I, chaps. 2–4, 7 Lindberg, 41–43, 86–87
Oct 3	Greek astronomy planetary phenomena (diagrams, photo); Ptolemaic models (diagrams) Lindberg, 88–105 (diagrams at Lindberg, 100–104, figs. 5.10–5.15)
Oct 5 (W)	film : <i>The Matrix</i> (1999) Irwin, "Computers, caves, and oracles: Neo and Socrates" (2002)

- Oct 10 (M) EXAM 1 in class**
- Oct 12 **Hellenistic natural philosophy**
Pliny the Elder, *Natural history*, excerpts
Lindberg, 67–81, 132–48
- Oct 17 **Hellenization and education**
Abelard, Anselm, and Bernard of Clairvaux excerpts
Lindberg, 148–62, 193–215, 218–24
- Oct 19 **Greek learning in the medieval university**
reaction to Aristotle, documents #10–13
Lindberg, 163–172, 215–18, 225–53
- Oct 24 **scientific renaissance: anatomy-medicine | Guest Lecturer: Scott Prinster**
Mondino de' Luzzi, *Anatomy* (1316), in *Fascicolo di medicina* (1493), illustration
Vesalius, *On the fabric of the human body* (1543), excerpts
Dear, chap. 2, section III (pp. 36–40)
- Oct 26 **scientific renaissance: astronomy-cosmology | Guest Lecturer: Prof. Michael Shank**
Peurbach, *New theoricis of the planets* (c.1474), images
Sacrobosco, *Sphere* (1482), images
Lindberg, 254–70
Dear, intro, section III; chap. 1, sections I–III; chap. 2, sections I–II (7–23, 29–32)
- Oct 31 **heliocentrism**
Copernicus, *On the revolutions* (1543), excerpts; diagrams
Dear, chap. 2, section II (32–36)
- Nov 2 **responses to heliocentrism**
Copernicus, *On the revolutions* (1543), 'To the reader concerning the hypotheses'
Brahe, *Instruments [Mechanica]* (1602), illustrations; diagrams
Brahe, *On the most recent phenomena* (1588/1610), excerpts
Dear, chap. 2, section IV and chap. 6, section I (40–43, 99–101)
- Nov 7 **heliocentrism**
Kepler, *Cosmographical mystery* (1596), illustration; diagrams
Kepler, *Rudolphine tables* (1627), illustration
Galileo, *Sidereal messenger* (1610), excerpts
Dear, chap. 4, sections I–III + chap. 6, section II (64–77, 101–106)
- Nov 9 **the Galileo affair**
timeline; Castelli-Galileo letters (1613)
Bellarmine-Foscarini letter (1615)
Inquisition & Index documents (1616)
Vatican letters (1631)
Galileo, *Dialogue on the two chief world systems* (1632), selections
- Nov 14 (M) EXAM 2 in class**

- Nov 16 **the skeptical crisis**
Descartes, *Discourse on the method* (1637), part 1
Vespucci illustrations
Of two woonderful Popish monsters (1586), excerpts
Paré, *On monsters and prodigies* (1573), excerpts
Dear, chap. 5, section I (79–82)
- Nov 21 **the Baconian project**
Bacon, *Great instauration* (1620), title page & ‘Preparative’, excerpts
Bacon, *Sylva sylvarum* (1627), excerpts
Dear, chap. 3, sections III–IV (55–63)
- Nov 23 **scientific communities**
Philosophical transactions exercise
Philosophical transactions 1 (1665): 1–16 & Oldenburg, “To the Royal Society”
- Nov 28 **experiment**
Galileo, *Dialogue on the chief two world systems* (1632), excerpt
Boyle, “New experiments,” *Philosophical transactions* 3 (1668): 581–600
Dear, chap. 7 (127–44)
- Nov 30 **mechanical philosophies**
Descartes, *Principles of philosophy* (1644/1647), excerpt
Dear, chap. 5, section II (83–85)
- Dec 5 **the Cartesian world**
Descartes, *The world* (1633/1677), chaps. 5–7
Descartes, *Principles of philosophy* (1644), illustration
Descartes, *Discourse on the method* (1637), title page
Fontenelle, *Conversations on the plurality of worlds* (1686), excerpt
Dear, chap. 5, sections III–VI (85–98)
- Dec 7 **the Newtonian world**
Newton, “The system of the world” (1685), selection; notes
Newton, *Mathematical principles* (1687/1729), book 3, selection; notes
Newton, *Opticks* (1706/1717), “Query 31” excerpt
Dear, chap. 8, sections I–III (145–63)
- Dec 12 **scientific societies**
Sprat, *History of the Royal Society* (1667), title page & illustration
Le Clerc, ‘Louis XIV visits the Academy of Sciences’, illustration
Bacon, *Great instauration* (1620), *Sylva sylvarum* (1627), title pages
Bacon, *New Atlantis* (1627), excerpts
Dear, chap. 6, section IV (109–20)
- Dec 14 **science & society**
Swift, *Gulliver’s travels* (1726/1727), part 3, excerpts
Dear, chap. 6, sections IV–V and conclusion (120–26, 164–66)
- Dec 21 (W) **EXAM 3 due Wednesday, December 21 by 5:00 pm**