Department of History, UNCG Fall 2001

History 251. History of Western Science: A Survey

(Tu & Th 9:30-10:45, McIver 228)

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Office hours: Tu & Th 11:00-12:00 or by appointment; I am potentially available many other times!

This course examines some of the major episodes in the historical development of Western science through the Scientific Revolution, which marked the effective founding of the modern scientific worldview. Primary attention will be devoted to developments in physics, cosmology, and astronomy as the fields most determinative of the character of Western science. (Other fields, such as medicine and technology, are also important, but choices must be made in the interest of time and coherence.) Some of the principal questions we'll be looking at are:

(1) How did people's conceptions of the structure of the cosmos and the nature of the material world change from antiquity to the Scientific Revolution?

(2) What kinds of questions did scientists try to answer? What did they rule out of bounds? How did "science" come to be defined?

(3) How was science shaped through its relationship to religious traditions?

The one required book for the course is Stephen Toulmin and June Goodfield, *The Fabric of the Heavens: The Development of Astronomy and Dynamics* (designated "FH" in the readings). In addition, there are a number of reading assignments from works on reserve (designated "**R**"). These readings are also accessible online; see the separate sheet for instructions. *You will get the most out of this class if you do the assigned readings before the scheduled class period, and then review them afterwards!* If you don't do the readings, you cannot expect to do well in this course.

Although this is primarily a lecture class, students are encouraged to ask whatever kinds of questions they might have--from the readings, from the lectures, or from anywhere else. Feel free to interrupt the lectures with your *relevant* questions!

There will be two exams and a cumulative final, each a third of the raw final grade, consisting of both short-answer and essay questions. Attendance and class participation will also be taken into account in determining the final grade (by up to a full letter grade, though usually much less, as will be explained in class). Students who miss the first two classes will be dropped from the role. I reserve the right to drop students who have more than three absences.

Student Learning Goals

• Basic knowledge of some of the principal episodes and developments in the history of Western science from its beginnings through the Scientific Revolution.

•Understanding of the changes in people's conception of the structure of the cosmos and the nature of the material world.

•Appreciation of the nature of scientific enquiry, in particular the relationship between phenomena and their explanation.

Syllabus of Topics and Readings

Introduction (Aug. 21): FH, 15-22

What is science? (Aug. 23): Lindberg, *Beginnings of Western Science*, 1-13 (**R**; to see the notes, consult the book on reserve)

Mesopotamian culture, mathematics, and astronomy (Aug. 28, 30): FH, 23-48 (optional: 48-50)

Greek culture and early science; atomism (Sept. 4, 6): FH, 52-79

Plato and Platonism (Sept. 11): FH, 79-89

Aristotle and Aristotelianism; physics (Sept. 13): FH, 90-105; Lloyd, *Early Greek Science*, 99-109, 112-115 (**R**)

Aristotle: cosmology (Sept. 18): FH, 105-114; Lloyd, *Early Greek Science*, 109-112, 121-124 (**R**)

Astronomy (Sept. 20): FH, 119-127, 131-137

Ptolemy: astronomy and astrology (Sept. 25): FH, 137-149

Greek science in its social context (Sept. 27): Lloyd, *Magic, Reason, and Experience*, 226-267 (**R**; for the bibliography, consult the book on reserve)

Review for first exam (Oct. 2)

FIRST EXAM (Oct. 4)

Fall Break (Oct. 9)

Science in the Middle Ages (Oct. 11): FH, 158-169, 210-218, 221-223; Alioto, *A History of Western Science*, 147-159 (**R**)

Significance of Medieval science (Oct. 16): Grant, "When Did Modern Science Begin?" (**R**)
Meaning in the natural world (Oct. 18): Ashworth, "Natural History and the Emblematic World View" (**R**; to see the notes, consult the book on reserve, *Reappraisals of the Scientific Revolution*)

New Ideals of Knowledge (Oct. 23): Eamon, "From Secrets of Nature to Public Knowledge" (**R**; to see the notes, consult the book on reserve, *Reappraisals of the Scientific Revolution*)

Copernicus and Copernicanism (Oct. 25): FH, 169-180; Cohen, *Revolution in Science*, 105-125 (**R**; to see the notes to this and all other selections from Cohen, consult the book on reserve)

Brahe and Kepler (Oct. 30): FH, 184-190, 198-208; Cohen, *Revolution in Science*, 126-133 (**R**)

Galileo: physics (Nov. 1): FH, 218-221, 223-225; Cohen, *Revolution in Science*, 135-142 (**R**)

Galileo: astronomy (Nov. 6): FH, 189-198; Cohen, *Revolution in Science*, 143-145 (**R**)

Galileo and the Church (Nov. 8): Shea, "Galileo and the Church" (**R**; to see the notes, consult the book on reserve, *God and Nature*)

Descartes, Cartesianism, and the mechanical worldview; laws of nature (Nov. 13): FH, 225-227; Cohen, *Revolution in Science*, 151-160 (**R**)

Review for second exam (Nov. 15)

SECOND EXAM (Nov. 20)

Thanksgiving (Nov. 22)

Bacon and Baconianism (Nov. 27): Hall and Hall, *A Brief History of Science*, 170-173 (**R**; to see the notes, consult the book on reserve); Cohen, *Revolution in Science*, 146-151 (**R**)

Newton: astronomy and mechanics (Nov. 29): FH, 228-249; Cohen, *Revolution in Science*, 161-175 (**R**)

Newtonianism (Dec. 4): FH, 250-271

Retrospect and review; course evaluation (Dec. 6)

Reading Day (Dec. 11)

FINAL EXAM (Thursday, Dec. 13, 8:00-11:00)