A colleague of mine once asked me to define briefly the central core of the scientific revolution so he could sum it up briefly for his course on Western Civilization. That was an obvious question, since, the scientific revolution was an event that drastically reoriented Western thought and fundamentally changed our ways of perceiving the world and of acting upon it, and thereby altered the relations between intellectual activity and the world of practice. So it seemed, at first, that his question deserved a simple answer, but the more I thought about it, the more convinced I became that there are very many different ways of trying to understand that complex, revolutionary, event.

To get at this multifaceted event, in the first part of the course we will examine a number of major events in the scientific revolution, the persons who made these discoveries, and the intellectual, social, and institutional contexts within which those discoveries were made. In the second part of the course I would like us to take a look at a number of historical interpretations of the scientific revolution.

The texts chosen for the course reflect this difference. Debus and Westfall agree in covering the scientific discoveries of the period. But each has their own emphases and interpretations, Westfall focusing on the development of the mechanical world view, which comes well after the revolutionary astronomical proposals of Copernicus, while Debus concentrates on chemistry, biology, and natural history, an area often overlooked by most historians who focus upon Copernicus and Kepler, Galileo and Newton. The final book edited by Peter Dear complements the other two by focusing at least as much upon the context as the content of the scientific revolution.

About three weeks of the course will focus heavily on Galileo Galilei; for that reason I have recommended purchasing two books of primary materials dealing with Galileo's astronomical discoveries and his problems with the Church hierarchy.

Since I anticipate students of diverse backgrounds and levels, the course will combine elements of a lecture course with those of a discussion course based on individually assigned readings. As will become apparent, scholars disagree on the nature and causes of the scientific revolution, when it occurred, and even whether such an event took place at all. In such a state of expert disagreement, I would hope that students will be able to contribute their own opinions and analyses to the topics under discussion.
Each student will be expected to read a number of assigned readings in the course of the semester (4 for undergrads; 6 for graduate students). On an assigned day, each student will summarize the book for the class in a 20 minute oral presentation, which should give the class a clear overview of the main points of the book. In addition to the class presentation, they will submit a typed critical review of each book (about 700 words). For books by a single author the critical review should identify the author's thesis and discuss the extent to which that evidence supports that thesis; for edited volumes the critical review should identify the unifying theme of the collection and discuss how particular essays fit into (or don't fit into) that theme. Late reviews will automatically forfeit a full letter grade.

Books to be reviewed will be assigned early in the semester. Since these books are not on reserve, be sure to check them out early so that you have adequate time to prepare your presentations.

In addition, students will prepare a short paper discussing the role of Galileo in the Scientific Revolution. Further details will be provided as we approach our readings on Galileo.

Given the different expectation of performance from undergraduates and graduate students, there will be different grading requirements for students of different levels:

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<thead>
<tr>
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<th>Undergraduates</th>
<th>Grad Students</th>
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<tr>
<td>Book Reports</td>
<td>4 @ 75 = 300</td>
<td>6 @ 75 = 450</td>
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<tr>
<td>Galileo Essay</td>
<td>100</td>
<td>150</td>
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<tr>
<td>Mid-Term Exam</td>
<td>125</td>
<td>125</td>
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<tr>
<td>Final Exam</td>
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<td>200</td>
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<td><strong>TOTAL</strong></td>
<td><strong>725</strong></td>
<td><strong>925</strong></td>
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Undergraduates' mid-term grades will be based on the panels and bibliographical exercise.
TENTATIVE SCHEDULE OF CLASSES

All members will be expected to have read assignments in the texts before the week for which they are scheduled. In addition, individual members of the class will be assigned other readings for which they will be specifically responsible.

PART I -- WHAT HAPPENED?

Aug. 24-26 The Ancient and Medieval Background
Required Readings:
Westfall, pp. 1-2
Debus, pp. 1-15
Dear, pp. 1-5

Aug. 31 - Sept. 2 Copernicus -- "On the Revolutions of the Heavenly Spheres"
Required Readings:
Debus, pp. 74-89
Westman in Dear, pp. 7-36

Assigned Readings (Thurs., Sept. 2):
Kuhn, T.S. The Copernican Revolution QB41 / .C815K8 (Phys Sci)

Sept. 6 LABOR DAY

Sept. 7-9 Tycho Brahe and Johann Kepler -- From the New Star to the New Astronomy
Required Readings:
Westfall, pp. 3-13
Debus, pp. 89-95
Hanaway in Dear, pp. 37-63

Assigned Readings (Thurs., Sept. 9):
Koyré, A. The Astronomical Revolution: Copernicus, Kepler, Borelli
Lattis, James M. Between Copernicus and Galileo: Christoph Claius and the collapse of Ptolemaic Cosmology QB981 / .L32 / 1994

Sept. 14-16 Paracelsus -- The Chemical philosophy
Required Readings:
Debus, pp. 16-33, 126-130
Westfall, pp. 65-81
Kuhn in Dear, pp. 255-272
Dobbs in Dear, pp. 237-254
Assigned Readings (Thurs., Sept. 16):
Debus, A. G.  The Chemical Philosophy: Paracelsian Science and Medicine in the Sixteenth and Seventeenth Centuries QD14 / .D43 (Phys-Sci) (Two volumes, counts as two discussions, requires 4-7 page review).
Pagel, W.  Paracelsus; an introduction to philosophical Medicine in the era of the Renaissance R128.6 / .P2P14p (Med)

Sept. 21-23 Natural History, Anatomy and Physiology in the Renaissance
Required Readings:
Debus, pp. 34-73
Westfall, pp. 82-104

Assigned Readings (Thurs., Sept. 23):
Singer, C.  A Short History of Anatomy from the Greeks to Harvey QM11 / Si64s2 (Med)
Graubard, Mark (ed.)  Circulation and Respiration: the Evolution of an Idea QP101 / G77c (Med)
Pagel, W.  William Harvey's Biological Ideas: Selected Aspects and Historical Background QP26 / .H3P3 / 1967a (Med)

Sept. 28-30 Galileo and the new Astronomy
Required Readings (These classes will concentrate on detailed examination of Galileo's Sidereus Nuncius; be ready to comment on Galileo’s text)
Westfall, pp. 13-16
Galileo / Van Helden, Sidereus Nuncius, pp. 25-80

Oct. 5-7 Galileo and the science of Mechanics
Required Readings:
Debus, pp. 109-115
Westfall, pp. 16-24

MID TERM EXAM (Thurs. Oct. 7)

Assigned Readings (Tues., Oct. 12):
Drake, S.  Galileo at Work: His Scientific Biography QB36 / .G2D69 (Phys Sci)
Biagioli, Mario  Galileo, Courtier: The Practice of Science in the Culture of Absolutism QB36 / .G2B54 / 1993
Oct. 12-14  The Galileo Affair
Required Readings:
Debus, pp. 95-100
Finocchiaro, The Galileo affair: A Documentary History, pp. 119-133,
134-149, 153, 256-292

Assigned Readings (Thurs., Oct. 14):
(Phys Sci)
Tomasso Campanella (1568-1639).  A Defense of Galileo, the Mathematician
from Florence...  QB36 /.G2C3213 / 1994 (Phys sci)
Langford, J.J.  Galileo, Science and the Church  BL245 / .L27 / 1971

Oct. 19-21  Descartes, Gassendi and the Mechanical Philosophy
Required Readings:
Debus, pp. 105-109, 121-126
Westfall, pp. 25-42, 43-64
Van Helden in Dear, pp. 133-153
Eastwood in Dear, pp. 154-175
Meinel in Dear, pp. 176-211

Assigned Readings (Thurs., Oct. 21):
Popkin, Richard  The History of scepticism from Erasmus to Descartes
B779 / .P65 / 1964
Osler, Margaret J.  Divine Will and the Mechanical Philosophy: Gassendi
and Descartes on Contingency and Necessity in the Created World
B1887 / .O85 / 1994

Oct. 26-28  The New Model of Applied Science
Required readings:
Westfall, pp. 105-119
Debus, pp. 101-105, 116-121
Bacon, Francis  New Atlantis
Dear in Dear, pp. 255-272
Shapin in Dear, pp. 273-304

Assigned Readings (Thurs., Oct. 28):
Rossi, Paolo  Francis Bacon: From Magic to Science  B1198 / .R6813 /
1968b
Farrington, Benjamin  Francis Bacon: Philosopher of Industrial Science
B1198 / .F3
Burke, John G. (ed.)  The Uses of science in the age of Newton  Q127 /
G4483 / 1983
Sobel, Dava  Longitude  QB225 / .S64 / 1995
Rossi, Paolo  Philosophy, technology, and the arts in the Early Modern
Era  CB478 / .R6513 / 1970
Hall, A. R.  Ballistics in the Seventeenth Century  UF820 / .H27
Shapin, Steven  A Social History of Truth: Civility and Science in
Nov. 2-4  The Newtonian Synthesis  
Required readings:  
Westfall, R. S.  Never at Rest: a biography of Isaac Newton, pp. 1-39  
Debus, pp. 131-141  
Westfall, pp. 139-159  

Assigned Readings (Thurs., Nov. 4):  
Koyré, A.  Newtonian Studies  QC16 / N48K (Phys Sci)  
Dobbs, B. J. T. and M. Jacob  Newton and the Culture of Newtonianism  QC16 / N7D66 / 1995 (Phys Sci)  
Manuel F.  A Portrait of Isaac Newton  QC15 / N7M3 / 1968 (Phys Sci)  
Shapiro, A. E.  Fits, passions, and paroxysms: Physics, method and  
chemistry and Newton’s theory of colored bodies...  QC402 / S53 / 1993 (Phys-Sci.)  
Westfall, R. S.  Never at Rest: A Biography of Isaac Newton  QC16 / N7W35 (Phys Sci)  (Large book, counts as two discussions,  
requires 4-7 page review).  

PART II -- WHAT DOES IT MEAN?  

Nov. 9-11  What is (the new) Science?  
Thomas Kuhn, "The Function of Dogma in Scientific Research", in A. C.  
Crombie (ed.), Scientific Change  
Karl Popper, "Normal Science and its Dangers", in I. Lakatos & A.  
Musgrave (eds.), Criticism and the Growth of Knowledge  

Assigned Readings (Thurs. Nov. 11):  
Butterfield, H.  The Origins of Modern Science (Rev. ed.)  Q125 / B97  
 / 1965  
Koyré, A.  From the Closed World to the Infinite Universe BD511 / K67 / 1958
Nov. 16-18 Magical Traditions and the New Science
Required Readings:
Hutchinson in Dear, pp. 86-106
Additional on reserve to be assigned

Assigned Readings (Thurs., Nov. 18):
Vickers, Brian (ed.) Occult and Scientific Mentalities in the Renaissance BF1429 / .O26 / 1984
Walker, D.P. Spiritual and Demonic Magic from Picino to Campanella BF1593 / .W2 / 1969
Yates, Frances A. Giordano Bruno and the Hermetic Tradition B783 / .Z7Y3
French, Peter J. John Dee: The World of an Elizabethan Magus BF1598 / .D5F73

Nov. 20-28 THANKSGIVING BREAK

Nov. 30 - Dec. 2 The Mathematization of Nature
Required Readings:
Westfall, pp. 120-138

Assigned Readings (Thurs., Dec. 2):
Yoder, Joella G. Unrolling time: Huygens and the mathematization of nature QA3 / .Y63 / 1988 (Math Lib.)

Dec. 7-9 Religion and the Origins of Modern Science
Required Readings:

Assigned Readings (Thurs., Dec. 9):
Hunter, Michael Science and Society in Restoration England Q127 / .G7H8

Wednesday, Dec. 15 8:00 - 10:00 AM
FINAL EXAM