Course Overview

To study the history of science is to recognize that science is something more than method. “Science” (and that which is “scientific”) is an essential component of our society, and is regarded as a key feature separating the “modern” from the “pre-modern” worldview. It is also a cultural feature which separates the developed West from Nonwestern (particularly third-world) countries. In many respects, the idea of being “scientific” in modern Western society has come to fill the same identifying role as as being “Christian” once did when Western Europe was known as “Christendom.” It is something that we can all agree that we are, and that we value, regardless of any differences which may separate us. We trust science, believe in its ability to deliver the ‘truth’ of a matter, and are willing to subject ourselves to its conclusions. Science has a social aspect which often puzzles, and even disturbs, practitioners of the sciences. Science influences and shapes culture, both at the popular level, in literature and theater, and also at a deeper level, informing our beliefs and perspectives. But the influence of science and culture is not one-way: much of what we recognize as scientific development indebted to very non-scientific forces in Western history, including religion, literature, and politics. In addition to the question of the effect of science on culture, this course is concerned with the question of how the development of modern science is affected by, and dependent upon, culture. The relationship of science and culture is seen as a relationship of mutual influence and interaction. Scientific activity does not occur in a vacuum, but in the minds and actions of people, and human thought and action is the very raw material of the discipline of history.

Liberal Education Statement

HIST 2245 examines the modern development of one of the key features of Western society and culture: the scientific worldview and the system of beliefs which is an integral part of it. An understanding of the development of Western science is critical for a comparison of Western and Nonwestern cultures, and an appreciation of their similarities and differences. After introductory lectures covering the development of science through the Scientific Revolution, the students examine the interaction of science and culture in the modern era. Throughout, science is presented as a human activity, for which the discipline of history must be added to the scientific disciplines themselves if science, and more significantly scientists (their assumptions, motives, goals, and methods), are to be understood.

The students are introduced to the analytical power of historical method in class presentations and discussions which examine change and continuity in the development of both life science and physics. By examining accounts of advances in science and physics from Darwin’s travels to the rise of modern medicine, to the development of Quantum Mechanics, the students will come to appreciate the effect that historical traditions and culture have had upon the development of Science. By considering and discussing the image of science in plays and media the students will identify the effect that scientific developments have upon Western culture and social trends. In addition, science is discussed in light of another massive cultural force in Western society, the Christian religion, which is sometimes mistaken for the adversary of modern science, rather than one of the forces which shaped it. Critical and creative thinking is fostered as students engage in class discussions, write response papers to the source material, and prepare more extensive written analyses of the relationship between science and culture in the take-home portions of the tests.

Texts Which You are Required to Buy:


**NOTE:** Other readings for the course are available from online sources, including the instructor’s web page. It is assumed that you are familiar with the internet and the online resources of the library. If this is not the case, see me.

**Special Facilities and/or Arrangements:**
If you have a physical or cultural condition, either permanent or temporary, which you believe makes it difficult for you to participate in and/or complete the requirements of this course in the time and manner prescribed, please let me know by the end of the first week of instruction. Adaptation of methods, materials, or testing may be made as required. It is your responsibility to contact the Access Center for advice regarding adaptations.

**Course Schedule**

**Week 1  Laying the Groundwork.**
W (01/21) Course Introduction.
F (01/23) What is the History of Science? Key questions and guidelines.

**Week 2  Pre-Modern “Science.”**
M (01/26) Background: Ancient “Science” and the Scientific Revolution.
W (01/28) The Scientific Revolution, continued.
F (01/30) The Scientific Revolution, continued.
   Reading Assignment: Lindberg and Numbers, ch. 2: “Galileo, the Church, and the Cosmos”

**Week 3  The Enlightenment and Modern Science.**
M (02/02) Scientific Revolution, concluded, Introduction to Science in the Enlightenment.
W (02/04) Science in the Enlightenment, continued.
F (02/06) Science and Society in the Enlightenment.

**Week 4  Science and Religion in the Eighteenth and Early Nineteenth Centuries.**
M (02/09) Science and Religion in the Enlightenment, Introduction
W (02/11) Science and Religion in the Enlightenment, continued.
F (02/13) Science and Religion after the Enlightenment.
   Reading Assignment: Lindberg and Numbers, ch. 6: “Genesis and Geology Revisited.”

**Week 5  Charles Darwin: A Case Study in Science and Culture.**
M (02/16) Transition. The “lost causes” and theories of evolution before Darwin.
W (02/18) Introduction to Darwin.
   Reading Assignment: Bowler, chapter 1.
*F (02/20) Darwin introduction, continued.
   Reading Assignment: Bowler, chapter 2.

**Available Online via J-Stor. Article Review Due.**
Week 6  Charles Darwin, continued.
M (02/23) Darwin’s Formative Years.
  Reading Assignment: Bowler, chapters 3 & 4.
W (02/25) Darwin’s Theory Develops.
  Reading Assignment: Bowler, chapters 5 & 6.
F (02/27) Darwin’s Theory hits the Public Sphere.
  Reading Assignment: Bowler, chapters 7 & 8.

Week 7  Darwin and Darwinism.
M (03/02) Darwin in the public, continued. The Fallout.
  Reading Assignment: Bowler, chapter 9.
W (03/04) Darwin and the Origins of Man.
  Reading Assignment: Bowler, chapter 10.
F (03/06) Darwin and Christianity.
  Reading Assignment: Lindberg and Numbers, ch. 8: “Re-placing Darwinism and Christianity.”

Week 8  Midterm
M (03/09) Leftover discussion points and Review for Midterm.
W (03/11) MID-TERM EXAMINATION.
F (03/13) Tests returned and discussed.

SPRING BREAK

Week 9  A Brief History of Medicine.
M (03/23) Introduction to the History of Medicine.
  Reading Assignment: Porter, Blood and Guts, first half.
F (03/27) Blood and Guts, part 2.
  Reading Assignment: Porter, Blood and Guts, second half.

Week 10  History of Science Theater (3000).
M (03/30) Part 1.
W (04/01) Part 2.
F (04/03) Movie: “The Boldest Hoax.”

Week 11  Men Who Made a New Physics.
M (04/06) History of Science Theater, concluded.
W (04/08) Ernest Rutherford.
  Reading Assignment: Cline, Chapter 1.
F (04/10) Rutherford, Continued.
  Reading Assignment: Cline, Chapter 2.

Week 12  Men Who Made a New Physics, continued
M (04/13) Max Planck
  Reading Assignment: Cline, Chapters 3&4.
W (04/15) Early Einstein.
  Reading Assignment: Cline, Chapter 5.
F (04/17) Neils Bohr and Co.
  Reading Assignment: Cline, Chapters 6 & 7.
Week 13 Men Who Made a New Physics, wrap-up.
M (04/20) Life at the Institute and Quantum Theory, for the Rest of Us.
   Reading Assignment: Cline, Chapters 8 & 9.
W (04/22) Quantum Theory, and the General Theory.
   Reading Assignment: Cline, Chapters 10, 11, & 12.
F (04/24) Men Who Made A New Physics, Concluded.
   Reading Assignment: Cline, Chapters 13 & 14.

Week 14 Copenhagen.
M (04/27) Copenhagen, part 1.
W (04/29) Copenhagen, part 2.
F (05/01) Copenhagen, concluded.

Week 15
**M (05/04) Copenhagen discussion.
**COPENHAGEN RESPONSE PAPERS DUE.
W (05/06) Conclusion of modern physics section.
F (05/08) Review for final.

FINAL EXAMINATION: Wednesday, May 13, 2:00-3:55.
Tests and Grades:
**Pay careful attention to test dates!** No make-up will be given without a serious medical excuse
(feel free to read into this such cheery phrases as: “grave bodily injury,” “emergency room,” and
“terminal condition,” if it helps for understanding) and/or prior approval from the instructor.
The final grade will be determined by written assignments and two tests. The writing assignments
consist of two short reviews, each of which will be three to five pages in length and worth 5% of the
final grade. The tests are a midterm and a final, each of which is worth 40% of the final grade.
Half of each test will be a take-home writing assignment due on the day of the exam. Participation
in class discussion and preparedness counts for the remaining 10% of the grade. **Late
assignments are not accepted.**

Grading is done on a 100-point scale
94-100 = A  77=C/C+
93=A/A-  74-76=C
90-92=A-  73=C/C-
89=B+/A-  70-72=C-
88=B+  69=D+/C-
87=B+/  68=D+
84-86=B  67=D/D+
83=B/B-  64-66=D
80-82=B-  63=D/D-
79=C+/B-  60-62=D-
78=C+ below 60=F

Cheating or Plagiarism:
Neither cheating nor plagiarism will be tolerated. The first instance of either will result in a grade of
“0” for that assignment or examination. A second instance of either will result in a failing grade for the course.
At the instructor’s discretion, based upon the seriousness of the offense, the student who cheats or plagiarizes will
be reported to the administration, and expulsion from the university may ultimately follow.
Attendance:
Regular attendance is necessary and you must be on time. Three unexcused absences or late arrivals will result in a one-half letter grade penalty. Four will result in a whole letter grade penalty. Five or more will result in a failing grade for the course. Absences will only be excused through prior arrangement with the instructor, or if they are the result of a serious medical problem (see the parenthetical under “Tests and Grades,” above.)

Academic Dishonesty (University Policy)
Academic dishonesty tarnishes UMD's reputation and discredits the accomplishments of students. UMD is committed to providing students every possible opportunity to grow in mind and spirit. This pledge can only be redeemed in an environment of trust, honesty, and fairness. As a result, academic dishonesty is regarded as a serious offense by all members of the academic community. In keeping with this ideal, this course will adhere to UMD's Student Academic Integrity Policy, which can be found at www.d.umn.edu/assl/conduct/integrity. This policy sanctions students engaging in academic dishonesty with penalties up to and including expulsion from the university for repeat offenders.

Student Conduct Code (University Policy)
The instructor will enforce and students are expected to follow the University's Student Conduct Code (http://www.d.umn.edu/assl/conduct/code). Appropriate classroom conduct promotes an environment of academic achievement and integrity. Disruptive classroom behavior that substantially or repeatedly interrupts either the instructor's ability to teach, or student learning, is prohibited. Disruptive behavior includes inappropriate use of technology in the classroom. Examples include ringing cell phones, text-messaging, watching videos, playing computer games, doing email, or surfing the Internet on your computer instead of note-taking or other instructor-sanctioned activities.

Office Hours:
M,W,F, 10:00-10:50
or by special arrangement with the instructor.
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