HISTORY OF SCIENCE
(Left II & III, see course descriptions)

Chair, Professor DONALD deB. BEAVER

A major in the History of Science is not offered, but the occasional Contract Major in it or a related interdisciplinary field is possible. Courses in the History of Science are designed primarily to complement and strengthen work in other major fields. Although any of the courses may be taken separately, studying related courses in other departments will enhance their value, because by nature, History of Science is interdisciplinary.

The following will serve as examples: the 101 course is an introduction to science and technology studies, and concentrates on key aspects of contemporary science and technology relevant to many issues of living in a technological society. Scientific Revolutions (HSCI 224) deals with the emergence of modern science in the 1600s and 1700s, and with subsequent revolutions in scientific thought; as such it complements courses related to modern European history. History of Science 240 traces the influential role of science and invention in the shaping of American culture, and complements offerings in American Studies and American History. HSCI 320, an historical overview of the ideas, practice, and organization of medicine, provides context for related coursework in History, Philosophy, and the Premed and Public Health Programs.

COURSES OF RELATED INTEREST

PHIL 209: Philosophy of Science
SOC 368: Technology and Modern Society

HSCI 101(F) Science, Technology, and Human Values
Crosslistings: HSCI 101/SCST 101

Primary Crosslisting
A study of the natures and roles of science and technology in today's society, and of the problems which technical advances pose for human values. An introduction to science-technology studies. Topics include: scientific creativity, the Two Cultures, the norms and values of science, the Manhattan Project and Big Science, the ethics and social responsibility of science, appropriate technology, technology assessment, and various problems which spring from dependencies engendered by living in a technological society, e.g., computers and privacy, automation and dehumanization, biomedical engineering.

Class Format: seminar
Requirements/Evaluation: two or three short exercises, two papers (3-5 pages and 5-7 pages), and two hour exams
Prerequisites: none
Enrollment Preferences: first-years and sophomores
Enrollment Limit: 20

Distributional Requirements:
Division 2

Fall 2015
SEM Section: 01 MWF 10:00 10:50  Instructor: Donald Beaver

HSCI 224 Scientific Revolutions: 1543-1927
Crosslistings: HSCI 224/HIST 294

Primary Crosslisting
How much does science create the sensibilities and values of the modern world? How much, if any, technical detail is it necessary to know in order to understand the difference between propaganda and fact? This course investigates four major changes of world view, associated with Copernicus (1543); Newton (1687); Darwin (1859); and Planck (1900) and Einstein (1905). It also treats briefly the emergence of modern cosmogony, geology, and chemistry as additional reorganizations of belief about our origins, our past, and our material structure. We first acquire a basic familiarity with the scientific use and meaning of the new paradigms, as they emerged in historical context. We then ask how those ideas fit together to form a new framework, and ask what their trans-scientific legacy has been, that is, how they have affected ideas and values in other sciences, other fields of thought, and in society. Knowledge of high-school algebra is presupposed.

Class Format: lecture/discussion
Requirements/Evaluation: evaluation will be based on five problem sets, four short papers (3-5 pages), and two hour exams
Prerequisites: none; open to first-year students
Enrollment Preferences: seniors and juniors
Enrollment Limit: 30

Distribution Notes: meets Division 2 requirement if registration is under HIST; meets Division 3 requirement if registration is under HSCI

Distributional Requirements:
Division 3

Other Attributes:
HIST Group C Electives - Europe and Russia
HIST Group P Electives - Premodern
SCST Related Courses

Not Offered Academic Year 2016

LEC Instructor: Donald Beaver

HSCI 240 Technology and Science in American Culture
Crosslistings: HSCI 240/HIST 295

Primary Crosslisting
Although technologically dependent, the American colonies slowly built a network of native scientists and inventors whose skills helped shape the United States' response to the Industrial Revolution. The interaction of science, technology, and society in the nineteenth century did much to form American identity: the machine in the garden, through the "American System of Manufactures" helped America rise to technological prominence; the professionalization and specialization of science and engineering led to their becoming vital national resources. Understanding these developments, as well as the heroic age of American invention (1865-1914), forms the focus of this course: how science and technology have helped shape modern American life.

Class Format: seminar
Requirements/Evaluation: class discussion, six short reports (2-3 pages), and two hour exams
Prerequisites: none; open to first-year students
Enrollment Limit: 15

Distributional Requirements:
Division 2

Other Attributes:
ENVP SC-B Group Electives
HIST Group F Electives - U.S. + Canada
SCST Elective Courses
**HSCI 263 Cold War Technocultures**

**Crosslistings:** SOC 263/AMST 263/HIST 363/HSCI 263/SCST 263

**Secondary Crosslisting**

With the Soviet Union's collapse at the end of the twentieth century and the emergence of the United States as an unchallenged victor and "new world" hegemon, have we lost a sense of the drama, fear, and unbridled terror that permeated American life during the Cold War? In this course we will set out to understand Cold War American culture(s) by examining the intersection of politics, aesthetics, and a range of major technoscientific developments during this period. The course will take shape in three parts. Part I will explore the emergence and role of the computer in shaping the distinctly American style of thought aimed at Soviet "containment". We will furthermore trace historical treads connecting MIT's legendary Whirlwind computer, the SAGE continental air defense system, nuclear wargaming at the RAND Corporation, artificial intelligence, and the advanced technologies, management strategies, and atrocities of the Vietnam War. Part II takes up the symbolic potency of the space race, which we will use as a conduit through which to explore the following events and developments: Sputnik, Yuri Gagarin's spaceflight, the Apollo moon landing, and American civil defense; the postwar science of cybernetics and the emergence of the now iconic cyborg; the Club of Rome's *Limits to Growth* report and the Gaia hypothesis; plans backed by NASA for the industrialization, humanization, and colonization of outer space; and Ronald Reagan's Strategic Defense Initiative, "Star Wars". Finally, case studies considered in Part III will focus on moments of conflict and resistance, appropriation, and unintended consequences of the preceding and other Cold War technological developments, among them antipsychiatry and environmentalism; Project Cybersyn, an infrastructural causality of the US/CIA-backed Chilean coup of 1973; the American counterculture and the countercultural roots of neoliberalism(s).

**Class Format:** seminar

**Requirements/Evaluation:** weekly discussion precis, film screenings, class presentations, and a final research project decided in consultation with the instructor

**Prerequisites:** none

**Enrollment Preferences:** preference will be given to students with a demonstrated interest in the study of Cold War science and technology

**Enrollment Limit:** 19

**Expected Class Size:** 19

**Distributional Requirements:**

Division 2

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**Not Offered Academic Year 2016**

SEM Instructor: Grant Shoffstall

**HSCI 300 Measuring Truth**

**Crosslistings:** MATH 300/HSCI 300/REL 301/SOC 300

**Secondary Crosslisting**

We will examine specific case studies of measuring truth—the emergence of science and technology in American colleges and universities; the prevalence of scientific methods in social science and humanities; the ways alternative methodologies in the humanities critique and historicize scientific approaches to reaching truth; and the possible tension between scientific modes of thinking and the aims of the liberal arts.

**Class Format:** seminar

**Requirements/Evaluation:** five 2-page papers and a final 15-page paper

**Extra Info:** may not be taken on a pass/fail basis

**Prerequisites:** any 200-level course

**Enrollment Preferences:** at the discretion of the instructors

**Enrollment Limit:** 20

**Expected Class Size:** 20

**Distribution Notes:** meets Division 3 requirement if registration under MATH; meets division 2 if registration under AFR, HSCI, REL or SOC

**Distributional Requirements:**

Division 3

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**Not Offered Academic Year 2016**

**HSCI 309 Environmental Politics and Policy (W)**

**Crosslistings:** ENVI 309/HSCI 309/SCST 309/PSCI 301

**Secondary Crosslisting**

This course will provide an overview of environmental policy-making, with an emphasis on the ways in which policies are developed and implemented at the local, state and national level. Special attention will be paid to the variety of actors that shape environmental outcomes, including legislators, administrators, the science community, civil society and the private sector. Following an examination of different models of environmental policy-making, this course will focus on several case studies, including on the management of public lands, air and water pollution, climate change and endangered species protection.

**Class Format:** seminar

**Requirements/Evaluation:** evaluation is based on several shorter writing assignments, a semester-long research project, and participation

**Prerequisites:** ENVI 101 or permission of instructor

**Enrollment Preferences:** Environmental Policy & Environmental Science majors & Environmental Studies concentrators; but other students interested in public policy are welcome

**Enrollment Limit:** 19

**Expected Class Size:** 19

**Dept. Notes:** required course for the Environmental Policy major and the Environmental Studies concentration

**Distributional Requirements:**

Division 2

Writing Intensive

**Other Attributes:**

ENVI Environmental Policy
ENVP PTL Theory/Method Courses
ENVP PE-A Group Electives
ENVP PTL-A Group Electives
ENVP SC-A Group Electives
POEC Comparative POEC/Public Policy Courses

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**Not Offered Academic Year 2016**

SEM Instructor: Brian McCammack
HSCI 320(F) History of Medicine  
**Crosslistings:** HSCI 320/HIST 293  
**Primary Crosslisting**
A study of the growth and development of medical thought and practice, together with consideration of its interaction with science and social forces and institutions. The course aims at an appreciation of the socio-historical construction of Western medicine, from prehistory to the twentieth century. The course begins with paleoanatomical reconstructions, and moves to Babylonian, Egyptian and Greek (not only Hippocratic) medicine, Greek and Roman anatomy and physiology, Arabic medical thought, Renaissance medicine, and the gradual professionalization and specialization of medicine from the sixteenth century. Attention is paid to theories of health and disease, ideas about anatomy and physiology, in addition to achievements such as anesthesia and internal surgery, and advances in instruments such as obstetrical forceps and the stethoscope.

**Class Format:** seminar  
**Requirements/Evaluation:** six short papers (3 pages), midterm, final hour exam  
**Prerequisites:** none; open to first-year students  
**Enrollment Limit:** 15  
**Distributional Requirements:** Division 2  
**Other Attributes:**  
- meets Division 3 requirement if registration is under ASTR; meets Division 2 requirement if registration is under HSCI  
- Writing Intensive  
- SCST Elective Courses

**Enrollment Preferences:** juniors and seniors and to those with backgrounds in science, history of science, or philosophy.

**Fall 2015**  
**LEC Section:** 01 MWF 11:00 11:50  Instructor: Donald Beaver

HSCI 322(F) Medieval Islamic Medicine  
**Crosslistings:** HSCI 322/REL 283/ARAB 281  
**Primary Crosslisting**
Medieval Islamic Medicine embodies both a medical tradition that deserves historical study in itself, and a relevant period of medical history with a deep impact on the development of the Western Medical Tradition. Paradoxically, while it is highly idealized, it has traditionally gained —and often still does today—a fleeting, superficial and outdated overview in the syllabi of history of medicine courses at medical schools, and only exceptionally has a well informed chapter been included in recent general works on history of medicine or Islamic studies. The aim of this course is to two-fold: first, to give students an overview of the Islamic medical tradition, outlining its origins and development both in the eastern and western lands of medieval Islamic civilization, and second, to develop student's critical skills in analyzing historical information as well as bibliography. Among other things, the course will consider the transmission and elaboration of Greco-Roman medical knowledge, the principles of medical theory and practice, the development of different genres of Islamic medical literature, their main authors, and their medical contributions.

**Class Format:** seminar  
**Requirements/Evaluation:** regular attendance and participation, two short papers, and a 10- to 15-page research paper  
**Prerequisites:** none  
**Enrollment Preferences:** none  
**Enrollment Limit:** 20  
**Expected Class Size:** 15  
**Distributional Requirements:** Division 2  
**Other Attributes:**  
- meets Division 3 requirement if registration is under ASTR; meets Division 2 requirement if registration is under HSCI  
- Writing Intensive  
- SCST Elective Courses

**Enrollment Preferences:** secular; does not count toward ASPH, ASTR or PHYS major

**Fall 2015**  
**SEM Section:** 01 TF 01:10 02:25  Instructor: Cristina Alvarez Millan

HSCI 336 Science, Pseudoscience, and the Two Cultures (W)  
**Crosslistings:** ASTR 336/HSCI 336  
**Secondary Crosslisting**
A famous dichotomy between the sciences and the humanities, and public understanding of them, was laid down by C. P. Snow and has been widely discussed, with ignorance of the second law of thermodynamics compared with ignorance of Shakespeare. In this seminar, we will consider several aspects of science and scientific culture, including how scientific thinking challenges the claims of pseudoscience. We will consider C. P. Snow and his critics as well as the ideas about the Copernican Revolution and other paradigms invented by Thomas Kuhn. We will discuss the recent "Science Wars" over the validity of scientific ideas. We will consider the fundamental originators of modern science, including Tycho, Kepler, Galileo, and Newton, viewing their original works in the Chapin Library of rare books and comparing their interests in science with what we now call pseudoscience, like alchemy. We will review the history and psychology of astrology and other pseudosciences. Building on the work of Martin Gardner in Pads and Fallacies in the Name of Science, and using the current journal The Scientific Review of Alternative Medicine, we consider from a scientific point of view what is now called complementary or alternative medicine, including both older versions such as chiropractic and newer non-scientific practices. We will discuss the current global-climate-change deniers and their effects on policy. We consider such topics as GM (genetically modified) foods, the safety and regulation of dietary supplements, and the validity of government and other recommendations relevant to the roles of dietary salt and fat in health. We consider the search for extraterrestrial intelligence (SETI) and reports of UFO's and aliens. We consider the possible effects that superstitious beliefs have on the general public's cooperation in vaccination programs and other consequences of superstition. We also consider the recently increased range of dramas that are based on scientific themes, such as Tom Stoppard's Arcadia and Michael Frayn's Copenhagen.

**Class Format:** seminar  
**Requirements/Evaluation:** evaluation will be based on biweekly 5-page papers, participation in discussions, and a 15-page final paper  
**Prerequisites:** none  
**Enrollment Preferences:** juniors and seniors and to those with backgrounds in science, history of science, or philosophy.  
**Enrollment Limit:** 12  
**Expected Class Size:** 12  
**Dept. Notes:** non-major course; does not count toward ASPH, ASTR or PHYS major  
**Distribution Notes:** meets Division 3 requirement if registration is under ASTR; meets Division 2 requirement if registration is under HSCI

**Distributional Requirements:**  
- Division 3  
- Writing Intensive  
**Other Attributes:**  
- SCST Elective Courses

**Not Offered Academic Year 2016**  
**SEM Instructor:** Jay Pasachoff
In the 2014-15 academic year of the study of the book, honoring the new library and the expansion of the Chapin Library of Rare Books, we study many of the greatest names in the history of astronomy, consider their biographies, assess their leadership roles in advancing science, and examine and handle their first-edition books and other publications. Our study includes the original books published as follows: 16th-century, Nicolaus Copernicus (heliocentric universe); Tycho Brahe (best pre-telescopic observations); 17th-century, Galileo (discoveries with his first astronomical telescope, 1610; sunspots, 1613; Dialogo, 1632), Johannes Kepler (laws of planetary motion, 1609, 1619), Johannes Hevelius and Elisabeth Hevelius (atlases of stars and of the Moon, 1647 and 1687), Isaac Newton (laws of universal gravitation and of motion, 1687); 18th-century, Edmond Halley (Miscellanea curiosa, eclipse maps, 1715, 1724); John Flamsteed and Margaret Flamsteed (Atlas Coelestis, 1729); William Herschel and Caroline Herschel (1781, 1798). In more recent centuries, the original works are articles: 20th-century: Albert Einstein (special relativity, 1905; general relativity, 1916); Marie Curie (radioactivity); Cecilia Payne-Gaposchkin (hydrogen dominating stars, 1929), Edwin Hubble (Hubble's law, 1929); Vera Rubin (dark matter, 1970s); Jocelyn Bell (pulsar discovery, 1968); 21st-century: Wendy Freedman (Universe's expansion rate, 2000s). We will also read biographies and recent novels dealing with some of the above astronomers. With the collaboration of the librarians, we will meet regularly in the Chapin Library of Rare Books and also have a session at the library of the Clark Art Institute to see its rare books of astronomical interest.

Class Format: seminar
Requirements/Evaluation: class participation, two 5-page intermediate papers, and a final 15-page paper
Enrollment Preferences: if over enrolled, preference by written paragraph of explanation of why student wants to take the course
Distribution Notes: meets Division 3 requirement if registration is under ASTR; meets Division 2 requirement if registration is under HSCI or LEAD
Distributional Requirements:
Division 3
Writing Intensive

Not Offered Academic Year 2016
SEM Instructor: Jay Pasachoff

HSCI 371 Science, Technology, and (Bio)medicalization
Crosslistings: SOC 371/HSCI 371/SCST 371
Secondary Crosslisting
Medicization: those processes by which previously non-medical problems, once defined as ethical-religious, legal or social (e.g. drug and alcohol addiction, shyness, obesity), are brought within the purview of medical science and redefined as medical problems, usually in terms of "illness" or "disorder." Part I: The history of the medicization thesis; medicization as a technical process; modern medicine as a form of social control; critiques of the medicization thesis. Part II: From medicization to biomedicalization; from the management of human life to the transformation of "life itself" by way of post-World War II technoscientific interventions aimed at "optimizing" human vitality. Empirical cases for consideration will be drawn from those technoscientific developments having made possible the work of optimization that defines biomedicalization: molecular biology, pharmacogenomics, biotechnologies, imaging techniques, robotics, and transplant medicine, among others. Finally, a consideration of how processes of biomedical optimization have produced new ways of seeing, knowing, and imagining human bodies, such that biology is increasingly less representative of "destiny" than it is of possibility. The course will to this end conclude with a survey of emerging issues in speculative technoscience and the ethics and politics of human enhancement.
Class Format: lecture
Requirements/Evaluation: weekly discussion précis, science-fiction book review essay, class presentations, and a take-home midterm
Extra Info: may not be taken on a pass/fail basis
Prerequisites: none
Enrollment Limit: 25
Expected Class Size: 20-25
Distributional Requirements:
Division 2
Other Attributes:
PHLH Bioethics + Interpretations of Health

Not Offered Academic Year 2016
LEC Instructor: Grant Shoffstall

HSCI 497(F) Independent Study: History of Science
History of Science independent study.
Class Format: independent study
Distributional Requirements:
Division 2

Fall 2015
IND Section: 01 TBA Instructor: Donald Beaver

HSCI 498(S) Independent Study: History of Science
History of Science independent study.
Class Format: independent study
Distributional Requirements:
Division 2

Spring 2016
IND Section: 01 TBA Instructor: Donald Beaver