History of Modern Science
HIS 322M unique# 39535
Spring 2011, MWF 1:00-2:00PM
Welch Hall classroom: WEL 2.308

Professor: Dr. Alberto A. Martínez
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office hours: MW 2:00-3:00 & by appt.
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office hours: MW 3:00-4:00

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This course explores a selection of topics and episodes in the history of science. The main time frame ranges from the early 1600s to 1945 (the end of World War II). The major scientific developments discussed will include the Copernican revolution, Newton's contributions to physics and their influence, the origins and rise of Darwin's theory of evolution, the Eugenics movement, the Scopes Monkey Trial, the origins of Einstein's theories of relativity, and the early development of nuclear weapons.

Students are required to take **three Exams**, including a **Final Exam** during finals week. There will also be **Quizzes** for reading confirmation. If you miss an Exam or Quiz you will only be allowed to take a make-up if you bring a medical excuse, and we have prearranged it.

Attendance Policy: Attendance is required. The material that is covered in lectures is not identical to the material in the books, so you would easily be lost if you do not attend. In some cases lectures will correct claims that appear in the readings. Every day, sometime after the class has begun, we will pass out an attendance sheet for you to sign-in. The TA will check that the signatures match attendance. If you do not sign in, you will be counted as absent. Every unexcused absence will reduce your attendance score by .5 points, up to a maximum of 10 course points (attendance constitutes 10% of your grade). Only medical excuses from a doctor's office will be accepted, on paper.

Participation: You are welcome to raise your hand to speak at any time, but since the course has 80 students, you are not required to do so. When you say something substantial and helpful to the class, the TA will make a note, thus giving you a point (equivalent to .5 bonus course points). You may score up to 10 participation points in the semester (equivalent to +5 course points at the end of the semester). Please do not ask the TA whether your comment counted at the end of any given class. That decision will be at our discretion. But you may discuss your participation and points by visiting office hours.

If you miss a class you should get notes from someone else who attended; so it is in your best interest to develop some contact with other students early on, so that you won't feel rude asking favors from 'a stranger.' I will not hand out copies of my lecture notes because this course will test your dedication in paying attention and taking your own notes. The material covered in class will supplement the readings, but it will also differ from them, so attendance and note-taking are necessary, as every absence might lower your performance in the exams.

The assigned readings vary in length, and you should read thoughtfully (underline, write on margins, or make outlines) rather than waste your time skimming and forgetting. Some of the readings will be from primary sources, such as writings by prominent scientists, other readings will be from secondary texts, such as by historians.

REQUIRED READINGS: The main course texts are:

Hal Hellman, *Great Feuds in Science*, New York: John Wiley & Sons, 1998.
Alberto Martínez, *Course Packet: Secrets and Myths in the Sciences*, 2010.
Jonathan Miller, *Darwin for Beginners*, New York: Pantheon Books, 1982.
Stephen J. Gould, *Ever Since Darwin*, New York: W.W. Norton, 1977/1992.

The Course Packet is available for purchase only at Jenn's Copies on 2518 Guadalupe at Dean Keaton (you may call them 512-482-0779, to confirm they have copies printed). These other books are available at the University CO-OP. If you do not purchase—*and read*— these books, it will be very difficult to earn a good grade in this course because you cannot invent history and because randomly skimming the internet will not cover the same material and will mislead you with irrelevant topics, myths and inaccuracies.

In addition to the four texts, there will be a few handouts, along with some historical websites. The following readings are scheduled in the Class Calendar. They will also be on Blackboard.

Rob Iliffe, "Isaac Newton's Personal Life," Newton Project
http://www.newtonproject.sussex.ac.uk/prism.php?id=40

David Brewster, "Newton, Sir Isaac," *Encyclopaedia Britannica*, 7th ed (1842), pp. 175-181.
http://www.newtonproject.sussex.ac.uk/catalogue/viewcat.php?id=OTHE00010

Henry Pemberton, "A View of Sir Isaac Newton's Philosophy" (London, 1728)
http://www.newtonproject.sussex.ac.uk/texts/viewtext.php?id=OTHE00035

C. Darwin and A. R. Wallace, "On the tendency of species to form varieties; and on the perpetuation of varieties and species by natural means of selection," *Journal of the Proceedings of the Linnean Society of London. Zoology* 3 (20 August, 1858): 46-50.
http://darwin-online.org.uk/content/frameset?itemID=F350&viewtype=text&pageseq=1

AIP website: Marie Curie: http://www.aip.org/history/curie/brief/index.html

AIP website: Einstein #1. American Institute of Physics, History Center:
http://www.aip.org/history/einstein/early1.htm
http://www.aip.org/history/einstein/early2.htm
http://www.aip.org/history/einstein/early3.htm
http://www.aip.org/history/einstein/early4.htm

AIP website: Einstein #2. American Institute of Physics, History Center:
1907-1915 http://www.aip.org/history/einstein/great2.htm#indexgr
World Fame I http://www.aip.org/history/einstein/fame1.htm
World Fame II http://www.aip.org/history/einstein/fame2.htm
Public Concerns I http://www.aip.org/history/einstein/public1.htm

Scopes: transcripts from the trial of John T. Scopes on the teaching of evolution, 1925:
http://www.law.umkc.edu/faculty/projects/ftrials/scopes/scopes2.htm
(note, these are excerpts, for the full transcripts see: http://www.scopestrial.org/)

Karl Popper, "Science as Falsification," excerpt from *Conjectures and Refutations* (1963)
http://www.stephenjaygould.org/ctrl/popper_falsification.html

AIP website: Heisenberg #1. Read the sections on "Early Years," "Student Years," and "Quantum Mechanics," at: http://www.aip.org/history/heisenberg/p01.htm

AIP website: Einstein #3: http://www.aip.org/history/einstein/quantum1.htm

Garland Allen, and others, Eugenics Movement: "Social Origins," "Scientific Origins," "Traits Studied," at: http://www.eugenicsarchive.org/eugenics/list3.pl

AIP website: Heisenberg #2. Read the sections on "The Difficult Years," "The Post-War Era," and "Quantum Mechanics," at: http://www.aip.org/history/heisenberg/p01.htm

The Class Calendar, below, includes a reliable schedule of when specific subjects will be covered in class. It also includes the Exam dates. All readings are listed in the calendar. You are responsible for carrying out each reading assignment on time.

Upon request, the University of Texas at Austin provides appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-6441 TTY.

GRADING: Possible grades: A, B, C, D, F; no + or – . The distribution is as follows:

Attendance 10%
Participation +5% Bonus
Quizzes 15%
First Exam 20%
Second Exam 25%
Final Exam 30%

University policies on plagiarism and academic dishonesty will be enforced in this course.

Class Calendar, Spring 2011

		required readings
Jan.19 W	Introduction	
Jan.21 F	Copernicus and Kepler	Martínez 1-17
Jan.24 M	Galileo on trial	Hellman 1-20, Martínez 17-33
Jan.26 W	The Plague and Newton's Optics	Iliffe (online)
Jan.28 F	Newton, God and the Devil	Brewster, 175-181 (online)
Jan.31 M	Newton's Math and Physics	Hellman 39-61, Pemberton (online)
Feb.2 W	The Generation of Life	Hellman 63-79
Feb.4 F	Elements and Alchemists' Gold	Martínez 34-49
Feb.7 M	***EXAM***	
Feb.9 W	Science and the French Revolution	Martínez 79-106
Feb.11 F	Questions about Species	Miller 3-25, 30-45

Feb.14 M	Geology and Charles Lyell		Gould 141-159, 192-198; Miller 26-29
Feb.16 W	Darwin and the Voyage of the Beagle		Gould 28-38, Martínez57-69, Miller46-73
Feb.18 F	Return from the Galápagos		Martínez 69-78, Miller 74-115
Feb.21 M	Malthus and Natural Selection	**Quiz:**	Darwin/Wallace (online); Gould 21-27
Feb.23 W	Responses to Darwin		Hellman 81-103; Gould 39-45, 103-110
Feb.25 F	Controversies on Evolution		Miller 116-134
Feb.28 M	Terrible Lizards		Hellman 121-140
Mar.2 W	Human Origins		Gould 49-69, Hellman 159-176
Mar.4 F	Mendel and Genetics		Miller 135-157
Mar.7 M	***Midterm EXAM***		
Mar.9 W	The Age of the Earth		Hellman 105-119
Mar.11 F	X-Rays and Electrons		Martínez 107-123

(Mar.12-20 Spring Break)

Mar.21 F	Atoms and Light		
Mar.23 M	Radioactivity	**Quiz:**	AIP website: Marie Curie (online)
Mar.25 W	Transmutation of Elements		Martínez 50-56
Mar.28 M	Optics and Electromagnetism		
Mar.30 W	Special Relativity	**Quiz:**	Martínez 124-144
Apr.1 F	Einstein and Modern Myths		Martínez 145-157, Einstein #1 (online)
Apr.4 M	A New Theory of Gravity		AIP website: Einstein #2 (online)
Apr.6 W	Continental Drift		Hellman 141-158; Gould 160-167
Apr.8 F	Progress and Scientific Revolutions		Gould 201-206, Miller 158-175
Apr.11 M	Science as Falsification		Popper (online)
Apr.13 W	Scopes Trial transcripts	**Quiz:**	Scopes (online) days 1, 2, 3, 4, 5, 6, 7.
Apr.15 F	Scopes Trial analysis		Scopes (online) day8, Bryan's, Mencken
Apr.18 M	Aftermath: the Dover trial		video
Apr.20 W	The Uncertainty of the Quantum	**Quiz:**	AIP website: Heisenberg #1 (online)
Apr.22 F	Einstein versus Bohr		AIP website: Einstein #3 (online)
Apr.25 M	Biometry, IQ testing, and Racism		Gould 179-191, 214-247
Apr.27 W	Inferior Blood vs. Eugenics		Martínez 158-177, Allen (online)
Apr.29 F	Scientists in WWII, Atomic Bomb		AIP web: Heisenberg #2 (online)
May 2 M			
May 4 W	Nature versus Nurture		Hellman 177-193
May 6 F	Last day of class: Sociobiology		Gould 251-271

<u>May * FINAL EXAM * during finals week. Place, date and time to be announced</u>