

**History of Modern Science**

HIS 322M unique# 39260  
Spring 2011, T&Th 12:30-1:50PM  
Welch Hall classroom: WEL 2.308  
almartinez@mail.utexas.edu

**Professor: Dr. Alberto A. Martínez**

office: Garrison Hall 0.138  
office hours: TTH 11:30-12:20 & by appt.

Teaching Assistant: James Hudson, M.A. email: intheyang@yahoo.com  
office hours: TTh 2:30-3:30, place: Caffé Medici on Guadalupe near 22nd St.

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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 covered in lectures is not identical to the books, so you would easily be lost if you do not attend. Some 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 0.5 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. You have one courtesy absence with no penalty; and a +0.5 for perfect attendance.

**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 0.5 bonus course points). You may score up to 8 participation points in the semester (equivalent to +4.0 course points at the end of the semester). Please don't 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 our office hours.

If you miss a class you should get notes from someone who attended; so it is in your best interest to talk 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, *Science Secrets*, Pittsburgh: Pittsburgh University Press, 2011.  
Jonathan Miller, *Darwin for Beginners*, New York: Pantheon Books, 1982.  
Stephen J. Gould, *Ever Since Darwin*, New York: W.W. Norton, 1977/1992.

These 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*, there will be handouts, plus historical websites. The following readings are scheduled in the Class Calendar. They will be on Blackboard: <https://courses.utexas.edu>

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/view/texts/normalized/OTHE00010>

Charles 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> click “*Start Here.*”

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>  
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: posted on Blackboard: <https://courses.utexas.edu> in the Course Documents section (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.stephenjaysgould.org/ctrl/popper\\_falsification.html](http://www.stephenjaysgould.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 topics 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 provides appropriate academic accommodations for qualified students with disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities 471-6259.

**GRADING:** 100-93 = A, 92-90 = A-, 89-87 = B+, 86-83 = B, 82-80 = B-, 79-77 = C+, 76-73 = C, 72-70 = C-, 69-67 = D+, 66-63 = D, 62-60 = D-, 59-0 = F. The distribution is as follows:

Attendance 10%  
Participation +4% 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, Fall 2011

		<i>required readings</i>
Aug.25 Th	Introduction / Copernicus	
Aug.30 T	Brahe, Kepler, Galileo	Martínez 1-30
Sept. 1 Th	Galileo on Trial	Martínez 30-46, Hellman 1-20
Sept. 6 T	The Plague and Newton’s Optics	Martínez 47-69
Sept. 8 Th	Newton, God and the Devil	online: Iliffe, Brewster 175-181
Sept.13 T	Alchemy and Life	Martínez 70-85 middle, Hellman 63-79
Sept.15 Th	Ben Franklin and the French Science	Martínez 118-127, 128-146
Sept.20 T	<b>Exam 1</b>	
Sept.22 Th	Questions about Species	Miller 3-25, 30-45
Sept.27 T	Geology and Charles Lyell	Gould 141-159, 192-198; Miller 26-29

Sept.29 Th	Darwin: the HMS Beagle voyage	Gould 28-38, Martínez 95-108, and Miller 46-73
Oct. 4 T	Malthus and Natural Selection	<b>QUIZ:</b> Martínez 108-117, and, Gould 21-27, and online: Darwin/Wallace
Oct. 6 Th	Controversies on Evolution	Miller 116-134
Oct.11 T	Big Lizards and Human origins	Hellman 121-140, Hellman 159-176
Oct.13 Th	origins cont., Mendel and Genetics	Gould 49-69, Miller 135-157
Oct.18 T	The age of the Earth	Hellman 105-119
Oct.20 Th	Discovery? X-Rays and Electrons	Martínez 147-163
Oct.25 T	<b>Exam 2</b>	
Oct.27 Th	Radioactivity and Transmutation	Martínez 85-94, and online: Marie Curie
Nov. 1 T	Light, magnetism, relativity	Martínez 172-192, Einstein #1
Nov. 3 Th	Einstein myths, and Gravity	<b>QUIZ:</b> Martínez 164-171, 193-205, 206-215, and online: Einstein #2
Nov. 8 T	Wegener and Scientific Revolutions	Hellman 141-158; Gould 160-167, 201-206, Miller 158-175, Popper (online)
Nov.10 Th	The Scopes Monkey Trial	<b>QUIZ:</b> online: Scopes, days 1, 2, 3, 4, 5, 6, 7.
Nov.15 T	Evolution in schools: Dover Trial	online: Scopes day8, Bryan, Mencken; and online: Dover video (in Blackboard)
Nov.17 Th	Uncertainty and the Quantum	<b>QUIZ:</b> online: Heisenberg #1, Einstein #3
Nov.22 T	Racism, Biometry, and IQ	Gould 179-191, 214-247
Nov.24	Thanksgiving	
Nov.29 T	Eugenics and World War II	Martínez 227-255, and online: Allen and online: Heisenberg #2
Dec. 1 Th	Anthropology and Sociobiology	Hellman 177-193, Gould 251-271
<b>Dec. 9 Fri.</b>	<b>* EXAM 3 * during finals week.</b>	<b>9:00AM – 12:00 Place to be announced</b>