

**Honors 221: History and Philosophy of Science  
Fall 2009**

<b>Instructors</b>	
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Office Hours: MW: 12-1 TTh: 1:15-2:00, 3:30-4:30	Office Hours: MWF: 12-1 TTh: 10-11:30

**Course Description:**

Science is a systematic attempt to understand the nature of the physical universe. In this course, we will look at the historical development of scientific thinking and dissect its philosophical foundations. Through class discussions and take-home writing assignments, we will explore fundamental questions of scientific epistemology including the following:

- How are scientific explanations different from other types of explanation?
- Is there such a thing as scientific objectivity?
- Can we explore our universe without altering it?
- What makes one scientific model better than another?
- What are the ethical ramifications to scientific discovery?
- Are there limits to what science can discover?

To thoroughly investigate these issues we will be looking at the history of scientific thought beginning with the Pre-Socratic thinkers and continuing into the modern era.

**Course Format and Grading:**

This course will combine background lecture and reading with a discussion-based exploration of major themes in the history and philosophy of science. Staying current in the reading and attending all classes is going to be crucial to a complete understanding of the course material. The grading structure for the class reflects these facts:

Class participation	30%
Short papers	45% (15% each)
Term Paper	25%

Class participation includes not only active engagement in discussions, but also completion of homework assignments. From time to time, we will give you questions to consider overnight. Your answers will not be collected, but they will form the basis for the next day's discussion.

The short papers are not intended to be research-based, but instead will require students to integrate and critically evaluate topics from reading and class into concrete arguments. Detailed instructions for the term paper will be distributed later in the term. A paper proposal, briefly outlining your topic will be due in class. We will happily work with you in writing your term paper, however due to time constraints, we will not be able to promise feedback on any drafts received after the Thanksgiving break.

**Course Schedule:**

Part One: Ancient Science (585 BC – AD 529)		
Date	Today's Topic	For Next Time
W 8/26	Intro to the Course What is Science? What is an explanation?	Read: Goodstein Read: Genesis
M 8/31	What is a belief?	Read: Pre-Socratic Fragments
W 9/2	Separating mythos from logos	
W 9/9	Do they really mean it? The role of metaphor in science.	Read: Pythagoras
M 9/14	The role of math in science	Read: Aristotle, <i>Posterior Analytics</i>
W 9/16	Drawing conclusions from premises	Paper due next time
M 9/21	<b>Paper Due</b> Ancient Science Recap	Read: Thomas Aquinas
Part Two: The Scientific Revolution (1543 – 1799-ish)		
Date	Today's Topic	For Next Time
W 9/23	Science in the Dark Ages	
M 9/28	The ethics of dissection	Read: Bacon, <i>The Novum Organum</i>
W 9/30	Can we observe the universe?	
M 10/5	Galileo and the problem of conflicting models	
W 10/7	Newton explains it all	Read: White & Linnaeus
M 10/12	What can nature teach us?	Read: Dalton & Avogadro
W 10/14	The Chemical Revolution meets the French Revolution	Paper due next time
M 10/19	<b>Paper Due</b> Scientific Revolution Recap	Read: Laudan, <i>Ideas and Organizations in British Geology</i>
Part Three: Modern Science (1800 – Today)		
Date	Today's Topic	For Next Time
W 10/21	The origin of scientific societies	Read: Playfair & Cuvier
M 10/26	The discovery of time	Read: Babbage, Ch 2 & Appx B Read: Paley

W 10/28	Miracles, Design, and Probability: Rethinking our assumptions once again	Read: Darwin Ch 1-4
M 11/2	Darwin changes everything	Read: Mendel & Wilson
W 11/4	Human behavioral biology	Read: Galton and Holmes
M 11/9	Towards the improvement of the human species	Read: Turing
W 11/11	A brief history (and possible future) of mechanization	Paper due next time
M 11/16	<b>Paper Due</b> Modern Science Recap	Term Paper Prospecti
<b>Part Four: History and Philosophy of Science</b>		
<b>Date</b>	<b>Today's Topic</b>	<b>For Next Time</b>
W 11/18	Term Paper Brainstorming	Read: Popper
M 11/23	The Doctrine of Falsification	Read: Kuhn
M 11/30	The Structure of Scientific Revolutions	
W 12/2	Kuhn-tinued	Read: Feynman
W 12/9	Final Discussion: What is Science?	Term Paper due at final exam

**Students with Disabilities:**

If you have a disability for which you will need accommodations in this class, please let me know as soon as possible. You will be required to provide documentation of your disability to the Services for Students with Disabilities program in the START center in Carleson Hall at 832-2280 (TDD 832-2286).

This syllabus is subject to change.