Philosophy 12: Scientific Reasoning
UCSD Winter Quarter 2013

Lecture:		TTh 12:30–1:50pm	Pepper Canyon Hall 109
Sections:	A01	M 2–2:50pm	HSS 1128A
	A02	T 5–5:50pm	Solis 111
	A03	W 11–11:50	Solis 111
Instructor:		Adam Streed	[astreed@ucsd.edu]
Teaching Assistants:		Tanya Hall	[tanyahall@ucsd.edu]
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Course Description. Science is a remarkably successful human enterprise, and even in its infancy stood as a model of how to reason and acquire knowledge. Historical attempts to understand what makes science special are interesting in their own right, but also inform our current understanding. In the first part of this course, then, we will look at a brief history of the philosophy of science, focusing on attempts to articulate what good scientific reasoning looks like. In the second part of the course, we will lay out a contemporary toolkit of concepts and techniques for making sense of scientific practices.

Course Materials. There is one assigned textbook: *Exploring the Scientific Method: Cases and Questions*, edited by Steven Gimbel. The book is available through the UCSD bookstore as well as various online retailers. There will also be some supplementary readings provided as .pdfs over Ted.

Format. The class consists of lectures and discussion sections, with a midterm exam, one short paper, and a final exam assigned. Your total score will be determined by the following breakdown:

- midterm: 30%
- paper: 30%
- final exam: 30%
- class participation: 10%

The default way of assigning grades is by the standard ten-percent intervals; i.e. an A- for 90%, a B- for 80%, and so on. There *might* be a slight curve depending on the distribution of final scores, but you should not rely on it. Should there turn out to be a curve, consider it a pleasant surprise.

Expectations. Students are expected to:

- complete assigned readings before the class meeting indicated on the schedule

- attend lectures and discussion sections
- participate in section
- strive for intellectual virtue, including taking arguments seriously, being a respectful listener, being willing to consider challenges to previously held beliefs, doing one's own work, and acknowledging the contributions of others

Computers in Class. Laptops and other such devices are permitted in class, but should be used only for taking notes and consulting course documents. If you simply cannot help checking Facebook, shopping online, watching sports highlights, or what have you, please sit in the back row so as not to distract other, more attentive students.

Talking in Class. Asking questions is strongly encouraged—you should always feel free to raise any question you have, even on a minor point of clarification. However, don't hold any side conversations, even about the class material. It is vital that every student is given the opportunity to hear a speaker (whether the lecturer or another student) without being distracted by their neighbors. Any students who hold side conversations after being given a warning will be asked to leave the classroom.

Academic Honesty. Students are expected to do their own work, as outlined in the UCSD Policy on Integrity of Scholarship published in the UCSD General Catalog. Academic misconduct includes but is not limited to:

- *Cheating*, such as using "crib notes" or copying answers from another student during an exam, modifying a graded exam and returning it for a new grade, or submitting the same paper or assignment for two or more different courses unless authorized by the instructors concerned.
- *Plagiarism*, such as using the writings or ideas of another person, either in whole or in part, without proper attribution to the author of the source.
- *Collusion*, such as engaging in unauthorized collaboration on homework assignments or take home exams, completing for another student any part or the whole of an assignment or exam, or procuring, providing or accepting materials that contain questions or answers to an exam or assignment to be given at a subsequent time.

The General Catalog can be found at http://www.ucsd.edu/catalog/. More helpful information can be found at http://academicintegrity.ucsd.edu. It is your responsibility to understand the Policy; if you have any questions about what constitutes acceptable work, please contact me or your TA.

Schedule. The following is provisional; any changes will be announced in class and over Ted:

Week	Date	Topics	Readings
1	Tues 1/8	Class Introduction. Science, Logic, Reasoning.	none!
	Thurs 1/10	The Syntactic View; Deductivism.	Aristotle, *Prior Analytics* and *Physics*
2	Tues 1/15	Deductivism	Descartes, *Discourse on Method*
	Thurs 1/17	Deductivism's Difficulties	case studies [TBA]
3	Tues 1/22	Inductivism	Bacon, *Novum Organum* Newton, *Principia Mathematica*
	Thurs 1/24	Inductivism	Mill, *A System of Logic*
4	Tues 1/29	Hypothetico-Deductivism	Carnap, "Theoretical Procedures in Science" Braithwaite, *Scientific Explanation*
	Thurs 1/31	Paradoxes of Evidence	Hume, *Enquiry* Goodman, *Fact, Fiction, and Forecast* Hempel, "Studies in the Logic of Confirmation"
5	Tues 2/5	**MIDTERM EXAM**	
	Thurs 2/7	Falsificationism	Popper, *The Logic of Scientific Discovery*
6	Tues 2/12	Holism	Duhem, *The Aim and Structure of Physical Theory* Kuhn, *The Structure of Scientific Revolutions*
	Thurs 2/14	Holism	Lakatos, *The Methodology of Research Programmes*
7	Tues 2/19	The Semantic View	Black, "Models and Archetypes" Giere, *Explaining Science*
	Thurs 2/21	Critical Approaches	Feyerabend, *Against Method* Hubbard, "Science, Facts, and Feminism"
8	Tues 2/26	Cognitive Biases & Other Traps	**PAPER DUE** Piattelli-Palmarini, *Inevitable Illusions* Martin, *There are Two Errors in the the Title of This Book*
	Thurs 2/28	Observation & Experimentation: Basic Concepts	none
9	Tues 3/5	Statistical Tools for Reasoning	none
	Thurs 3/7	Reasoning about Causes	none
10	Tues 3/12	Visualizing Information	Tufte, *Visual Explanations*
	Thurs 3/14	Marginal Science (a.k.a. Pseudoscience)	Feynman, "Cargo Cult Science" Giere et al., *Understanding Scientific Reasoning*
F	Tues 3/19	**FINAL EXAM**	