

Philosophy 220 – Philosophy and the Sciences – Fall, 2018

Elliott Sober

(3 credits, TR 1-2:15)

This is a first course in philosophy of science. There are no prerequisites. Throughout the course, the emphasis will be on understanding the logic of scientific reasoning. The course helps fulfill Humanities and Social Science distribution requirements. It also satisfies the Quantitative Reasoning A requirement.

The course is divided into three parts. The first concerns the ABCs of deductive logic and probability reasoning. The second addresses the question “what is science?” as it pertains to the on-going conflict between evolutionary biology and creationism/intelligent design. The third addresses some central topics in philosophy of science – the justification of induction, the nature of explanation, reductionism, the question of how science is able to provide knowledge of unobservable entities, the difference between normal scientific change and scientific revolutions, and the role of values in scientific practice.

This class meets for two 75-minute class periods each week over the fall semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc). for about 3 hours out of classroom for every class period. This syllabus includes more information about meeting times and expectations for student work.

Learning Objectives

- Ability to think critically about philosophical and scientific arguments.
- Ability to interpret complex texts accurately and analyze them logically.
- Ability to communicate precisely and concisely in both writing and speech.
- Familiarity with central concepts in philosophy of science, such as probability, confirmation, explanation, causality, reductionism, realism, and instrumentalism.

Requirements

Attendance at all classes is required, except that you are permitted to have two unexcused absences (see below). There will be one in-class exam, **two essay assignments**, and a final exam. The first essay will be on an assigned topic. The second essay will be on a topic of your choice from the third part of the class. Both essays should be 4-5 double-spaced typed pages. They should be sent as pdfs to ersober@wisc.edu (with “220 essay assignment” in the subject line). Completion of all assignments is a requirement for passing the course.

Grading

Your grade for the course will be based on your grades on the above requirements, as follows: Exam = 20%, First Essay = 20%, **Second Essay = 20%**, Final = 40%.

Here are the grading categories that will be used for each graded assignment: $A = 100-93$; $AB = 92-88$; $B = 87-83$; $BC = 82-78$; $C = 77-70$; $D = 69-60$; $F = 59-0$.

Late Policy: Essays handed in late will receive a half-letter grade penalty per day, where a day is measured from the start of class each day. For example, if a paper is due Tuesday at 1:00 p.m. and would have received a grade of A had you handed it in on time, your grade will be AB if you hand it in on after 1:00 but before Wednesday 1:00 p.m. If you turn it in on Wednesday after 1:00 and before Thursday at 1:00, it gets a grade of B. Etc. I will not enforce these penalties if there is a medical excuse or personal emergency.

Absences

You are allowed two unexcused absences during the semester, after which each absence will lower your grade. If you must miss class due to illness, religious observance, or for some other valid reason, please e-mail ersober@wisc.edu. This will count as an excused absence.

Getting Ready for Each Class Meeting

Before each lecture, do the readings for the lecture, download the slides for that class meeting (which will be posted on the course dashboard at Learn@UW), and print them out (4 or 6 to a page, your choice). Read through the slides before you come to class and make note of which slides you have questions or comments about. Bring your print-out of the slides to class, for you to take notes on. After each lecture, review the slides from the lecture and reread the reading assignment.

Electronic Devices

Do not use phones or laptops during lectures. If you want to take notes, use paper.

Problems

Students are encouraged, in this and all classes, to discuss problems concerning the teaching of this course with the instructor. If students wish to pursue a complaint with someone else, they should contact Jesse Steinberg, Assistant to the Chair, Philosophy Department, 5185 Helen C. White Hall, phone = 263-5162.

Accommodations

Every student should have an equal opportunity to participate in and benefit from this course. To that end, if you need to make special arrangements for receiving class materials or completing assignments because of a disability, please let me know, and I will work with you and the McBurney Disability Resource Center. You can find information about the McBurney Center on their web site (<https://mcburney.wisc.edu/>).

Academic Misconduct and Plagiarism

Academic misconduct in any form - including plagiarizing from a published source or a classmate - will not be tolerated. I take academic integrity violations *very seriously*. Penalties for such violations will be adjudicated based upon the severity of the offence, and may range from a grade reduction on the assignment to failure of the course. For information about academic integrity and associated University policies see <https://www.students.wisc.edu/doso/academic-integrity/>.

Office Hours

ES's office hours are Wednesday 1:30-3:30, or by appointment, in 5199 Helen C. White Hall. ES's email is ersober@wisc.edu.

Two Cancelled Class Meetings and Two Make-up Meetings

The regular class meetings on September 6 and November 11 are cancelled. Two make-up sessions are scheduled on Sunday, October 14 and Thursday, December 13.

Books available at University Bookstore (and on reserve at College Library)

Ian Hacking, *An Introduction to Probability and Inductive Logic*, Cambridge University Press, 2001. (= H)
Samir Okasha, *Philosophy of Science – A Very Short Introduction*, Oxford University Press, 2nd edition, 2016 (= O).

Schedule of Readings and Assignments			
Week	Dates	Topics	Readings

1	9/6	No class – make-up session is on 10/14	
2	9/11	Deductive Logic	H (ch 1)
2	9/13	The ABCs of Probability	H (chs 2,3,4)
3	9/18	The ABCs of Probability	H (chs 5,6,7)
3	9/20	Interpretations of Probability	H (chs 11,12)
4	9/25	Bayesianism, Principle of Indifference, and Likelihoodism	H (ch 15), Sober, “A Probability Primer.”
4	9/27	Significance tests	H (chs 16,18). David Colquhoun, “The Problem with p-values.” <i>Aeon</i> , October 11, 2016: https://aeon.co/essays/it-s-time-for-science-to-abandon-the-term-statistically-significant
5	10/2	Frequentism: Neyman-Pearson Hypothesis Testing	H (chs 17,18)
5	10/4	Frequentism: Confidence Intervals	H (19)
6	10/9	Causation, Correlation, and Randomized Controlled Trials	Vladica Velickovic, “What Everyone Should Know about Statistical Correlation.” <i>American Scientist</i> , 2015, http://www.americanscientist.org/issues/pub/what-everyone-should-know-about-statistical-correlation . Tyler Vigen, “Spurious Correlations,” http://www.tylervigen.com/spurious-correlations John Worrall, “Causality in Medicine – getting back to the Hill top.” <i>Preventive Medicine</i> (2011), 53: 235-238. <i>Wikipedia</i> article on “Randomized Control Trials.”
6	10/11	The Replication Crisis	Regina Nuzzo, “Scientific Method: Statistical Errors.” <i>Nature</i> 2014, 150-152. Christie Aschwanden, “Science isn’t Broken,” 2015, http://fivethirtyeight.com/features/science-isntbroken/
	10/14	Make-up session #1	review for first exam
7	10/16	First Exam	
7	10/18	The Design Argument, the Problem of Imperfect Adaptations	William Paley, excerpt from <i>Natural Theology</i> , 1802. Stephen Jay Gould, “The Panda’s Thumb.” In <i>The Panda’s Thumb</i> , Norton, 1980, pp. 19-26. “Evolution” and “Natural Selection” in <i>Wikipedia</i> . Del Ratzsch and Jeffrey Koperski, “Teleological Arguments for God’s Existence,” <i>Stanford Encyclopedia of Philosophy</i> .
8	10/23	Evolutionary Theory and Irreducible Complexity	Michael Behe, “Irreducible Complexity - Obstacle to Darwinian Evolution.” In W. Dembski and M. Ruse (eds.), <i>Debating Design - from Darwin to DNA</i> . Cambridge University Press, 2007, pp. 352-370. Allen Orr, “Darwin v. Intelligent Design (Again) - the latest attack on evolution is cleverly argued, biologically informed – and wrong.” <i>Boston Review</i> , December/January, 1997: http://bostonreview.mit.edu/
8	10/25	Karl Popper and the Demarcation Problem	O, ch 1. Sober, “What’s wrong with ID?” (on Sober’s web site) Wikipedia article on demarcation problem: https://en.wikipedia.org/wiki/Demarcation_problem
9	10/30	McLean v Arkansas and Methodological Naturalism	“Establishment Clause” in <i>Wikipedia</i> . Michael Ruse, “Witness Testimony Sheet, McLean v Arkansas.” Larry Laudan, “The Demise of the Demarcation Problem” and “Science at the Bar.” Michael Ruse, “Pro Judice.” Laudan, “More on Creationism.” In <i>But is it Science?</i> Prometheus Books, 1996. Sober, “Why Methodological Naturalism?” (on Sober’s web site).

9	11/1	Kitzmiller v Dover Area School District	John Jones, 2005, "Kitzmiller v Dover Area School District" Lemon v. Kurtzman, <i>Wikipedia</i> .
10	11/6	First Essay due by 1:00 pm	
10	11/6	Problem of Induction	O (ch 2)
10	11/8	Problem of Induction	H (ch 20-22)
11	11/13	Ockham's Razor	Sober, "Why is Simpler Better?" <i>Aeon</i> , May 3, 2016. https://aeon.co/essays/are-scientific-theories-really-better-when-they-are-simpler
11	11/15	Explanation	O (ch 3); David Lewis, "Causal Explanation."
12	11/20	Second Essay due by 2:00 pm	
12	11/20	no class – make-up session on 12/13	
13	11/27	Reductionism and Multiple Realizability	Wikipedia article on "Multiple Realizability." https://en.wikipedia.org/wiki/Multiple_realizability Frank Jackson and Philip Pettit, "In Defense of Explanatory Ecumenism." <i>Economics and Philosophy</i> (1992) 8: 1-21.
13	11/29	Scientific Realism	O (ch 4) Wikipedia article on "Scientific Realism" Sober, "Empiricism" (on Sober's web site)
14	12/4	Social Constructivism, Scientism, and the Fact/Value Distinction	Helen Longino, "Values and Objectivity," from <i>Science as Social Knowledge: Values and Objectivity in Scientific Inquiry</i> , Princeton University Press, 1990, pp. 62-82; O (ch. 7); <i>Wikipedia</i> on Fact/Value: https://en.wikipedia.org/wiki/Fact%E2%80%93value_distinction
14	12/6	Rational Action and Values	H (ch. 8-10)
15	12/11	Are ethical values relevant to whether hypotheses should be accepted or rejected?	Richard Rudner, "The scientist qua scientist makes value judgments," <i>Philosophy of Science</i> , 1953, 20: 1-6.
15	12/13	Make-up Session #2: review for final	Attendance is optional
16	12/15	Final	