

Philosophy 220 – Philosophy and the Sciences – Fall, 2017

Elliott Sober and Elizabeth Bell

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 whether science can provide knowledge of unobservable entities, the difference between normal scientific change and scientific revolutions, and the role of values in scientific practice.

Requirements

Attendance at all lectures and at your scheduled weekly section, and participation in discussion, are required and will affect your grade. 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. No later than Thursday at midnight, use the Desire2Learn folder to send a question to Elizabeth Bell that is about that week’s two lectures and/or the readings connected to those lectures that you’d like to have discussed in your section. Some additional brief writing projects may also be assigned in sections. There may be unannounced quizzes. 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 = 30%, Participation = 10%.

Late Policy: An essay that is 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, suppose the paper is due on day x and that you would have received a grade of A had you handed it in on time. This means that your grade will be AB if you hand it in after 1:00 on day x but before 1:00 p.m. on day $x+1$. If you turn it in on day $x+1$ after 1:00 and before 1:00 on day $x+2$, it gets a grade of B. And so on. These penalties will not be enforced if there is a medical excuse or personal emergency.

Late questions for discussion sections will not be accepted.

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 Elizabeth Bell (ebell3@wisc.edu) prior to your absence; this will count as an excused absence.

Problems

Students are encouraged, in this and all classes, to discuss problems concerning the teaching of this course with the instructor and/or the TA. 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.

EB's office hours are Monday and Tuesday 2:30-4:00 in 5112 Helen C. White Hall. EB's email is ebell3@wisc.edu.

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, 2002. (= O)

Schedule of Readings and Assignments			
Week	Dates	Topics	Readings
1	9/7	Deductive Logic	H (ch 1)
2	9/12-14	The ABCs of Probability	H (chs 2,3,4; then 5,6,7)
3	9/19	Bayesianism	H (chs 11,12,15)
3	9/21	Frequentism: 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
4	9/26	Frequentism: Neyman-Pearson Hypothesis Testing	H (chs 17,18)
4	9/28	Frequentism: Confidence Intervals	H (19)
5	10/3	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-isnt-broken/
5	10/5	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	10/10	Review for First Exam	
6	10/12	First Exam	
7	10/17	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> .
7	10/19	Evolutionary Theory, Common Ancestry, 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	10/24	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
8	10/26	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.” Sober, “Why Methodological Naturalism?” (on Sober’s web site).
9	10/31	Kitzmiller v Dover Area School District	John Jones, 2005, “Kitzmiller v Dover Area School District”
9	11/2	First Essay due by 1:00pm	
9-10	11/2-7	Problem of Induction	O (ch 2); H (ch 20-22).
10	11/9	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	11/14	Explanation	O (ch 3); David Lewis, “Causal Explanation.”
11	11/16	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.
12	11/21	Second Essay due by 1:00pm	
12	11/21	Scientific Realism	O (ch 4) Wikipedia article on “Scientific Realism” Sober, “Empiricism” (on Sober’s web site)
13	11/28	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 (chs. 5 and 7); <i>Wikipedia</i> on Fact/Value: https://en.wikipedia.org/wiki/Fact%E2%80%93value_distinction
13	11/30	Rational Action and Values	H (ch. 8-10)
14	12/5	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. Richard Jeffrey, “Valuation and acceptance of scientific hypotheses,” <i>Philosophy of Science</i> , 1956, 23: 237-246.
14	12/7	Stein’s Paradox	B. Efron and C. Morris, “Stein’s Paradox in Statistics.” <i>Scientific American</i> 236 (5): 119–127, 1977.
15	12/12	Review for Final	
16	12/18	Final (12:25-2:25)	