

Philosophy 523 – Philosophy of Evolutionary Biology – Fall 2014

Elliott Sober

This course will examine some philosophical questions concerning the theory of evolution. We'll begin by studying a substantial portion of Darwin's 1859 *Origin of Species* and start our analysis of what common ancestry and natural selection each mean in Darwin's theory and in contemporary evolutionary biology. We'll also investigate how hypotheses about each can be tested. Then we'll turn to the on-going conflict between evolutionary biology and creationism / intelligent design. A central question we'll consider is "the demarcation problem" – what is the difference between a scientific statement and a non-scientific statement? Returning to evolutionary biology, we'll explore some questions about natural selection: How should the concept of fitness be understood? Are there laws concerning natural selection? How can natural selection cause altruistic behaviors to evolve if altruists are always less fit than selfish individuals? Finally, we'll delve into biological classification and phylogenetic inference. How are taxa (varieties, species, genera, families, etc.) to be understood? How can genealogical relationships be inferred from the observed similarities and differences that organisms exhibit?

Requirements:

Attendance in class and participation in discussion are required and will affect your grade. There will be two in-class exams and two essays. Each essay will be on an assigned topic and should be 4-5 double-spaced pages, hardcopy. Completion of all assignments is a requirement for passing the course.

Office Hours:

My office hours are W 1:15-3:15, or by appointment, in 5199 Helen C. White Hall.

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

Charles Darwin, *Origin of Species*, facsimile of the 1st edition, reprinted by Harvard University Press.
Elliott Sober, *Did Darwin write the Origin Backwards?* Prometheus Books, 2012. (= DDWOB)
Elliott Sober, *Philosophy of Biology*, Westview Press, 2nd edition, 2000. (= PB)
Elliott Sober (ed.) *Conceptual Issues in Evolutionary Biology*, 3rd edition, MIT Press, 2006. (= CI)

Other readings:

Ernst Mayr, "Darwin's Five Theories of Evolution" In his *What Makes Biology Unique?* Cambridge University Press, 2007, pp. 97-115.
Elliott Sober, "Introduction to Bayesian Epistemology" (on my web site under Course Materials).
M. J. S. Hodge, "Natural Selection as a Causal, Empirical, and Probabilistic Theory," in *The Probabilistic Revolution*, L. Kruger, G. Gigerenzer, and M. Morgan (eds.), MIT Press, 1987), vol. 2, pp. 233-70.
Waters, K. (2003) "The Arguments in the *Origin of Species*." In J. Hodge and G. Radick (eds.), *The Cambridge Companion to Darwin*. Cambridge: Cambridge University Press, pp. 116-142.
William Paley, *Natural Theology*, 1802, chapters 1-2. Available at:
<http://darwin-online.org.uk/content/frameset?itemID=A142&viewtype=text&pageseq=1>
Michael Ruse, "Witness Testimony Sheet, McLean v Arkansas" In M. Ruse, *But is it Science?* Prometheus Books, 1988, pp. 287-306
Larry Laudan, "The Demise of the Demarcation Criterion" and "Science at the Bar – Causes for Concern." In M. Ruse, *But is it Science?* Prometheus Books, 1988, pp. 337-355.
Michael Ruse, "Pro Judice." In M. Ruse, *But is it Science?* Prometheus Books, 1988, pp. 356-362.
Larry Laudan, "More on Creationism" In M. Ruse, *But is it Science?* Prometheus Books, 1988, pp. 363-366.
Sven Hansson, "Science and Pseudo-Science." *Stanford Encyclopedia of Philosophy* (on-line).
Elliott Sober, "What's Wrong with Intelligent Design?" *Quarterly Review of Biology* 2007, on my web site.
Wikipedia, "Irreducible Complexity"
Elliott Sober, "A Priori Causal Models of Natural Selection." *Australasian Journal of Philosophy*, on my web site.
Richard Lewontin, "The Units of Selection." *Annual Review of Ecology and Systematics*, 1970, 1: 1-18.
Michael Wade, "Group selection among laboratory populations of *Tribolium*." *Proc. Natl. Acad. Sci. USA*, 1976,

73: 4604-4607.

Baum and A. Larson (1991): "Adaptation reviewed: a phylogenetic methodology for studying character macroevolution." *Systematic Biology* 40: 1-18.

Gillian Brown, Kevin Laland, Monique Borgerhoff Mulder, "Bateman's principles and human sex roles." *Trends in Ecology and Evolution*, 2009, 24: 297-304.

David Baum and Stacey Smith, *Tree-Thinking: An Introduction to Phylogenetic Biology*, 2013, pp. 9-23, 35-55, 90-99, 173-207.

Sober, "Likelihood and Cladistic Parsimony," ms.

Schedule of Readings and Assignments

Week	Dates	Topics	Readings
1	9/2	Introduction	Mayr's "5 theories;" DDWOB, first two sections of chapter 1; PB (1.1-1.3)
1-2	9/4, 9/9	Probability Theory	Sober, "An Introduction to Bayesian Epistemology"
2-4	9/11, 9/16, 9/18, 9/23	Darwin, <i>On the Origin of Species</i>	Darwin, <i>Origin</i> , Intro and chs. 1,2,3,4,6,13,14. Hodge; Waters; DDWOB (1.4-1.7).
4	9/25	First Exam	
5	9/30	Paley's Design Argument	Paley; PB, ch. 2.
5	10/2	The Demarcation Problem	Hansson, "Science and Pseudo-Science"; Wikipedia article on "Demarcation Problem"
6	10/7	McLean v Arkansas	Ruse, Laudan, Ruse, Laudan
6	10/9	Irreducible complexity, ID, and Creationism	Wikipedia article on irreducible complexity; Sober "What's wrong with ID?"
7	10/14	Methodological Naturalism	DDWOB, chapter 4.
7	10/16		Judge Jones's Opinion in <i>Kitzmiller v Dover Area School District</i>
8	10/21	First Essay Due	
8	10/21	Fitness	PB, ch. 3; Mills and Beatty (in CI); Sober, "Two Faces" (in CI)
8-9	10/23,10/28	Are there laws of evolution?	Sober, PB, 1.4-1.5; Beatty, "Evolutionary Contingency Thesis" (in CI); Sober, "Two Outbreaks" (in CI); Sober, "A <i>Priori</i> Causal Models of Natural Selection."
9-11	10/30,11/4, 11/6,11/11	Units of Selection:	PB ch. 4; GC Williams (in CI); DS Wilson (in CI); Lewontin 1970; Wade 1978; DDWOB, chapter 2 and Section 5.2.
11-12	11/13,11/18	Adaptationism	PB ch 5; Gould&Lewontin (in CI); Baum&Larson; Brown&Laland&Mulder.
12	11/20	Second Exam	
13	11/25	Population-Thinking and Species	Mayr, "Population Thinking" (in CI); Sober, "Evolution, Population Thinking and Essentialism" (in CI); Hull, "A Matter of Individuality" (in CI); PB 6.1-6.2.
14-15	12/2,12/4, 12/9, 12/11	Systematics and Phylogenetic Inference	PB 6.3-6.6; Baum&Smith; Felsenstein (in CI), Farris (in CI), Sober, "Likelihood and Cladistic Parsimony;" Appiah (in CI); Andreasen (in CI).
		Second essay due on day of scheduled final	