

## *Philosophy 523 – Philosophy of Evolutionary Biology – Fall 2016*

*Elliott Sober*

In this course, we'll examine several philosophical questions concerning the theory of evolution. What do common ancestry and natural selection mean and how can hypotheses about each be tested? How should the concepts of fitness and adaptation be understood? Are there laws concerning natural selection? How can natural selection cause altruistic behaviors to evolve if altruists are, by definition, less fit than selfish individuals?

### **Requirements**

Attendance in class and participation in discussion are required and will affect your grade. There will be an in-class exam, a final, and two essays on assigned topics, which should each be 4-5 double-spaced pages, hardcopy.

Each week you should email me a question about the readings for that week. Here's the plan: If your last name begins with a letter between A and K, you should email me a question about the readings that will be discussed on Tuesday; you should get your email to me by 1 pm on Monday. If your last name begins with a letter between L and Z, you should email me a question about the readings that will be discussed on Thursday; you should get your email to me by 1 pm on Wednesday.

Completion of all assignments is a requirement for passing the course.

### **Grading**

Your final grade will be based on your grades on the above requirements, as follows: In-class exam = 20%. First Essay = 20%. Second Essay 20%. Final = 30%. Participation = 10%. Your weekly question about the readings will not be graded, though it is required.

### **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 observation, or some other valid reason, please e-mail 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**

My office hours are W 1:30-3:30, or by appointment, in 5199 Helen C. White Hall.

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

Elliott Sober and David S. Wilson (1998). *Unto Others – The Evolution and Psychology of Unselfish Behavior*. Harvard University Press.

[recommended] Charles Darwin (1859). *On the Origin of Species*. Harvard University Press, 1959.

### **Schedule**

***Note: There are two extra class meetings (both on Sunday nights) listed below. These are make-up sessions for two regular class sessions that are cancelled (also indicated below).***

***Note also: Additions to this syllabus may be made as the semester progresses at my discretion. I will notify you of all changes and will update the syllabus on the course's Desire2Learn dashboard as needed.***

#### **Week 1. The ABCs of Probability**

E. Sober (2015). "The ABCs of Probability and the Basics of Bayesianism." from E. Sober, *Ockham's Razors – A User's Manual*, Cambridge University Press.

#### **Week 2.1. Central Features of Darwinian Theory**

Ernst Mayr (2007). "Darwin's Five Theories of Evolution" In his *What Makes Biology Unique?* Cambridge University Press, 2007, pp. 97-115.

M. J. S. Hodge (1987). "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.

### **Week 2.2. The Randomness of Mutation**

- R. Lenski, and J. Mittler (1993). "The Directed Mutation Controversy and Neo-Darwinism." *Science* 259: 188-194.
- E. Sober (2014). "Evolutionary Theory, Causal Completeness, and Theism - The Case of 'Guided' Mutation." In D. Walsh and P. Thompson (eds.), *Evolutionary Biology. Conceptual, Ethical, and Religious Issues*, 2014. Cambridge University Press, pp. 31-44. On my web site.

### **Week 3.1. Fitness and Probability**

- Alan Hajek (2011). "Interpretations of Probability." *Stanford Encyclopedia of Philosophy*.
- Susan Mills and John Beatty (1979). "The Propensity Interpretation of Fitness." *Philosophy of Science* 46. 263-286.
- E. Sober (2001). "The Two Faces of Fitness." In R. Singh, D. Paul, C. Krimbas, and J. Beatty (eds.), *Thinking about Evolution: Historical, Philosophical, and Political Perspectives*. Cambridge UP, vol. 2, pp. 309-321. On my web site.

### **Week 3.2. Natural Selection and Drift**

- Roberta Millstein (2002). "Are Random Drift and Natural Selection Conceptually Distinct?" *Biology and Philosophy* 171: 33-53.
- Ken Reisman and Patrick Forber (2005). "Manipulation and the Causes of Evolution." *Philosophy of Science* 72: 1115-1125.

### **Extra Meeting on Sunday September 25 (evening): Review for Exam**

### **Week 4.1: Exam**

### **Weeks 4.2, 5, and 6: Altruism and the Units of Selection Controversy**

- E. Sober and David S. Wilson (1998). *Unto Others – the Evolution and Psychology of Unselfish Behavior*. Harvard University Press, chs. 1-5, and chs. 6,7,10.
- Wikipedia*, "The Stag Hunt."

### **Week 7.1. First writing assignment due.**

### **Weeks 7 and 8: Are there laws of natural selection?**

- Karl Popper (1974). "Darwinism as a Metaphysical Research Program" Section 37 of Popper's "Intellectual Autobiography" in *The Philosophy of Karl Popper*, edited by Paul Arthur Schillp, Open Court.
- Karl Popper (1978). "Natural Selection and the Emergence of Mind." *Dialectica* 32: 339-355.
- Stephen Jay Gould (1979). "Darwin's Untimely Burial." *The Panda's Thumb*, Norton, pp. 39-45.
- John Beatty (1995). "The Evolutionary Contingency Thesis." In G. Wolters and J. Lennox (eds.), *Concepts, Theories, and Rationality in the Biological Sciences*, 45-81.
- Russell Powell and Carlos Mariscal (2015). "Convergent evolution as natural experiment - the tape of life reconsidered." *Interface Focus*.

- Sandra Mitchell (1996). "Pragmatic Laws" *Philosophy of Science* 64: S468-S479.
- E. Sober (2011). "A *A priori* Causal Models of Natural Selection." *Australasian Journal of Philosophy* 89: 1-19. On my web site.

### **Week 9.1: Second Writing Assignment Due**

#### **Week 9: Adaptationism**

- Stephen Jay Gould and Richard Lewontin (1979). "The Spandrels of San Marco – a Critique of the Adaptationist Programme." *Proceedings of the Royal Society of London B* 205: 581-598.
- W. Mitchell and T. Valone (1990). "The Optimization Research Program - Studying Adaptations by their Function." *Quarterly Review of Biology* 65: 43-52.
- Steve Orzack and E. Sober (1994). "Optimality Models and the Test of Adaptationism." *American Naturalist* 143: 361-380.

#### **Week 10: Testing Specific Adaptive Hypotheses**

- E. Sober (2009). "Did Darwin Write the Origin Backwards?" *Proceedings of the National Academy of Science* 106: 10048-10055. On my web site.
- E. Sober and Steven Orzack (2003). "Common Ancestry and Natural Selection." *British Journal for the Philosophy of Science* 54: 423-437. On my web site.
- Sarah Hrdy (1986). "Empathy, Polyandry, and the Myth of the Coy Female." In R. Bleier (ed.), *Feminist Approaches to Science*, Pergamon Press, pp. 119-146.
- Gillian Brown, Kevin Laland, Monique Borgerhoff Mulder (2009). "Bateman's principles and human sex roles." *Trends in Ecology and Evolution* 24. 297-304.

#### **Week 11, plus extra meeting on Sunday evening November 20: Taxonomy, Species, Common Ancestry, Phylogeny, and Race**

- E. Sober (2000). "Essentialism and Taxonomy." Excerpt from Chapter 6 of *Philosophy of Biology*. Westview Press, pp. 146-172.
- David Hull (1976). "Are species really individuals?" *Systematic Zoology* 25:174-191.
- Joel Velasco (2008). "Species concepts should not conflict with evolutionary history, but often do." *Stud. Hist. Phil. Biol. & Biomed. Sci.* 39: 407-414.
- David Baum and Stacey Smith (2013). *Tree-Thinking - An Introduction to Phylogenetic Biology*, Roberts and Company, Chs. 2,3,4.
- Robin Andreasen (1998). "A New Perspective on the Race Debate." *British Journal for the Philosophy of Science* 49: 199-225.

#### **Week 12: no class**

#### **Weeks 13 and 14: The Epistemology of Common Ancestry and Phylogenetics**

- E. Sober and Mike Steel (2014). "Time and Knowability in Evolutionary Processes." *Philosophy of Science* 81: 537-557. Just Sections 1,2,5. On my web site.
- E. Sober (2015). "Likelihoods and Common Causes." From *Ockham's Razors*, Cambridge UP.
- Carol E. Cleland (2011). "Prediction and Explanation in Historical Natural Science." *Brit. J. Phil. Sci.* 62: 551-582.
- David Baum and Stacey Smith (2013). *Tree-Thinking - An Introduction to Phylogenetic Biology*,

Roberts and Company, Ch. 7.  
Joe Felsenstein, "Cases in which Parsimony and Compatibility can be Positively Misleading."  
*Systematic Zoology* 1978, 27. 401-410.  
E. Sober (2004). "The Contest between Likelihood and Parsimony." *Systematic Biology* 53: 644-653.

**Week 15.1: review for Final**

**Week 15.2: no class**

**December 17 (10:05-12:05): Final**