

# Philosophy of Biology

William A. Bauer, Ph.D.

*This is my model syllabus for an undergraduate course in philosophy of biology.*

## **Course Overview**

This is an advanced undergraduate course in the philosophy of biology. The biological sciences, especially the theory of evolution by natural selection, raise questions about and challenge traditional views of human nature, the mind, our origins, and morality. But, in addition to these specific concerns, general concerns in the philosophy of science such as the nature of theory choice and scientific explanation, are given vivid exemplification within biological contexts.

In this course we will examine both questions within general philosophy of science that become more pointed within biology, and questions that biology raises for our understanding of human nature, ethics, etc. Specifically, we will focus on the following topics:

- (i) the nature of scientific explanation within biology;
- (ii) theory choice (e.g., as in the intelligent design v. evolutionary theory debate);
- (iii) species classification;
- (iv) the debate over units of selection;
- (v) functions & teleology; and,
- (vi) implications of evolutionary theory for morality and human nature.

The general goals of this course are for you to become acquainted with and increase your capacity to analyze concepts relevant to biology and philosophy of science, and to increase your ability to both critique and develop arguments pertaining to philosophical and ethical issues raised by biology. These goals will be accomplished through intensive reading assignments and a seminar-style classroom environment consisting of both lecture, class discussions, and small group discussions within class. Achievement of these goals will be measured by essay writing assignments and exams.

## **Course Grading**

Besides completing all of the readings and participating in class discussions, you are required to do the following in this course: (i) write six short critical response essays (5% each, for a total of 30% of your course grade); (ii) develop one of the critical response essays in (i) into a longer essay (40% of your course grade); and, (iii) take a final exam consisting of two essay questions (30% of your course grade). Further guidance about the final exam will be issued well in advance of the scheduled date. The critical response essays are expected to be about two pages long. The point of these is to analyze some concept, critique some argument, raise an interesting implication, etc. discussed in an assigned reading. For some of the critical response essays, and especially those early in the course, you will be given a specific question to answer and further guidance on what is expected. Others will be more open-ended in content, but still should be succinct and focused.

## **Course Materials**

1. Various journal articles (these will be made available through the course website, via online resources or electronic reserves at the library).

2. Charles Darwin, *On the Origin of Species by Means of Natural Selection...*

(Free at <http://www.literature.org/authors/darwin-charles/the-origin-of-species/>)

3. James Rachels, *Created from Animals: The Moral Implications of Darwinism*. Oxford: Oxford University Press. 1990.  
(Free at [www.jamesrachels.org](http://www.jamesrachels.org))
4. Janet Radcliffe Richards, *Human Nature after Darwin: A Philosophical Introduction*. New York: Routledge, 2000.
5. "What Darwin Never Knew" (Nova documentary, available online).

### **Schedule**

*Each of the units below is projected to cover two to three weeks; a more precise schedule will be developed for any specific course.*

#### **Unit 1: Preliminary Concepts (2 weeks)**

1. Charles Darwin, *Origin of Species by Means of Natural Selection...*  
Ch. 3, "Struggle for Existence."  
Ch. 4, "Natural Selection."
2. Daniel Dennett, "Universal Acid." Ch. 3 of *Darwin's Dangerous Idea*. Simon and Schuster. 1996.
3. Janet Radcliffe-Richards, *Human Nature after Darwin*.  
Ch. 1, "The Theory."  
Ch. 2, "The Sceptics."
4. Jerry Fodor, "Special Sciences (or: The Disunity of Science as a Working Hypothesis)." *Synthese* 28, pp. 97-115. 1974.

#### **Unit 2: Scientific Explanation (1 week)**

1. Carl Hempel, "Laws and their Role in Scientific Explanation." In *The Philosophy of Natural Science*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 1966, pp. 47-69.
2. Stathis Psillos, "Simply the Best: A Case for Abduction." In A.C. Kakas and F. Sadri, eds., *Computational Logic: From Logic Programming into the Future*, LNAI 2408. Berlin-Heidelberg: Springer-Verlag. 2002, pp. 605-25.
3. Brian Ellis, "Realism and Essentialism in Science." In *Scientific Essentialism*. Cambridge: Cambridge University Press. 2001, pp. 145-76.

#### **Unit 3: Theory Choice (1 week)**

1. Elliott Sober, "Let's Razor Occam's Razor." In *From a Biological Point of View*. Cambridge: Cambridge University Press. 1994, pp. 136-57.
2. Phillip Kitcher, "Darwin's Achievement." In *The Advancement of Science*. Oxford: Oxford University Press. 1995, pp. 11-58.
3. Thomas Kuhn, "Objectivity, Value Judgment, and Theory Choice." In *The Essential Tension*. Chicago: Chicago University Press. 1977, pp. 320-39.

**Unit 4: Species (2 weeks)**

1. Ian Hacking, "A Tradition of Natural Kinds." *Philosophical Studies* 61. 1991, pp. 109-26.
2. Elliott Sober, "Evolution, Population Thinking, and Essentialism." *Philosophy of Science*, Vol. 47, No. 3. Sep 1980, pp. 350-83.
3. Richard Boyd, "Homeostasis, Species, and Higher Taxa." In R.A. Wilson, ed., *Species: New Interdisciplinary Essays*. MIT. 1999.

**Unit 5: Units of Selection (2 weeks)**

1. Elliott Sober and Richard C. Lewontin, "Artifact, Cause, and Genic Selection." *Philosophy of Science* 49. 1982, pp. 157-180.
2. Kim Sterelny and Philip Kitcher, "The Return of the Gene." *The Journal of Philosophy* 85(7). 1988, pp. 339-61.
3. Samir Okasha, "The Levels of Selection Debate: Philosophical Issues." *Philosophy Compass* 1. 2006, pp. 1-12.
4. Nova documentary: "What Darwin Never Knew." PBS. 2009.

**Unit 6: Functions & Teleology (2 week)**

1. Mark Perlman, "The Modern Philosophical Resurrection of Teleology." *The Monist* 87. 2004, pp. 3-51.
2. Robert Cummins, "Neo-Teleology." In A. Ariew, R. Cummins, and M. Perlman, eds., *Functions: New Essays in the Philosophy of Psychology and Biology*. Oxford: Oxford University Press. 2002, pp. 157-72.
3. Peter Godfrey-Smith, "A Modern History Theory of Functions." *Noûs* 28. 1994, pp. 244-62.

**Unit 7: The Challenge of Intelligent Design (2 weeks)**

1. Elliott Sober, "What is wrong with Intelligent Design?" *The Quarterly Review of Biology* 81(1). 2007, pp. 3-8.
2. Michael J. Behe, "Irreducible Complexity: Obstacle to Darwinian Evolution." In M. Ruse W.A. Dembski, eds., *Debating Design: From Darwin to DNA*. Cambridge University Press. 2004, pp. 352-70.
3. Kenneth R. Miller, "The Flagellum Unspun: The Collapse of "Irreducible Complexity." In M. Ruse W.A. Dembski, eds., *Debating Design: From Darwin to DNA*. Cambridge University Press. 2004, pp. 81-97.

**Unit 8: Human Nature & Ethics (3 weeks)**

1. Jaime Confer, et al, "Evolutionary Psychology: Controversies, Questions, Prospects, and Limitations." *American Psychologist* 65(2). 2010, pp. 110-26.

2. Alexander Rosenberg, "Darwinism in Moral Philosophy and Social Theory." In G. Raddick and J. Hodge, eds., *The Cambridge Companion to Darwin*, 2d Edition. Cambridge: Cambridge University Press. 2009.
3. Janet Radcliffe-Richards, from *Human Nature after Darwin*.
  - Ch. 4, "Implications and Conditionals"
  - Ch. 5, "Biology as Destiny"
  - Ch. 6, "Blameless Puppets"
  - Ch. 7, "Selfish Genes and Moral Animals"
4. James Rachels, from *Created from Animals: The Moral Implications of Darwinism*.
  - Ch. 2, "How Evolution and Ethics Might Be Related"
  - Ch. 5, "Morality without the Idea That Humans Are Special"