

PHIL 317 – Philosophy of Biology

Fall Term 2013

Mon Wed Fri, 11:00–11:50 am, SAB 331

Instructor: Ingo Brigandt
E-mail: brigandt@ualberta.ca
Phone: 780-492-3307 ext. 1-2 (voicemail only)
Office: 3-49 Assiniboia Hall
Office hours: Mon, Wed 2:10–3:00 pm, and by appointment
Website at <https://eclass.srv.ualberta.ca>

A. Course overview and aims

This course is an introduction to philosophy of biology, suitable for philosophy students and for biology students, among others. Philosophy of biology addresses and contributes to a variety of conceptual and methodological questions that often arise from within biological science. Examples of such question are: What is the unit of natural selection—the organism, the group, the gene? What is the nature of species, and can there be different species concepts that classify organisms differently? Can biology be reduced to molecular biology? How does intelligent design differ from real scientific theories?

This class will address issues pertaining to evolutionary, developmental, and molecular biology, focusing in particular on the role of genes in development and evolution and different kinds of explanations bearing on evolutionary biology. The strategy is to develop these issues based on comparing and contrasting two popular science books: *The Selfish Gene* deals with the evolutionary explanation of behaviour and presents a neo-Darwinian approach as it was prevalent a few decades ago, emphasizing the centrality of genes. *The Plausibility of Life* approaches evolution from the point of view of evolutionary developmental biology ('evo-devo')—a recent field and one of the most thrilling approaches in current biology. This second book accords to genes a less dominant role in the explanation of evolution, and our task will be to understand how the neo-Darwinian and evo-devo explanations differ from and relate to each other.

The discussion of these books in class will be complemented by lectures that cover relevant topics and notions from philosophy of biology (so as to give an overview of some main ideas of the field) or that fill in some necessary background in biology and its history. Topics to be covered include species concepts, adaptationism, the units of selection debate, altruism and selfishness, sociobiology and evolutionary psychology, gene-centered explanations in evolution, genetic information, explanations of development which are less focused on genes, evolutionary developmental biology, and intelligent design.

Students who successfully complete this class will

- have gained acquaintance with some current issues in the philosophy of biology,
- have gained knowledge about some core biological concepts and about the role of genes in development and evolution,
- be able to identify different kinds of explanations used in biology,

- have developed skills that will enable them to think more clearly and critically about (popular) biological texts, and
- have (hopefully) acquired interest in pursuing philosophical issues about biology.

B. Prerequisites

There are no formal prerequisites for this class. The class is organized such that background knowledge in philosophy or biology is not required, though interests in either field are desirable.

C. Required texts

Richard Dawkins, *The Selfish Gene*. 3rd edition. Oxford University Press, 2006. (Available at the UofA bookstore in the SUB.)

Marc Kirschner and John Gerhart, *The Plausibility of Life: Resolving Darwin's Dilemma*. Yale University Press, 2005. (Available at the UofA bookstore. We do not need this book until the second half of the term.)

D. Course requirements and grading

- Midterm 20%
- Final 30%
- Book report 10%
- Essay 20%
- Oral presentation 10%
- Participation 10%

Midterm exam (20%): The midterm on **Oct. 16** covers the material up to Oct. 9 and will consist of short answer questions (requiring you to explain in a few sentences a philosophical or biological concept), and long answer questions (requiring you to write a paragraph showing you have understood a philosophical issue).

Final exam (30%): The final on **Dec. 12** will consist of short answer questions and long answer questions. While emphasis will be placed on material covered in the second half of the course, the final will be cumulative.

Book report (10%): On **Oct. 9**, you have to hand in a 2 page (double spaced) report on one of the books listed below in section H. The point of this task is to give you an idea of what some of the basic books in the field are and to make you take a look at (at least) one of them apart from the material we read in class. Among the books listed in section H, take a look at some of them in the library. Choose one of them that interests you in some way and read the introduction and at least one of the chapters. Write a report on what you found of interest in that book. In evaluating the book report I am not looking for any deep reflections, but merely evidence that you have thought about your own interests in the class and that you have taken a look at a relevant book in addition to the required texts.

Essay (20%): On **Dec. 4**, you have to hand in an essay (5–6 pages double spaced). In the essay, you have to choose and critically discuss one issue from the required readings or the books

listed in section H if you wish, making use of the philosophical notions you have learned in class. Guidelines and suggestions on possible topics will be distributed after reading week.

Oral presentation (10%): Each student has to give one oral presentation (about 10 minutes), where two students may give a joint presentation (the number of students this term requires that some of you collaborate on a presentation). The most straightforward option is to give a summary of this meeting's reading and offer some questions that the material raises. Alternatively, you may choose to present on other material that is relevant to our topic. The main function of the presentation is to trigger subsequent discussion, which the presenter is to lead. You may give your presentation using PowerPoint or otherwise distribute a brief handout, making sure that discussion questions are included. In any case, I ask you consult with me about your topic and to send me a draft of your presentation in advance.

Participation (10%): Attendance and active participation is important for this class. Each class will normally intersperse lecture with general discussion of the readings. It is the responsibility of each student to come to class prepared to actively engage in discussion. Each of you will probably have picked up different points from the readings or have questions or objections, so please share them! You can also obtain participation credit by contributing to the discussion forum on our website.

When assigning final grades at the end of the term based on your performance on the above requirements, I will ensure that the grade distribution of this class does not deviate too much from the overall university distribution, taking into account the overall workload of this course and the difficulty of the material.

E. Course website

The course has a website at <https://eclass.srv.ualberta.ca>. I use the site to post lecture notes, handouts, study guides, and your grades. The site also contains our discussion board.

F. Academic integrity and plagiarism

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards and to uphold the policies of the university in this respect. Students are urged to familiarize themselves with the Code of Student Behaviour (<http://tinyurl.com/CodeofStudentBehaviour>) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the university. For a summary please see <http://www.governance.ualberta.ca/en/StudentAppeals/DontCheatsheet.aspx>

The Code of Student Behaviour defines plagiarism as follows:

No Student shall submit the words, ideas, images or data of another person as the Student's own in any academic writing, essay, thesis, project, assignment, presentation or poster in a course or program of study.

The library has a general website on plagiarism: <http://www.library.ualberta.ca/guides/plagiarism>. See in particular the section on "Avoiding Plagiarism" (sidebar on the left, among "Resources for Students").

G. Schedule of classes

Wed, Sep 4	Introduction
Fri, Sep 6	
Mon, Sep 9	Dawkins: Preface to 1 st ed; Chapters 1 and 2
Wed, Sep 11	Dawkins: Ch 3 (skip pp 40-44)
Fri, Sep 13	
Mon, Sep 16	Dawkins: Ch 4
Wed, Sep 18	Dawkins: Ch 5 (skip pp 78-81)
Fri, Sep 20	
Mon, Sep 23	Dawkins: Ch 6
Wed, Sep 25	Dawkins: Ch 7
Fri, Sep 27	
Mon, Sep 30	Dawkins: Ch 8 (skip pp 136-138)
Wed, Oct 2	Dawkins: Ch 9
Fri, Oct 4	
Mon, Oct 7	Dawkins: Ch 10
Wed, Oct 9	Dawkins: Ch 11. BOOK REPORT DUE in class
Fri, Oct 11	
Mon, Oct 14	No class. Thanksgiving
Wed, Oct 16	MIDTERM EXAM
Fri, Oct 18	Kirschner&Gerhart: Preface; Introduction; Ch 1, pp 10-18
Mon, Oct 21	Kirschner&Gerhart: Ch 1, pp 19-37
Wed, Oct 23	
Fri, Oct 25	Kirschner&Gerhart: Ch 2
Mon, Oct 28	Kirschner&Gerhart: Ch 3, pp 71-90
Wed, Oct 30	
Fri, Nov 1	Kirschner&Gerhart: Ch 3, pp 91-108
Mon, Nov 4	Kirschner&Gerhart: Ch 4, pp 109-127
Wed, Nov 6	
Fri, Nov 8	Kirschner&Gerhart: Ch 4, pp 128-142; Ch 5, pp 143-152

Mon, Nov 11	No class. Remembrance Day
Wed, Nov 13	Kirschner&Gerhart: Ch 5, 153-176
Fri, Nov 15	
Mon, Nov 18	Kirschner&Gerhart: Ch 6, pp 177-198
Wed, Nov 20	Kirschner&Gerhart: Ch 6, pp 199-218
Fri, Nov 22	
Mon, Nov 25	Kirschner&Gerhart: Ch 7, pp 219-236
Wed, Nov 27	Kirschner&Gerhart: Ch 7, pp 237-243; Ch 8, pp 244-252
Fri, Nov 29	
Mon, Dec 2	Kirschner&Gerhart: Ch 8, pp 253-273
Wed, Dec 4	Review for final. ESSAY DUE in class

Thu, Dec 12	FINAL EXAM 9:00–11:00 am
--------------------	---------------------------------

H. Books for writing reports on

On reserve at Rutherford (Humanities and Social Sciences) Library

- Griffiths, P.E. and Sterelny, K. (1999) *Sex and Death: An Introduction to Philosophy of Biology*. University of Chicago Press. [The most recent textbook in philosophy of biology. Highly recommended.] QH 331 S82 1999
- Garvey, B. (2007) *Philosophy of Biology*. Acumen Press. [The most recent introductory textbook.] QH 331 G27 2007 and as electronic resource at <http://site.ebrary.com/login.ezproxy.library.ualberta.ca/lib/ualberta/docDetail.action?docID=10455554>
- Sober, E. (2000) *Philosophy of Biology*. 2nd ed. Westview Press. [Good textbook in philosophy of biology. More mathematical and not as up-to-date as Griffiths&Sterelny, though, as it differs hardly from its first, 1993 edition.] QH 371 S677 2000
- Hull, D. and M. Ruse (Eds.) (2007) *The Cambridge Companion to the Philosophy of Biology*. Cambridge University Press. [Very good collection of recent essays surveying some main issues in philosophy of biology.] QH 331 C285 2007 and as as electronic resource at http://cco.cambridge.org/login.ezproxy.library.ualberta.ca/uid=1628/book?id=ccol9780521851282_CCOL9780521851282
- Ayala, F. and R. Arp (Eds) (2010) *Contemporary Debates in Philosophy of Biology*. Wiley-Blackwell. [On several topics, there is each one essay arguing for and one essay arguing against a thesis.] QH 331 C8465 2010 and as electronic resource at <http://site.ebrary.com/login.ezproxy.library.ualberta.ca/lib/ualberta/docDetail.action?docID=10355293>
- Hull, D. and Ruse, M. (eds) (1998) *The Philosophy of Biology*. Oxford University Press. [Collection of many classical, original articles by biologists and philosophers of biology.] QH 331 P468 1998 and as electronic resource at <http://login.ezproxy.library.ualberta.ca/login?url=http://www.netlibrary.com/summary.asp?ID=12424>

- Sober, E. (ed) (2005) *Conceptual Issues in Evolutionary Biology*. 3rd ed. MIT Press. [Another collection of many classical, original articles by biologists and philosophers of biology.] QH 366.2 C74 2006 and as electronic resource at <http://site.ebrary.com/login.ezproxy.library.ualberta.ca/lib/ualberta/docDetail.action?docID=10173687>
- Keller, E.F. (2000) *The Century of the Gene*. Harvard University Press. [Popular discussion of the gene concept in contemporary molecular biology. Good account of the complexity of genetic processes and why the term 'gene' has partially ceded to many other genetic terms.] QH 428 K448 2000 and as electronic resource at <http://site.ebrary.com/login.ezproxy.library.ualberta.ca/lib/ualberta/docDetail.action?docID=10318489>
- Morange, M. (2001) *The Misunderstood Gene*. Harvard University Press. [Popular discussion explaining many common misunderstandings of what genes are and how they work.] QH 447 M672 2001
- Dawkins, R. (1999) *The Extended Phenotype: The Long Reach of the Gene*. 2nd ed. Oxford University Press. [A development of many of the ideas in *The Selfish Gene*, written primarily for biologists but still quite accessible.] QH 375 D38 1999
- Roughgarden, J. (2009) *The Genial Gene: Deconstructing Darwinian Selfishness*. University of California Press. [An evolutionary biologist proposes social selection theory in opposition to sexual selection and the selfish gene theory.] QL 761 R68 2009
- Sober, E. and Wilson, D.S. (1998) *Unto Others: The Evolution and Psychology of Unselfish Behavior*. Harvard University Press. [Much-debated discussion of altruism and defense of group selection.] BF 637 H4 S65 1998
- Buller, D.J. (2005) *Adapting Minds: Evolutionary Psychology and the Persistent Quest for Human Nature*. MIT Press. [A critique of evolutionary psychology.] BF 701 B85 2005
- Richardson, R. C. (2007) *Evolutionary Psychology as Maladapted Psychology*. MIT Press. [Another philosophical critique of evolutionary psychology. Also as an ebook at <http://cognet.mit.edu/login.ezproxy.library.ualberta.ca/library/books/view?isbn=0262182602>] BF 698.95 R44 2007
- Behe, M. (1996) *Darwin's Black Box: The Biochemical Challenge to Evolution*. Free Press. [Classical defense of intelligent design by a biochemist.] QH 325 B365 1996
- Behe, M. (2007) *The Edge of Evolution: The Search for the Limits of Darwinism*. Free Press. [Behe's latest defense of intelligent design.] QH 367 B44 2007
- Pennock, R.T. (1999) *Tower of Babel: The Evidence against the New Creationism*. MIT Press. [Critique of intelligent design, evidence for evolution.] QH 366.2 P428 1999
- Amundson, R. (2005) *The Changing Role of the Embryo in Evolutionary Thought: Roots of Evo-Devo*. Cambridge University Press. [While neo-Darwinists told a biased account of the history of biology, Amundson offers an evo-devo perspective that recovers useful features especially of pre-Darwinian biology.] QH 360.5 A48 2005
- Robert, J. (2004) *Embryology, Epigenesis and Evolution: Taking Development Seriously*. Cambridge University Press. [Recent book on the philosophy of developmental biology. Also as an ebook at <http://site.ebrary.com/login.ezproxy.library.ualberta.ca/lib/albertaac/Doc?id=10124681>] QH 491 R63 2004
- Weber, M. (2005) *The Philosophy of Experimental Biology*. Cambridge University Press. [Good and recent book on the philosophy of molecular biology. Also available as an ebook at <http://site.ebrary.com/login.ezproxy.library.ualberta.ca/lib/albertaac/Doc?id=10131669>] QH 324 W43 2005

Beurton, P., Falk, R. and Rheinberger, H.-J. (eds) (2000) *The Concept of the Gene in Development and Evolution: Historical and Epistemological Perspectives*. Cambridge University Press. [A collection of recent essays by biologists and historians and philosophers of biology on the gene concept.] QH 447 C662 2000

I. Other books on reserve

For reference, but not suitable for book reports

Ridley, M. (2004) *Evolution*. 3rd ed. Blackwell. [Widely used textbook in evolutionary biology. Good reference.] QH 366.2 R524 2004