INTRODUCTION TO HISTORY AND PHILOSOPHY OF BIOLOGY
(GRADUATE SEMINAR)

HPS 2657

MON/WED 10:00 - 11:15

208B CATHEDRAL OF LEARNING

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Office Hours: Tues 10-12 or by appointment

Course Description

Philosophy of Biology will consider methodological and conceptual issues in biology through an historical lens. Drawing on the writings of life scientists from Charles Darwin onwards as well as current philosophers of biology, we will consider the nature and structure of biological explanation, the possibility of laws in evolutionary theory, the problem of species reality and classification, the metaphorical representations of evolution and natural selection, the methods biologists use to learn about the world, whether biology is an historical or exact science, and more. It is designed for both the philosopher who can explore central epistemological and metaphysical issues in the context of biological science and for the biologist who wants to explore the conceptual foundations and presuppositions of her science. The students will read primary historical and philosophical texts, engage in discussion and write essays. The format of the course will be a seminar and lecture.

Prerequisites

This course is designed for upper-level students in either biology or philosophy. It does not however presuppose extensive familiarity with either evolutionary theory or philosophy of science, although some acquaintance with either of these fields will be helpful. If you have any questions or concerns regarding the content of the course, please ask as soon as possible.

Course Website

http://sai2247.wix.com/introhpb (password: introhpb)

Texts

Required

1. All required texts will be available online through the Blackboard UPitt website (https://courseweb.pitt.edu). (A link is also provided from the course website.)

Suggested Resources

1. Sober, *Philosophy of Biology* (**So**)
2. Godfrey-Smith, *Philosophy of Biology* (**GS**)
3. Sterelny and Griffiths, *Sex and Death* (**SG**)
4. Grene and Depew, *The Philosophy of Biology: An Episodic History*
5. Sober, *Conceptual Issues in Evolutionary Biology*
6. Matthen and Stephens, *Philosophy of Biology (Handbook of the Philosophy of Science)*
7. The *Stanford Encyclopedia of Philosophy* (http://plato.stanford.edu/)

. There are also class-specific background/further readings listed below

Assessment and Policies

Course Requirements

1. 2 Class Presentations	(12.5% each) 25%
2. Final Term Paper Prospectus	10%
3. Final Term Paper	50%
4. Discussion	15%

Class Presentations: Each student is required to give **two** brief (10 - 20min) presentations during the term. Following the presentation you are expected to contribute to and help direct the seminar for that class. In the presentation you should summarize the main points of one reading *and* develop a possible objection or criticism (you may also attempt to answer the criticism on behalf of the author). Thus the presentation should not be purely expository. You are allowed to use handouts, cue cards, the blackboard, powerpoint, or pursue other creative presentation options. I will pass around a sign-up sheet the first day.

Final Term Paper Prospectus (Nov. 16): Each student is required to write a short prospectus for their final assignment (~500 words). This is due **Nov. 16**. The prospectus should state which final assignment option you have chosen, include a short paragraph stating your proposed topic, and a rough list of relevant literature with which you're going to engage. On the due date for this assignment everyone is expected to come prepared to give a 3min presentation of their prospectus (just talk us through your thinking). We will spend this entire class providing feedback. This is an important component of the course not just because it is worth points(!) but also because it allows me to approve of and help develop your topic which will make your term paper much better.

Final Term Paper (Dec 17): There are three options for the end of term assignment:

1. Write a 5000 word term paper (either philosophical or historical). This paper will be due Dec. 17. The topic of the paper should be related to the subject matter of the course. You

may write a paper (e.g.) that (i) directly engages with one or more readings from one class, (ii) engages with the topic from one class but with papers we did not read, (iii) engages with a topic in philosophy of biology broadly construed that we did not cover in this course (e.g., Elliot Sober on phylogenetic inference). Whichever option is chosen, the student should demonstrate **significant independent research**. Everyone is *strongly* encouraged to come talk to me during office hours about your topic before you begin writing your prospectus (it will be a great help especially to those that are departing from our course materials!). This paper may also be a further development of one of your short papers.

Discussion: Everyone is expected to take part in class discussions on a regular basis. This means that you should regularly ask and answer questions (either mine or other students') in class. Please come prepared having done all the relevant readings before the start of each class.

Assessment

Grading Rubric: All grades will be given a number.; final grade through UPitt's system will be a letter grade. The following is a grading rubric for overall achievement in the course.

A+ (**4.00, 95+**)**/A** (**4.00, 87-94**)**/A-** (**3.75, 82-86**): Represents achievement that is outstanding relative to the level necessary to meet course requirements.
B+ (**3.25, 77-81**)**/ B** (**3.00, 72-76**)**/ B-** (**2.75, 68-71**): Represents achievement that is well above the level necessary to meet course requirements.
C+ (**2.25, 64-67**)**/ C** (**2.00, 60-63**)**/ C-** (**1.75, 55-59**): Represents achievement that meets the course requirements in every respect.
D (**1.00, 50-54**): Represents achievement that is worthy of credit even though it fails to meet fully the course requirements.
F (**0, 0-49**): Represents failure that is not worthy of credit even if some course requirements were met.

University Academic Policies

Academic Integrity: Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity (http://www.cfo.pitt.edu/policies/policy/02/02-03-02.html). Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University

Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

Disability Services: If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS) (http://www.studentaffairs.pitt.edu/drswelcome), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Accessibility: Blackboard is ADA Compliant and has fully implemented the final accessibility standards for electronic and information technology covered by Section 508 of the Rehabilitation Act Amendments of 1998. Please note that, due to the flexibility provided in this product, it is possible for some material to inadvertently fall outside of these guidelines.

Copyright Notice: These materials may be protected by copyright. United States copyright law, 17 USC section 101, et seq., in addition to University policy and procedures, prohibit unauthorized duplication or retransmission of course materials. See Library of Congress Copyright Office and the University Copyright Policy.

Statement on Classroom Recording: To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

Schedule

Day	Topic	Required Readings	Background
Aug. 31	***Introduction***	. Syllabus . Presentation Sign-up	. (**So**) chapt 1 . (**GS**) chapt 1 . (**SG**) chapt 1, 2 . Hull (1969) "What the.."
Sept 2	***Warm-Up*** *Origins of the Theory of Natural Selection (and Artificial Selection!)*	. Darwin, (1859) *Origin of Species* (excerpts) . Wallace (1858) "On the Tendency…"	. Waters (1986) "Taking Analogical…" . Burnett (2009) "Savage Selection"

Day	Topic	Required Readings	Background
Sept. 7	***Labor Day - No Class***		
Sept. 9	***Laws*** ***Intro Lecture*** *Does biology have laws? How do they relate to laws in the physical sciences?*	. Beatty (1996) "The evolutionary contingency thesis"	.(**GS**) chapt 2 . (**So**) chapt
Sept. 14	***Laws:*** *Discussion 1*	. Lange (2005), "Ecological Laws" . Haufe (2012) "Darwin's Laws"	. Mitchell (2000), "Dimensions of Scientific Law"
Sept 16	***Laws****: Discussion 2*	. Woodward (2001), "Law and explanation…" . Sober (1997) "Two outbreaks of…"	
Sept. 21	***Fitness*** ***Intro Lecture*** *What is fitness?*	. Mills and Beatty (1979) "The propensity interpretation of fitness"	. (**So**) chapt 3
Sept. 23	***Fitness****: Discussion*	. Sober, (2001) "Two faces of fitness" . **Discussion of Book Reviews**	. Pence and Ramsey (2013), "A new foundation…"
Sept. 28	***Chance variation and natural selection*** ***Intro Lecture*** *Can mutation matter more than selection? Is natural selection creative?*	. Beatty (2006) "Chance Variation…" . Huxley (excerpts)	. Pence (2015), "The early history"
Sept. 30	***Chance:*** *Discussion*	. Beatty (2010) "Replaying Life's Tape…" . Beatty (1997) "Why do biologists…"	. Gould, *Wonderful Life* . (**SG**) chapt 12
Oct. 5	***Adaptationism*** ***Intro Lecture*** *Should we assume that a current trait was fitness enhancing in the past? Why or why not?*	. Gould and Lewontin (1979) "The spandrels of San Marco"	. (**GS**) chapt 4 . (**So**) chapt 5 . (**SG**) chapt 10 . Orzack & Sober (1994) "Optimality"

Day	Topic	Required Readings	Background
Oct. 7	***Adaptationism*** ***Adaptationism:*** *Disucssion*	. Lewens (2009) "Seven types…" . Smith (1978) "Optimization…"	
Oct. 12	***Species*** ***Intro Lecture*** *What are species? Why does an answer to this question matter?*	. Hull (1978) "A matter of individuality"	. Dobzhansky (1935) "A critique of…" . (**GS**) chapt 7 . (**SG**) chapt 9
Oct. 14	**SECOND SHORT PAPER DUE** ***Species and Taxonomy*** *Discussion*	. Ereshefsky (1994) "Some problems with the Linnaean Hierarchy" . Velasco (2008) "Species concepts…"	. (**So**) chapt 6
Oct. 19	***Fall Break - No Class***		
Oct. 21	***Experiments in Biology*** *What types of experiments do biologists use? Why do they use these types? How does knowledge learned in the lab apply outside that setting?*	. Brandon (1994) "Theory and experiment…" . Waters (2008) "How practical know-how…"	. Losos (2007), "Detective work…" . Rheinberger (19997), *Toward a History…*
Oct. 26	***Modelling in Biology*** ***Intro Lecture***	. Weisberg (2007) "Who is a Modeller?" . Levins (1966) "The Strategy…"	. Weisberg (2013), *Simulation and Similarity*
Oct. 28	***Model organisms: Historical-Epistemological*** ***Discussion 1*** *What are they? How are they constructed?*	. Kohler (1994) "Constructing *Drosophila*" . Burian (1993) "How the Choice of Experimental Organism Matters"	. Kohler (1994), *Lords of the Fly*
Nov. 2	**BOOK REVIEW DUE** ***Model organisms: Philosophical*** ***Discussion 2*** *What role do they play in practice?*	. Bolker (1995) "Model Systems…" . Levy & Currie (2014) "Model Organisms…"	. Ankeny & Leonelli (2011) "What's so special…"

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Nov. 4	***Guest Seminar! Anya Plutynski (Washington)***	. Material from her forthcoming book *Explaining Cancer*	
Nov. 9	***Guest Seminar! Sandra Mitchell (UPitt HPS)***	. Mitchell (2009) Ch 4 "Science" . Mitchell (2009) Ch 5 "Policy"	
Nov. 11	***Metaphors and representations*** *How should we think about or picture natural selection or evolution?*	. Darwin, *Origin of Species* (excerpts) . Gavrilets (2008) "Fitness landscapes" . Pigliucci and Kaplan (2006) "Slippery landscapes"	
Nov. 16	**FINAL ASSIGN. PROSPECTUS DUE**	**. 3 min presentations—2 min discussion**	
Nov. 18	***Class Canceled***		
Nov. 23	***Mechanisms in Biology***	. Craver & Darden (2013) "2. Biological Mechanisms" . Craver & Darden (2013) "9. Strategies"	. Machamer et al (2000) "Thinking About Mechanisms"
Nov. 25	***Thanksgiving - No Class***		
Nov. 30	***Phylogenetic HPS! Current work by Jim Lennox***	. Lennox (draft) "Phylogenetic HPS"	
Dec. 2	***Issues in Conservation*** *Early Conservation and Ecology*	. Adams (1913) *Guide to the Study…* (excerpts) . Sumner (1921) "The Responsibility…" . Committee on the Preservation of Natural Conditions Report (1921)	. **(SG)** chapt 1.6
Dec. 7	***Issues in Conservation*** *Are invasive species bad?*	. Simberloff (2005) "Non-native species…" . Davis et al (2011) "Don't Judge…" . Pearce (2015) "6. Ecological Cleansing" (SKIM)	

Day	Topic	Required Readings	Background
Dec. 9	***Human Activity and Biological Regularities***	. Inkpen (MS) "Are Humans Disturbing…" . Martin et al (2012) "Mapping where…"	