

PHIL 341 | Philosophy of Science 1
Topic: Philosophy of Biology
Mondays & Wednesdays 11.35 – 12.55
BIRKS 205

Instructor Information
Yasmin Haddad
yasmin.haddad@mcgill.ca
Office hours: Mondays, 2.00 – 4.00pm
Location: LEA 914

Description

Philosophy and Biology are two disciplines whose intersections address unique questions, such as: What is the validity of biological theories? What are the units of selection? What characterizes living things? Which accounts of causation are applicable to living organisms? What are the societal impacts of the theory of evolution? Why does biology matter to philosophy (and vice versa)? The answers to these questions are addressed by Philosophy of Biology. In this course, we will survey key debates in four major topics:

Topic 1 | Life: in this section of the course, we will understand the challenge of defining “life” and evaluate the pertinence of binary and gradualist definitions of life.

Topic 2 | Evolution: in this section, we will study the main tenets of evolutionary theory and their philosophical implications.

Topic 3 | Epistemological issues: in this section, we will study topics such as causality, mechanistic conceptions of organisms, the question of pluralism and unity in Biology.

Topic 4 | Experimentation: we will address issues related to the use of model organisms in biology and survey how experimental methods have been impacted by big data and technology.

Learning outcomes

By the end of this course, students will be able to:

- ◇ Understand the main intersections between biology and philosophy;
- ◇ Critically analyze an argument, formulate objections and responses;
- ◇ Understand how philosophical thinking can be useful for a critical analysis of scientific knowledge;
- ◇ Write a philosophical paper that demonstrates critical thinking about one or more issues in Philosophy of Biology.

Students should note that this is an intermediate-level class, and that they should be prepared to read substantial amounts of often difficult material. No background knowledge in philosophy or biology is required; however, a curious attitude is strongly encouraged. Some readings will be slightly technical, and you will often encounter new vocabulary. It is recommended to look up unfamiliar terms in order to understand what they mean.

Assignments and grades

| Task | Due date | % of final grade |
|---|---|------------------|
| 5 Reading Responses (each worth 5% - only the 4 best grades will be selected) | Jan 22 nd , Feb 12 th , Feb 26 th , Mar 18 th , Apr 8 th 11 a.m. | 20% |
| First assignment (1.000 words) | Feb 19 th 11 a.m. | 25% |
| Essay outline (700 words) and participation in essay workshop | April 1 st 11 a.m. | 10% |
| Final essay (2.500 words) | April 14 th 11 p.m. | 45% |

Reading responses: the reading responses will be maximum of 1 page in length, single-spacing and will either be the summary of an argument, a formulation of an objection to an argument, or proposing a response to an objection. Each reading response will have short guidelines and they will serve as a practice exercise for what you will have to do in your assignment and in the final essay. In total, you will have five reading responses, but only four will count towards your grade (that is, the four best grades).

First assignment: the first assignment will be 1.000 words long and will involve a critical analysis of an argument with a proposed objection. The essay should be philosophical in nature and critically engage with the readings. Two essay-type questions will be suggested, and you will be able to choose one of the two.

Essay outline: the final essay outline must be submitted on MyCourses by April 1st, before the lecture. Students should come to the lecture prepared to share their outlines with peers as the April 1st lecture will be an essay writing workshop to prepare you for the final essay. The outline and engagement in the workshop will be worth 10% of your final grade.

Final essay: the final essay will be 2.500 words in length and will be an argumentative essay. You are expected to demonstrate knowledge of one of the suggested topics, formulate objections and anticipate responses.

All assignments must be submitted through MyCourses. Files must be submitted in .PDF or .docx format. Formatting instructions are Times New Roman, size 12, double-spacing.

Course schedule

[All readings will be available on MyCourses]

| Week | Specific Topic | Reading |
|----------------|----------------------|---|
| 1 | Introduction | Jan 6: no class Jan 8: Griffiths, P. "Philosophy of Biology", <i>The Stanford Encyclopedia of Philosophy</i> . Laplaine, L. et al. "Why science needs philosophy" |
| Topic 1 Life | | |
| 2 | Constituents of Life | Jan 13: Dupré, J. "The Constituents of Life 1: Species, Microbes and Genes" |

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| | | Jan 15: Dupré, J. “The Constituents of Life 2: Organisms and Systems” |
| 3 | Definitions of Life | Jan 20: Schrödinger, E. “Is Life Based on the Laws of Physics?” Jan 22: Bruylants, G. “Is It Useful to Have a Clear-Cut Definition of Life?” [Deadline for 1st reading response] |
| Topic 2 Evolution | | |
| 4 | Darwin | Jan 27: Darwin, C. <i>The Origin of Species</i> (excerpts) Jan 29: Lewens, T. “Adaptation” |
| 5 | Adaptationism | Feb 3: Dewey, J. “The influence of Darwin on Philosophy” Feb 5: Gould, S. “The Spandrels of San Marco” |
| 6 | Debates | Feb 10: Okasha, S. “The Levels of Selection Debate: Philosophical Issues” Feb 12: Müller, G. “Why an extended evolutionary synthesis is necessary” [Deadline for 2nd reading response] |
| Topic 3 Epistemological issues | | |
| 7 | Reductionism | Feb 17: Brigandt, I., Love, A. “Reductionism in Biology”, <i>The Stanford Encyclopedia of Philosophy</i> Feb 19: Dupré: “It is not Possible to Reduce Biological Explanations to Explanations in Chemistry and/or Physics” [Assignment 1 deadline] |
| 8 | Mechanism | Feb 24: Nagel, E. (1951) “Mechanistic Explanation and Organismic Biology” Feb 26: Nicholson, D. J. “The concept of mechanism in Biology” |
| | | Mar 2: BREAK Mar 4: BREAK |
| 9 | Causality | Mar 9: NO CLASS [Deadline for 3rd reading response] Mar 11: Mayr, E. “Cause and Effect in Biology” and Bizzarri et. al, “A call for a better understanding of causation in Biology” |
| 10 | Pluralism | Mar 16: Kellert, S. Longino H., Waters, K. “Introduction: The Pluralist Stance” (book chapter) Mar 18: Mitchell, S. “Integration without Unification: An Argument for Pluralism in the Biological Sciences” [Deadline for 4th reading response] |
| Topic 4 Model Organisms and Experimentation | | |
| 11 | Model organisms I | Mar 23: Bolker, J. “Exemplary and Surrogate models” Mar 25: Bolker, J. “Model species in evo-devo, a philosophical perspective” (bonus reading: “There’s more to life than rats and flies”) |
| 12 | Model organisms II | Mar 30: Ankeny, R. Leonelli, S. “What’s so special about model organisms?” Apr 1: Essay Writing Workshop [deadline to submit essay outlines] |
| 13 | Databases | Apr 6: Leonelli, S. Ankeny, R. “Re-thinking organisms: The impact of databases on model organism biology” Apr 8: Final review and wrap up [Deadline for 5th reading response] Apr 14: Final essay deadline |

Class format and policies

E-mail: You can contact the instructor for administrative issues or general questions by email and I will try to respond within the next 48h (excluding weekends). If your question is a conceptual or philosophical question, these are better answered in-person and I strongly encourage you to visit me during office hours or ask questions during lectures.

Technology: Cell phones must be put away during all lectures. Laptops and tablets are allowed for taking notes and consulting course material only. The classroom is a social-media free environment as surfing on the internet can be extremely distracting for colleagues nearby.

Accommodations: I hope to make the classroom environment inclusive to all students. Should you need special accommodations I strongly encourage you to register at the OSD (Office of Students with Disabilities) and inform the instructor about accommodations as soon as possible.

Policy on extensions and late work: extensions can only be granted with a medical note or a death certificate. Late work without justification will be penalized at the rate of -5% per day.

Grading criteria: these will be provided for each assignment and discussed together in class.

Submitting work: All assignments are to be submitted through MyCourses in Word or PDF format.

Language of submission: In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit written work to be graded in English or in French.

Academic integrity: McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism, and other academic offences under the Code of Student Conduct and Disciplinary Procedures. (See www.mcgill.ca/students/srr/honest/ for more information).

Policy on accommodations: I hope to make this course accessible for everyone. If you are in need of an accommodation, please let me know as soon as possible. In cases where the need/accommodation warrants, students should also have contacted the Office for Students with Disabilities beforehand.

Syllabus change policy: This syllabus is intended as a guide for the course and is subject to change with advanced notice.