Phil*6740 Philosophy of Biology - 2015

Thursdays 2:30-5:20

Mac 201

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Description

This course is designed with two types of student in mind: philosophy students interested in how biology might inform their understanding of human nature, mind, and morality; and biology students interested in how a philosophical perspective sheds light on the foundational assumptions of their discipline. We have therefore tailored this course to students with little or no training in either discipline. The first part of the course will review the "scientific method" and its various shortcomings as a guiding principle for working scientists. We then explore the basic structure of evolutionary theory and some of the controversies that arise, for example, in its application at multiple biological levels and to culture. Related issues concern the nature of genes, the existence of species, and the concept of a biological individual. The second part of the course will explore the concepts of necessity and contingency in biology. On the one hand, biologists tend to approach biological systems as if they were physical mechanisms governed by strict laws of nature. On the other hand, it is widely recognized that historically contingent events play an important role in shaping everything from genomes to ecosystems. We will critically evaluate some of the ways that scientists have attempted, with varying degrees of success, to reconcile these two frameworks.

The course follows a seminar format, focusing on discussion and student participation. Requirements include two term papers in which students are encouraged to write philosophically on topics pertaining to their areas of study. The composition of the course usually contains some philosophy and some biology students – with an emphasis on building bridges between these disciplines. The course is co-taught by Dr. Ryan Gregory (Integrative Biology, rgregory@uoguelph.ca) and Dr. Stefan Linquist (Philosophy, linquist@uoguelph.ca).

Grading

- Participation (30%) This grade is based on discussion of reflection questions and readings during class.
- First paper (30%) approx. 2,500 words. Due mid-semester
- Final paper (40%) approx 4,500 words. Due approximately two weeks after the last class.

Format

Each week, students are assigned a number of chapters and a set of questions on those readings. Students will meet in small groups prior to class to discuss the readings, prepare answers to reflection questions, and to develop their own arguments and questions. We will then meet as a class to share our thoughts and insights.

Readings

Peter Godfrey Smith (2014), *Philosophy of Biology* and various articles made available through the course website.

Outline of Topics

(Please note that this is a work in progress, topics will not change much, but specific readings will be added).

1. **The scientific method**: Its social significance for biologists and its widespread rejection by the philosophical community.

2. **Laws, mechanisms and models**. Introduces alternative approaches to biological explanation.

3. **Evolution and natural selection**. Reviews the basic structure of Darwinian theory and some controversies surrounding its application to "higher level" entities like groups of organisms and to entire species.

4. **Adaptation and biological function**. What does it mean to identify some trait as having a particular function and what sort of evidence is required to support such a claim?

5. **What is a biological individual?** When does an aggregation of biological entities count as an individual? Do entire ecosystems or even Gia qualify as examples? Why is this an important question for both philosophy and biology?

6. **What is a gene?** Scientists continue to dispute the very nature of the gene and whether it should be regarded as a fundamental unit of evolution and development. Why do some people think that genes are over-rated?

7. **What are species and is there a tree of life?** One of the most challenging questions in biology surrounds the attempt to define the species concept. Many philosophers and biologists are even skeptical about their very existence.

8. **Evolution, culture, and social behaviour**. Are culture and biology distinct, or, do cultural systems undergo evolution?

9. **Evolution, morality and religion.** Can human morality and religion be understood as an adaptation to human social life, and what are the implications for ethics?

10. "**Neutral Theory" in genomics**. How did biologists come to recognize that much of the genome consists of "junk" DNA and why are so many reluctant to adopt this perspective?

11. "**Neutral Theory" in ecology**. Why do so many ecologists think that ecosystems are governed by chance historical events and what does this mean for the science of ecology?