

PHIL750 (Philosophy of Science 2): Concepts and Categories in Biology

Meeting Times: Fridays 12–2pm in Room 202, Building 206 (Humanities)

Coordinator: Dr Emily Parke

Email: e.parke@auckland.ac.nz

Office hours: Wednesdays 3–4pm, Thursdays 11am–12pm, other times by appointment

Office: Room 427, Building 206 (Humanities)

Course Description:

Some concepts in science are (apparently) straightforward: ‘gold’, for example, is a chemical element with 79 protons and a series of other features agreed upon by chemists. Other concepts are more contentious, and scientists argue about how to define, understand, or make use of them: for example, ‘biodiversity’, ‘gene’, ‘intelligence’, ‘species’, and ‘complexity’. Many of these concepts lie at the heart of other debates—for example, is there a “gene for intelligence?”—so reaching clarity and consensus on these topics is far from simply a matter of semantics. In this course we will focus on conceptual debates in science, and how philosophers can contribute to them. After some general introductory discussion, we will look in depth at debates surrounding some key concepts in biology: natural selection, Darwinian populations, and life itself. Many of the readings will draw on examples and case studies from biology, but no particular background in biology is assumed.

This is a discussion based course. Everyone will be expected to come to class having done the assigned readings at least once, and prepared to discuss them. In addition, everyone will take turns leading the class discussion. There is no textbook; all assigned readings (as well as further suggested readings on each topic) will be available electronically through Canvas > Reading Lists.

Assessment:

- **85%—5000-word Essay:** You are expected to meet with me throughout the semester to develop an original essay topic based on the course material.
- **15%—Presentations:** Students will be responsible for leading the class discussion twice during the semester. This means you will prepare a presentation outlining key points from the relevant reading(s) and guiding our group’s discussion with questions and other points of interest. It does not mean that you must become an expert in the relevant week’s topic, or have all the answers to questions about it.

A bit more about presentations

The purpose of presentations is to guide and stimulate discussion. They *should not* be complete summaries of the readings, or discussions of every point the authors make. Your presentation should kick off class by quickly (5–10 minutes per reading) covering the readings’ central question or topic, its central argument(s), its conclusion, and (where relevant) a key example or two. You should then be prepared to guide the discussion. Minimally, this means raising genuine questions about the reading. You might also highlight possible weaknesses in the argument, counterexamples, or responses, or discuss connections with pertinent issues in other weeks of the course or other areas of philosophy and/or science.

Your presentation should have some written component: covering key points about the reading, and guiding discussion with some questions. A standard way to do this is to prepare a handout. If you’d rather do something else (make slides, write on the whiteboard) that is fine too.

Presentations that guide and stimulate discussion, as described above, will get full credit.

Presentations that summarise or review every point made in the reading will get less than full credit.

Tentative Schedule of Topics and Readings:

Part I: Concepts, Conceptual Change, and Categories in Biology

Week 1 (20 July): Introduction

— Alan Love, “Conceptual change” (Section 1.2 of *Conceptual change in biology*)

Week 2 (27 July): Natural kinds and conceptual change

— Joseph Laporte, “What is a natural kind, and do biological taxa qualify?” (Chapter 1 of *Natural kinds and conceptual change*)

— P. D. Magnus, excerpts from “How to think about natural kinds”: pp. 4–8, 18–21, 26–28 (this is the intro, section A, and sections B.intro, B.2, B.3, and B.6 of Chapter 1 of *Scientific enquiry and natural kinds*)

Week 3 (03 Aug): Pluralism through the lens of two case studies (species and planets)

— Marc Ereshevsky, “Species pluralism and anti-realism”

— Carl Brusse, “Planets, pluralism, and conceptual lineage”

Week 4 (10 Aug): No class

Week 5 (17 Aug): (How) should conceptual analysis take scientists’ views into account? Another case study (genes)

— Karola Stotz, Paul Griffiths & Rob Knight, “How biologists conceptualize genes: an empirical study”

— C. Kenneth Waters, “What conceptual analysis in philosophy of science should be (and why competing philosophical analyses of gene concepts cannot be tested by polling scientists)”

— *Optional but highly recommended background reading: Paul Griffiths & Karola Stotz, “The identities of the gene” (Section 9.1 of Genetics and Philosophy: An Introduction)*

Part II: Life

Week 6 (24 Aug): Defining life: The debates

— Carol Cleland & Christopher Chyba, “Does ‘life’ have a definition?”

— Edouard Machery, “Why I stopped worrying about the definition of life... and why you should as well”

***** Mid-Semester Break *****

Week 7 (14 Sept): ‘Defining’ life: Is it a kind or an individual?

— Carlos Mariscal & Ford Doolittle, “Life and life only: a radical alternative to life definitionism”

— Kelly Smith, “Life as adaptive capacity: Bringing new life to an old debate”

Week 8 (21 Sept): ‘Defining’ life continued: some more alternative approaches

— Emily Parke, “Finding, explaining, and engineering life”

— Tarja Knuuttila & Andrea Loettgers, “What are definitions of life good for? Transdisciplinary and other definitions in astrobiology”

Part III: Darwinian Populations and Natural Selection

Week 9 (28 Sept): Darwinian populations and natural selection I: Introduction and framework

— Peter Godfrey-Smith (2009), *Darwinian Populations and Natural Selection*, chapters 1 & 2

Week 10 (05 Oct): Darwinian populations and natural selection II: Key concepts

— Peter Godfrey-Smith (2009), *Darwinian Populations and Natural Selection*, chapters 3 & 4

Week 11 (12 Oct): Darwinian populations and natural selection III: Completing the framework, levels & transitions

— Peter Godfrey-Smith (2009), *Darwinian Populations and Natural Selection*, chapters 5 & 6

Week 12 (19 Oct): Course wrap-up, essay discussion and peer review