PHILOSOPHY 2320: PHILOSOPHY FOR INTEGRATED SCIENCE
MWF 8:30 - 9:30; PAB 117

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Course Description

An introduction to aspects of science not covered in traditional science courses. This includes history of science, scientific methodology, ethical dimensions of conducting and applying research, and conceptual issues in specific disciplines. The role of the media in disseminating science and how science shapes public policy will be discussed.

Objectives

This course has three main objectives. First, students will reflect on the nature of scientific inquiry from a philosophical perspective, including a critical assessment of the methods of science, their rationale, and the nature of scientific progress. Second, the course will invite students to reflect on the relation of science to other aspects of our culture, including ethical questions related to the conduct of research, and the implications of scientific research for public policy. Third, the writing assignments for the course will help students to develop their ability to evaluate various viewpoints fairly and critically, to develop their own positions, and to present clear arguments in writing.

Texts

There are no required books for the class. All assigned readings, as well as other materials, including supplementary readings, assignments, and lecture slides, will all be posted online at the OWL website for the course.

I can recommend two introductory textbooks on philosophy of science that cover similar topics. These are not required reading, but may be helpful:

Barker and Kitcher, *Philosophy of Science: A New Introduction*, New York: Oxford University Press.

Godfrey-Smith, *Theory and Reality*, Chicago: University of Chicago Press.

Evaluation

1. Short assignments (15 %): approximately 8 assignments over the term; no late assignments are accepted, but the two lowest scores will be dropped in calculating the final grade. The nature of the assignments will reflect the course material: in some cases, these will be problem sets; in others, very brief essays.

2. Papers (50 %): 1200 word paper due on Feb. 9 (20 %); 1600 - 1800 word paper due on March 30th (30 %). For the second paper, evaluation will be based in part on an initial outline and thesis statement due on March 16. Suggested topics and detailed guidelines will be distributed as the term progresses. The late penalty is 3 % per work day and 5 % for the weekend, with a maximum penalty of 20 %.
3. Final Exam (35 %): cumulative essay exam.

TENTATIVE SCHEDULE

We will consider four major themes (in the following order, each for approximately three weeks). I will maintain a more detailed schedule of readings, topics for lectures, and assignments on OWL.

- *Analyzing Scientfic Method*: An overview of scientific reasoning practices and their rationales: including the use of the hypothetico-deductive method and its limitations, the importance of replicability, and the uses and abuses statistical methods. Drawing on these accounts of method, we will consider recent discussions of the so-called "replicability crisis."

  Readings:

  - Selections from Hempel, *Philosophy of Natural Science*, Chapters 2-4
  - Selections from Hacking, *An Introduction to Probability and Inductive Logic*, Chapters 13-18.
  - Ioannidis (2005), "Why Most Published Research Findings Are False," *PLoS Medicine*.
  - Ioannidis (2012), "Why Science is Not Necessarily Self-Correction," *Perspectives on Psychological Science* **7**: 645-654.
  - Nosek, B. et al., 2015, "Estimating the Reproducibility of Psychological Science," *Science* 28, Vol.349, No.6251.

- *History of Science: Controversy and Progress*: History of science provides a clearer understanding of how science works than what is customarily presented in textbooks. In this part of the course, we will consider in detail the controversy regarding the "two chief world systems" (Ptolemaic vs. Copernican astronomy), with an emphasis on how intractable the dispute was at the time, and what was required for its eventual resolution. The aim is to develop the ability to critically analyze evidence in favor of theories, and to envision ways to develop stronger evidence. We will further discuss conceptions of scientific progress motivated by reflections on the history of science.

  - Selections from Galileo, *Dialogue Concerning the Two Chief World Systems*
  - Selections from Kuhn, *The Copernican Revolution*, Chapters 2, 5-6
  - Kuhn, "Objectivity, Value Judgment, and Theory Choice," from *The Essential Tension*.

- *Science as a Social Enterprise*: Even the best scientists do not know everything within their field, and "scientific knowledge" is, in a sense, best attributed to the entire community rather than to any individual. We will consider issues that arise once we shift perspective from

focusing on individual researchers to considering a community of researchers, whose interactions with each other are important to acquiring knowledge. The structure of the interactions among scientists – how they communicate with one another, whom they decide to trust – in part determines how a field progresses. We will first consider how the structure of a field may lead to particular effects, such as promoting polarization. We can further ask how the scientific community should be structured to promote rapid progress: for example, what incentives should the community give researchers to encourage productive work? Finally, we will consider how scientific results are disseminated to the broader public through the media, and develop the skills needed to critically assess media reports.

  - Selections from O'Connor and Weatherall, *Why do False Beliefs Spread?* (manuscript).
  - Kitcher (1990), "The Division of Cognitive Labor." *Journal of Philosophy* **87**: 5-22.
  - Selections from Conway and Oreskes, *Merchants of Doubt*, Chapters 1, 6.

- *Science and Public Policy*: Today's sciences provide information that is essential to making wise choices in public policy, yet policymakers and citizens alike are often unavoidably ill-equipped to interpret that information or to assess contested scientific claims. Choices about what kinds of scientific research should be pursued (with the support of scarce public funding) are also of vital importance, yet it is unclear how these choices should be made, and by whom. This module explores these two aspects of the interplay between science and democratic governance, focusing primarily on climate science and policy. We will consider the competing values and practical considerations that are in play in this case, and investigate both classic approaches to understanding the interplay between science and policy (from Vannevar Bush) and recent innovations that aim to justify and enable public participation in science policy.

  - Vannevar Bush, *Science – The Endless Frontier* (selections).
  - Selections from Kitcher, *Science, Truth, and Democracy*, Chapters 6, 8, and 10.
  - Selections from Hulme, *Why we Disagree about Climate Change*.
  - Selections from Schneider et al., *Climate Change Science and Policy*.

Audit: Students wishing to audit the course should consult with the instructor prior to or during the first week of classes.

The Department of Philosophy Policies which govern the conduct, standards, and expectations for student participation in Philosophy courses is available in the Undergraduate section of the Department of Philosophy website at `http://www.uwo.ca/philosophy/undergraduate/policies.html`. It is your responsibility to understand the policies set out by the Senate and the Department of Philosophy, and thus ignorance cannot be used as grounds of appeal.

Students who are in emotional/mental distress should refer to Mental Health@Western `http://www.uwo.ca/uwocom/mentalhealth/` for a complete list of options about how to obtain help.