

PHILOSOPHY 2320: PHILOSOPHY FOR INTEGRATED SCIENCE  
Thursday 6:30 - 9:30, AHB 2B02

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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 assignments for the course will help students to develop their ability to identify and evaluate arguments, to assess different viewpoints fairly and critically, to develop their own positions, and to present clear arguments in writing.

*Texts*

There are two required books for the class, available at the Campus Bookstore:

O'Connor and Weatherall, *The Misinformation Age*. Yale University Press.

Kitcher, *Science in a Democratic Society*. Prometheus Books.

All other assigned readings, as well as other materials — including updates to the schedule, supplementary readings, assignments, and slides — will be posted at the OWL website for the course.

I can also 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 %): 9 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, and will include argument mapping exercises, brief written work, and participating in peer review of written work.
2. Papers (50 %): 1000 word paper due on Feb. 14 (10 %); 1200 - 1400 word papers due on March 7th and April 4th (20 % each). Rubrics, 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 three major themes (in the following order, each for approximately four weeks). I will maintain a more detailed schedule of readings, topics for lectures, and assignments on OWL.

- *Analyzing Science: Method and Progress*: 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.” Second, we will consider debates regarding whether science makes “progress” motivated by reflections on the history of science.

#### Readings:

- Selections from Bird, *Philosophy of Science*, Chapters 6, 8.
  - Goodman et al. (2016), “What does research reproducibility mean?”.
  - 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-Correcting,” *Perspectives on Psychological Science* 7: 645-654.
  - Kuhn, “Objectivity, Value Judgment, and Theory Choice,” from *The Essential Tension*.
  - Nosek, B. et al., 2015, “Estimating the Reproducibility of Psychological Science,” *Science* 28, Vol.349, No.6251.
- *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.

- O'Connor and Weatherall, *The Misinformation Age*.
  - 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).
    - Kitcher, *Science in a Democratic Society*.
    - Collins and Evans, *Why Democracies need Science* (selections).
    - Selections from Hulme, *Why we Disagree about Climate Change*.
    - Selections from Schneider et al., *Climate Change Science and Policy*.

Date	Topic	Reading
January 10	Course Overview and Objectives Demarcating Science and the “Replicability Crisis”	Nosek 2015; Hempel
17	Peer Review: Exegesis Analyzing Scientific Method	Hempel; Bird, Chapter 6
24	Introduction to Argument Mapping Lies, Damn Lies, and Statistics	Hacking; Bird (continued)
31	Writing Effective Thesis Statements Replicability Reconsidered	Ioannidis (2005, 2012); Goodman et al. (2016)
February 7	Argument Mapping, II Progress and Objectivity	Kuhn; Bird, Chapter 8
14	Debate: Does Science Progress? <i>First Paper Due</i> Science as a Social Enterprise	O’Connor and Weatherall
21	<i>Reading Week – No Class</i>	
28	Peer Review: Second Paper Thesis Statements Science Communication and Propaganda	O’Connor and Weatherall Conway and Oreskes
March 7	Analyzing Science in the Media <i>Second Paper Due</i> Division of Cognitive Labor	Kitcher (1990)
14	Writing Effective Abstracts Managing Science	Bush; Kitcher
21	Argument Mapping: Review of Papers Well-Ordered Science	Kitcher (continued)
28	Prospective Argument Mapping Science and Democracy	Collins and Evans; Kitcher
April 4	Debate: Who determines the “scientific consensus”? <i>Third Paper Due</i> Climate Science and Public Policy	Hulme; Schneider et al.
April, TBD	<i>Final Exam: 3 hour written exam</i>	

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

All coursework must be completed by the last day of classes, April 9th. No late work can be accepted after that date, unless a medical or other accommodation is granted by the Dean's office.

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.