PHIL 35a: Philosophy of Science

Instructor

Matthias Jenny, mjenny@mit.edu
Office hours: Tuesdays and Thursdays 2:30pm-3:30pm and by appointment

Time & Location

Tuesdays and Thursdays, 3:30pm-4:50pm
Room TBD

Course overview

For about one hundred years, philosophers have thought deeply about the nature of science. Among the questions they have addressed are:

★ What, if anything, makes science a distinct intellectual enterprise?
★ How do we decide between competing scientific theories?
★ Does science describe reality?

In this course, we will discuss these questions and more. The first five parts of the course will retrace the development of the philosophy of science throughout the 20th century, from a sole concern with the logic of science through the so-called historical and social turns to more recent discussions of scientific realism. The last part of the course will cover a variety of issues such, scientific explanation, natural laws, and scientific inference.

Course objectives

This course will introduce you to some of the basic concepts of philosophy as they are discussed in the philosophy of science. By the time you complete this course, you should be able to:

★ Define and identify deductively valid arguments.
★ Explain the role that confirmation played in early writings on the philosophy of science.
★ Compare the role of historical and social considerations in the philosophy of science.
★ Evaluate the merits of scientific realism.
★ Formulate your take on the role of value judgments in science, the nature of scientific explanation and natural laws, and theories of scientific inference.
★ Write on difficult philosophical topics in a clear, concise, and accessible way.
★ Think critically about issues that affect all scientifically-minded citizens.

Course materials

There is no required textbook for the class. All readings will be made available online. However, the first five parts of the course are roughly structured the way Peter Godfrey-Smith's textbook Theory and Reality: An Introduction to the Philosophy of Science is structured, and many of our readings are discussed in that book. Taking a look at some of the chapters from that book may help you gain a deeper understanding of the readings, but the book isn't required reading.

What will be expected of you

Attendance and class participation. Attendance is required. You may miss no more than 4 classes without penalty. Participate in class – bring the text with you. Attendance and class participation will count for 15% of your final grade.

Reading responses. For the third through the eighth class meeting, I ask you to send me a roughly 200-300 word reading response two hours before class time on the reading for the day. The reading responses may be about something that you particularly liked about the article, something you disagree with, or something that you didn't understand. You may miss no more than one reading responses without penalty. You won't be graded on the reading responses. If you miss less than two of them, you will get full credit for this part of the course, which amounts to 10% of your final grade. There are no reading responses due on catch-up days.

Problem set. There will be one short problem set on the science of argument, which will be worth 10% of your final grade.

Papers. There will be 3 papers, two of which will be worth 15% of your final grade and the last of which will be worth 35%. For the first two papers, you will submit a draft, which is worth 5%, and then you will submit the final version, which is worth 10%. You are required to meet with me to discuss your drafts before you hand in the final versions. If you don't meet with me on a draft, the grade you received for that draft will be cut in half. For the third paper, you are encouraged but not required to submit a draft. If you choose to submit a draft, it will not be graded.

Accessibility

All of us learn in different ways and have different needs to ensure our well-being and success. Your well-being and success in this course is important to me. Please talk to me as soon as possible about any circumstances that may affect your performance. These may include mobility, visual, hearing, medical, psychological, and learning disabilities, but they may also be personal, health-related, or family-related issues. We will work together to find ways of adapting course assignments to meet your needs as well as the course requirements. I also encourage you to discuss your individual learning styles and comprehension requirements with me.

If you have, or think you may have, a disability, I strongly encourage you to make use of the services provided by Disability Services and Support (DSS), who will handle your concerns in a confidential matter. The DSS office is located in Usdan 130. Their website is at http://www.brandeis.edu/acserv/disabilities/ and their phone number is (781) 736-3470. If you have a
documented disability on record at Brandeis and wish to have accommodations made for you in this class, please see me as soon as possible.

Other important resources are:

- **Brandeis Counseling Center**  
  Mailman House  
  [http://www.brandeis.edu/counseling/](http://www.brandeis.edu/counseling/)  
  (781) 736-3730

- **Mental Health & Counseling**  
  third floor of E23  
  [https://medical.mit.edu/services/mental-health-counseling](https://medical.mit.edu/services/mental-health-counseling)  
  (617) 253-2916

- **Writing Center**  
  Rabb 144  
  [http://www.brandeis.edu/writingprogram/writingcenter/](http://www.brandeis.edu/writingprogram/writingcenter/)  
  (781) 736-2130

Making use of such resources is part of a normal learning experience.

Finally, to further the goal of creating an inclusive learning environment, I ask that we all use inclusive language in written and oral work. For example, please don't use 'he' as the only impersonal pronoun, but mix it up with 'she.' You may also use 'they' as an impersonal singular pronoun. So, for example, say things like 'Someone left their umbrella in the classroom last week' or 'The utilitarian thinks that she ought to maximize happiness.' For more information on this issue, the following guide is a good starting point on how to use inclusive language: [http://hrcouncil.ca/hr-toolkit/diversity-language-guidelines.cfm](http://hrcouncil.ca/hr-toolkit/diversity-language-guidelines.cfm)

**Academic Integrity**

Academic integrity is central to the mission of educational excellence at Brandeis University. Each student is expected to turn in work completed independently, except when assignments specifically authorize collaborative effort. It is not acceptable to use the words or ideas of another person without proper acknowledgement of that source.

Violations of University policies on academic integrity, described in Section Three of Rights and Responsibilities, may result in failure of the course or on the assignment, or in suspension or dismissal from the University. If you are in doubt about the instructions for any assignment in this course or about how to properly cite the sources you've used, it is your responsibility to ask for help. If you have questions about academic integrity, please do not hesitate to ask me, refer to the Rights and Responsibilities Handbook, or contact the office of Student Development and Conduct.

**Workload**

Success in this 4 credit hour course is based on the expectation that students will spend a minimum of 9 hours of study time per week in preparation for class - readings, problem sets, preparation for exams, working on papers, etc.

**Schedule**

(some of the details here may still change)

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<th>Prelude</th>
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| 1/17 | 1. Philosophy of science in 40 minutes!  
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<th>Part 1: The Dawn of 20th Century Philosophy of Science: Logical Empiricism</th>
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| 1/19  Herbert Feigl, “Logical Empiricism”  
Reading response due |
| 1/24  W.V. Quine, “Two Dogmas of Empiricism”  
Problem set due  
Reading response due |

**Part 2: The Holy Grail: A Theory of Confirmation**

| 1/26  Carl Hempel, “Studies in the Logic of Confirmation (I)”  
Reading response due |
| 1/31  Nelson Goodman, *Fact, Fiction & Forecast*, ch. 3, sect. 4 & 5  
Karl Popper: “Science: Conjectures and Refutations”  
Reading response due |

| 2/2  Catch-up day |

**Part 3: The Historical Turn**

| 2/7  Thomas Kuhn, *The Structure of Scientific Revolutions*, excerpts  
Reading response due |
| 2/9  Thomas Kuhn, *The Structure of Scientific Revolutions*, excerpts  
Reading response due |
| 2/14  Larry Laudan, *Progress and its Problems*, ch. 3 |
| 2/16  Lorraine Daston, “Objectivity and the Escape from Perspective” |
| 2/28  Catch-up day |

**Interlude on How to Write a Philosophy Paper**

First paper assigned |

**Part 4: The Social Turn**

| 3/7  Helen Longino, *Science as Social Knowledge*, excerpts |
| 3/9  Elizabeth Anderson, “Feminist Epistemology: An Interpretation and a Defense”  
First paper draft due |
| 3/14  Carla Fehr: “What Is in It for Me? The Benefits of Diversity in Scientific Communities” |
| 3/16  Michael Strevens, “The Role of the Priority Rule in Science” |
| 3/21  Catch-up day  
First paper due  
Second paper due assigned |

**Part 5: Scientific Realism**

| 3/23  Bas van Fraassen, *The Scientific Image*, excerpts |

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Page 4 of 5
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| 3/28  | Kathleen Okruhlik, "Bas van Fraassen's Philosophy of Science and His Epistemic Voluntarism"  
**Second paper draft due** |
| 3/30  | Anjan Chakravartty, “What You Don't Know Can't Hurt You: Realism and the Unconceived" |
| 4/4   | Catch-up day                                                            |

**Part 6: Assorted Topics**

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| 4/6   | Nancy Cartwright, “From Causation to Explanation and Back"  
**Second paper due** |
| 4/20  | Helen Beebee, “The Non-Governing Conception of Laws of Nature" |
| 4/25  | Leah Henderson, “Bayesianism and Inference to the Best Explanation"  
**Third paper assigned** |
| 5/2   | Catch-up day                                                            |

**Third paper due TBD**