

Philosophy 250
Philosophy of Science I
TuTh11-11:50
CHM0115
Syllabus

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COURSE DESCRIPTION:

Modern science appears to provide us with the most reliable and successful means of obtaining knowledge about the world. Many people would say that the success of science is the result of scientists' following the 'scientific method' – a set of procedures that set the mature sciences apart from all other human activities and that ensure the progress of science. But what is the scientific method? And what distinguishes science from other human activities? Is creationism, for example, equally as scientific as evolutionary biology? If not, why not?

We will begin with a brief historical discussion of the Scientific Revolution of the 16th and 17th century, which seems marks the beginning of modern science. After that we will largely look at arguments about the nature of science from the early twentieth century onward. For much of the course we will discuss ideas in their chronologically order. That is, we will examine ideas in roughly the order in which they were presented historically. Roughly, philosophers we will read early on in the course believe that there is a rational method that ensures the objectivity of science, while later philosophers are rather more skeptical about this claim. Questions we will address include: What is the relation between theory and observation in science? What is the role of so-called 'scientific revolutions'? How do social factors and values influence scientific theory choice? Are feminist critics justified who claim that there is a sexist bias in science? And if there is, does this impugn the results of science? When we accept a scientific theory, do we have to believe that everything the theory tells us about the world is true (or could we accept the theory as a useful 'tool' for making predictions)? What is it for a scientific theory to explain a phenomenon?

REQUIRED TEXTS:

- Peter Godfrey-Smith, *Theory and Reality*, U of Chicago Press (2003). [G-S]
- E.D. Klemke, Robert Hollinger, and David Wýss Rudge (eds.) *Introductory Readings in the Philosophy of Science*, Prometheus Books (1998). [KHR]
- Thomas Kuhn, *Structure of Scientific Revolutions*, U of Chicago Press (1996). [K]
- Articles on electronic reserve on the library web-page.

OVERVIEW OF TOPICS AND ROUGH SCHEDULE OF READINGS

- WEEK 1 (8/31)** **Introduction.**
 ■ G-S: Chapter 1
- WEEK 2 (9/5&7)** **The Scientific Revolution**
 ■ Westfal (e-reserve)
- WEEK 3 (9/12&14)** **Logic Plus Empiricism**
 ■ G-S: Chapter 2
 ■ Carnap (KHR, ch.17)
 ■ Putnam (KHR, ch.18)
- WEEK 4 (9/19&21)** **Induction and Confirmation**
 ■ G-S: Chapter 3
 ■ Hempel (e-reserve)
 ■ Giere (KHR, ch. 25)
- WEEK 5 (9/26&28)** **Popper's Falsificationism**
 ■ G-S: Chapter 4
 ■ Popper (KHR, ch. 1)
 ■ Kitcher (KHR, ch.5)
- WEEK 6 (10/3&5)** **MIDTERM on 10/3; Kuhn: Introduction**
 ■ G-S: Chapter 5
 ■ Kuhn, *Structure* (chs. 1-8)
- WEEK 7 (10/10&12)** **Kuhn and Normal Science, Theory and Observation**
 ■ G-S: Section 10.3
 ■ Hanson (KHR, ch.19)
 recommended:
 ■ Jerry Fodor, "Observation Reconsidered," *Philosophy of Science*, vol. 51, 1984 (web)
 ■ Paul Churchland, "Perceptual Plasticity and Theoretical Neutrality: A Reply to Jerry Fodor," *Philosophy of Science*, vol. 55, 1988 (web)
 ■ Jerry Fodor, "A Reply to Churchland's 'Perceptual Plasticity and Theoretical Neutrality'," *Philosophy of Science*, vol. 55, 1988 (web)
- WEEK 8 (10/17&19)** **Kuhn and Scientific Revolutions**
 ■ G-S: Chapter 6
 ■ Kuhn, *Structure* (chs. 9-end)
 ■ Kuhn, "Objectivity, ..." (KHR, ch. 26)
- WEEK 9 (10/24&26)** **Lakatos and Feyerabend**
 ■ G-S: Chapter 7
 ■ Lakatos (e-reserve)
 ■ Feyerabend (e-reserve)
 ■ Feyerabend (KHR, ch.3)
 ■ Hempel, "Scientific Rationality ..." (KHR, ch. 27)
- WEEK 10 (10/31)** **The Challenge from Sociology of Science**
SHORT PAPER DUE 10/31; NO class 11/2.
 ■ G-S: Chapter 8
 ■ Bloor (e-reserve)
 ■ Collins and Pinch (e-reserve)
- WEEK 11 (11/7&9)** **Feminist Philosophy of Science**
 ■ G-S: Chapter 9
 ■ Hubbard (e-reserve)
 ■ Hrdy (e-reserve)
- WEEK 12 (11/14&16)** **Science and Values**
 ■ G-S: Chapter 11
 ■ McMullin (KHR, ch. 31)
 ■ Hacking (CP)

WEEK 13 (11/21) Scientific Explanation (I)

- G-S: Chapter 12
- Hempel, “Studies in the Logic of Explanation” (KHR, ch. 11)
- Toulmin (KHR, ch. 21)
- Maxwell (KHR, ch. 22)

WEEK 14 (11/28&30) Scientific Explanation (II)

- Cartwright (KHR, ch. 13)
- Salmon (KHR, ch. 14)
- van Fraassen (KHR, ch. 15)

WEEK 15 (12/5&7) TBA**WEEK 16 (12/12) Review
FINAL PAPER DUE 12/14**

TEACHING METHOD AND EVALUATION: Lecture and discussion sections. You will be expected to have done the assigned reading **before** you come to class to be able to participate in the discussion, both in the lectures and in your discussion sections. Learning philosophy is as much learning a style of thinking and reasoning as it is learning certain contents. Therefore it is important that you try to participate actively in the discussions and learn to engage with the readings critically.

There will be a midterm on 10/3 (worth 20% of your grade), a short 5-page paper, due 10/31 (20%), a longer 6- to 7-page paper, due 12/14 (30%), and a final exam (30%).

In order to pass the course you need to complete all course requirements.

Tips for writing a paper:

- 1) It is important that you proofread each of your papers and check it for typos, spelling mistakes and grammatical errors. I will grade your paper down, if it contains a large number of such errors. It is part of the criteria for an A paper that the paper contain hardly any spelling mistakes or grammatical errors.
- 2) Use the active voice and try to avoid the passive voice. For example: ‘Kuhn argues’ instead of ‘it is argued by Kuhn.’
- 3) Write in complete sentences! Reading what you have written out aloud can help you identify sentence fragments.
- 4) Write in a straightforward, clear style. Use only words whose meaning you yourself understand. If you need to use a ‘technical term’ whose meaning is not widely understood, explain how you are using it.
- 5) Your paper needs to begin with a short and focused introductory paragraph. In your introduction you should briefly introduce the question or problem you will be addressing and state your thesis. Also (in the case of a longer paper) you should provide an outline of the strategy you will use to discuss the problem. It is best, if you use the first person voice in introducing what you will write about.
- 6) The point of a philosophy paper is to present an argument. One strategy for writing a paper is to present a position you disagree with, discuss the reasons one might offer in support of that position and then raise objections to these reasons.
- 7) Start writing your paper early enough to allow yourself time for revisions. Often it is helpful after you complete a draft of your paper to wait a couple of days before you return to it. By gaining a little distance you will be able to assess your own work more critically. You might also consider giving your paper someone else to read. (If you feel like you have trouble writing papers, you might take it to the Writing Center here on Campus.) Someone who is not familiar with the course material will be able to tell you if your paper is sufficiently clear and self-contained.

A note about the reading philosophy:

Even though the number of pages we will read for each class is going to be relatively small, you should budget enough time for the reading to be able to read each piece at least three times. Don't expect to be able to 'breeze through' the texts and you can avoid a lot of frustration. For all the readings you should have a pen and paper ready to take notes as you read. Philosophical writing is concerned with advancing and defending arguments. Your task will be to try to reconstruct the arguments and to critically evaluate them.

The first reading of a text should be fairly quick. Your goal here should be to get a first, rough sense of the general argument the author is advancing and the rough structure of the text. What is the author's main thesis? (write this down!) Often you will find a statement of the main thesis in the beginning of the text and/or in the conclusion. Where in the text is s/he arguing for it? Where does the author address objections? Where does s/he discuss qualifications? Where does s/he motivate the argument? Don't worry, if during the first reading you don't yet understand how precisely the author is arguing for his thesis.

The second reading should be devoted to giving a reconstruction of the argument that is as sympathetic as possible. Now you should spend a lot of time on trying to understand how the author supports the main thesis, and how s/he might address potential objections. Here it is usually useful to try to jot down the following: What are the premises of the argument? How are the premises themselves supported? For example the author might appeal to shared intuitions or might claim that the premises are self-evident. (e.g., "Obviously all science is ultimately based on observation...") What are the steps which are meant to get the author from the premises to the conclusion? (Here words like 'because' and 'therefore' can provide a clue.) You might think of yourself as engaging in a dialogue with the text here. Ask critical questions of the text, such as "You say that a good scientific theory has to be falsifiable. Why should I be compelled to accept this?" Then search the text for answers. At this stage your aim should not yet be to try to discover flaws or problems in the argument. Aim to make the argument as strong as possible.

Finally it is time to be critical. During a third reading you ought to try to see if you can uncover weaknesses in the author's arguments. If someone would want to disagree with the author's conclusion, there are two general ways in which one might attack the author's arguments. One, you can disagree with one or more of the author's premises. That is you might accept that *if* we grant the premises, *then* the author's conclusion follows, but you might disagree with one or more of the premises. (But then you should ask yourself how you would respond to the author's attempt to motivate the premises.) Or, two, you might disagree with one or more of the author's steps in the argument. That is, you might be willing to accept the premises, but you might deny that this commits you to the conclusion as well. If you have an objection of the latter kind you should try to explain why it is possible to accept the author's premises and yet deny his or her conclusions. (Of course you also might have objections of both kinds.)

A careful reading of a difficult text takes time. Learn to read patiently and slowly, and before you get frustrated, remember that even professional philosophers struggle with some of the texts you are reading. One of the most wonderful aspects of reading philosophy is that it allows you to engage in conversations with some of the deepest and most original thinkers of all times. Enjoy the challenge!

ACADEMIC INTEGRITY:

As you know, the university has a student-administered Honor Code and Honor Pledge which commits you neither to give nor receive any unauthorized assistance on any of your assignments. Unauthorized assistance includes plagiarizing papers. Whenever you quote from an author directly you must identify the quote and add a reference to the source. The same goes for very close paraphrases of someone else's ideas.

ACCOMODATIONS FOR STUDENTS WITH DISABILITIES:

If you need special accommodations please let me know at the beginning of term so that we can work out appropriate arrangements.

RELIGIOUS OBSERVANCES:

If you will need to miss class for religious observances, please let me know within the first couple of weeks of class.