

PHLC72-Topics in Philosophy of Science: Rationality and change in science

Instructor: Dr. Dustin Stokes
Section: PHLC72H3 LEC01; Fall Term
Lectures: W 11:00-1:00 MW264
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Course description

This is an advanced course in the philosophy of science. We will be concerned with a number of philosophical problems concerning scientific change. Although the course will centre around Thomas Kuhn's seminal work, *The Structure of Scientific Revolution*, we will supplement this reading with a number of texts, both critical of and complementary to Kuhn's theses. Some issues central to the course will be the following (though these issues will arise in a number of places, i.e. not necessarily in this order):

SCIENTIFIC METHOD

What are the everyday proceedings of science as such? And what changes need to take place to this set of methods or structure, such that significant scientific change occurs? For example, what events and changes had to occur to enable a change from classical Newtonian mechanics to general relativity?

RATIONALITY OF THEORY CHANGE

When a shift occurs, such as one from Newton to Einstein, is this a rational, rule-bound shift? Or something else entirely? And, as a normative matter, what is best for science? Are there methods—rational or not—that are ideally conducive to developing scientific knowledge?

MEANING AND CONCEPTUAL FRAMEWORKS

When radical changes occur in science, what are the semantic relations between the old and the new theories? Do conceptual frameworks shift entirely, or do identifiable connections remain between, say, Newtonian and Einsteinian physics?

THE EPISTEMOLOGY OF THEORY CHOICE AND CHANGE

Related to the last question above, are there epistemological standards common to distinct scientific theories and movements? And what is the role of perception and observation in the competition and selection of theories? Do competing scientists see and observe the world neutrally, or in a way biased by their respective theoretical commitments?

Course materials

Course readings:

- *The Structure of Scientific Revolutions*, 3rd Ed., Thomas Kuhn (University of Chicago Press 1996)
- All remaining readings will be available in PDF on the course blackboard website.

The portal may be accessed via:

<https://portal.utoronto.ca/webapps/portal/frameset.jsp> (You must login using your UTORid and password. Then find our course: PHLC72 Topics in Philosophy of Science. Then click 'Content', then 'Course readings').

All remaining course materials are available online via the course blackboard site. Lecture materials, essay assignments, announcements, and other information will also be made available on this site. Please check the site regularly.

Assignments/Requirements:

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|-------|--|---|
| 5% | Participation/attendance/discussion | |
| 27.5% | Short paper 1 | DUE 20 OCT (Questions assigned 13 Oct) |
| 27.5% | Short paper 2 | DUE 17 NOV (Questions assigned 10 Nov) |
| 40% | Final exam | TBA |

The short papers might also be thought of as take-home exams. You will be given a short list of questions, from which you will choose and respond to one. The questions will be distributed in class, and the papers are to be submitted the following week at the start of class. Your responses should be concise and to the point, and should be approximately 750-1250 words.

The final exam will be comprehensive and essay-style, but like the short papers, you will have choices between questions. More details later.

The default final assignment is the final exam. However, advanced students with a special interest in one of the topics covered in the course may write a final research paper of 8-10 pages, *instead of* the final exam. This paper will be due on the day of the final exam (TBA). If a student chooses this alternative, s/he must first submit a 1-2 page paper proposal no later than **24 NOV. 2010**. If you do not submit the paper proposal by this date, you **must** write the final exam. No exceptions.

General:

This is a writing intensive course. All of the work/examinations will be written. Your papers will be graded not only on content, but also on grammar, writing mechanics, style, etc. The UTSC writing centre can be found online here:

<http://www.utoronto.ca/~ctl/twc/index.html>

I also recommend this for writing philosophy papers:

<http://www.jimpryor.net/teaching/guidelines/writing.html>

Plagiarism and academic dishonesty of any kind will not be tolerated. You should familiarize yourself with the university guidelines and policies on academic integrity:

<http://www.utoronto.ca/academicintegrity/resourcesforstudents.html>

Late work/exams are allowed only with the submission of an official University of Toronto Medical Certificate or a letter from your registrar (or other university authority). **Unexcused late work will NOT be accepted.** No exceptions.

If you require special test-taking or note-taking accommodations, please see me.

Tentative Reading/lecture schedule:

*You are expected to have readings completed **prior** to the lecture date for the respective readings.

***Structure [n]*= Kuhn's *Structure of Scientific Revolutions [chapter number]*
All other readings available in PDF on blackboard

- W 15/09 *Introduction/background*
READ: *Structure I*
Popper, from *The Logic of Scientific Discovery*
- W 22/09 *Normal science: Popper vs. Kuhn*
READ: *Structure II-V*
Popper, 'Normal science and its dangers'
- W 29/09 *Concepts and constraints*
READ: *Structure VI-VIII*
- W 06/10 *Scientific explanation and reduction*
READ: Hempel, 'Two types of scientific explanation'
Nagel, 'Issues in the logic of reductive explanations'
Optional: Ayer, from *Language, Truth, and Logic*
- W 13/10 *Scientific revolutions: Kuhn and paradigm shifts*
READ: *Structure IX & XII*
- W 20/10 *Semantic incommensurability*
READ: Hacking, 'Incommensurability' and 'Reference'
Davidson, 'On the very idea of a conceptual scheme'
Optional: Quine, Ch. II of *Word and Object*
- *SHORT PAPER 1 DUE***
- W 27/10 *Methodological incommensurability*
READ: Quine, 'Two dogmas of empiricism' (esp. §5 & 6)
Sankey, 'Incommensurability: An overview'
Optional: Feyerabend, 'Explanation, reduction and empiricism'
- W 03/11 *Alternative theories of rationality and change in science*
READ: Feyerabend, from *Against Method*
- W 10/11 *Alternative theories of rationality and change in science*
READ: Laudan, from *Progress and its Problems*
- W 17/11 *Observational incommensurability: Theory-ladenness*
READ: *Structure X*
Hanson, 'Seeing and seeing-as'
- *SHORT PAPER 2 DUE***
- W 24/11 *YOUR CHOICE: More on theory-ladenness and cognitive penetrability OR*
The epistemology of theory acceptance
READ: TBA
- W 01/12 *Does science progress?*
READ: *Structure XI & XIII*

Resources:

All of the readings are primary sources. Needless to say, much of this material will be challenging. You might find some of the following resources helpful.

-For introductory texts on philosophy of science, try Rosenberg, A., *Philosophy of Science: A contemporary introduction* (Routledge 2000) or Godfrey-Smith, P. *Theory and Reality* (University of Chicago Press 2003)

-For general philosophy resources, I suggest both *The Cambridge Dictionary of Philosophy*, (1999) ed. Audi, R. and *The Oxford Dictionary of Philosophy*, (1994) ed. Blackburn, S. Online, try the Stanford Encyclopedia of Philosophy at <http://plato.stanford.edu/>