6AANA026 Philosophy of Science

Syllabus – Academic year 2019/20 (semester 1)

Basic information

Credits
15

Module Tutors
Alexander Bird (email: alexander.bird@kcl.ac.uk; Office: Philosophy Building 610)
Nicholas Emmerson (email: nicholas.emmerson@kcl.ac.uk)

Lecture time and venue
Tuesday 09.00–10.00 KINGS BLDG K2.31 (Nash Lecture Theatre)

Seminar times and venues:
See Timetable

Module aims	This module aims to give students an understanding of central topics in contemporary philosophy of science, in particular as they relate to contemporary epistemology.
Module description	The topics and questions to be covered include: • What is the aim of science? • What is scientific evidence? • How do scientists reason? • Scientific revolutions and Kuhnian philosophy of science • Inference to the Best explanation and Bayesianism • What is scientific progress? • The pessimistic meta-induction and the no-miracles argument

Learning outcomes	Key learning outcomes are:
	• An understanding of certain central topics in contemporary philosophy of science
	• An understanding of the place of these topics in wider philosophy
	• An ability to use the techniques of philosophical argument to analyse and discuss questions arising from the study of these topics
	• Transferable skills:
	  o analysing arguments
	  o constructing a coherent and effective argument
	  o writing a clear and well-structured essay around an argument

Assessment

Formative assessment: **one 2,500 word essay**
Formative essays due: See KEATS
N.B. Any essays received past the deadline without prior permission or an extremely good excuse will not be given feedback.

Summative assessment: **1 two-hour exam**

Consultation times

Tuesday 11.00–12.00;
Wednesday 11.00–12.00.
I am very happy to arrange to meet at other times or to talk by Skype.

Books and Resources

Introductory Textbooks
James Ladyman, (2002): *Understanding Philosophy of Science*, Routledge.
A very readable introduction and excellent for those with less philosophy background. Available reasonably cheaply. But not quite as good as the next book.
Alexander Bird (1998), *Philosophy of Science*, Routledge.
Alan Chalmers (1999), *What is This Thing Called Science?* 4th ed. Open University Press

Classic Texts
B. Van Fraassen (1980), *The Scientific Image*, Clarendon Press.
T. Kuhn (1998), *The Structure of Scientific Revolutions*, 3rd Ed., University of Chicago Press.
K. Popper (1959), *The Logic of Scientific Discovery*, Hutchinson Press
D. Mayo (1996). *Error and the Growth of Experimental Knowledge*. Chicago University Press.
I. Hacking (1983). *Representing and Intervening.* Cambridge University Press.

Collections
M. Curd and J. A. Cover (eds.) (1998) *Philosophy of Science: The Central Issues*, Norton
D. Papineau (1996), *The Philosophy of Science*, OUP.

Other Resources
Stanford Encyclopedia of Philosophy <https://plato.stanford.edu>. Please ensure you respect the Encyclopedia's citation policy. See articles on:
Bayes's Theorem
Confirmation
Evidence
Kuhn, Thomas
Science, theory and observation in
Scientific progress
Scientific realism
Scientific revolutions

Topics and readings

1. Scientific progress and the aim of science

   Questions
   How does progress relate to the aim of science?
   Is progress to be understood in terms of puzzle-solving, verisimilitude, or knowledge?

   Reading
   Bird, A. (2007). What is scientific progress? *Noûs*, 41:64–89.
   Laudan, L. (1981). A problem-solving approach to scientific progress. In Hacking, I., editor, *Scientific Revolutions*, pages 144–55. Oxford University Press, Oxford.
   Rowbottom, D. (2008). N-rays and the semantic view of scientific progress. *Studies in History and Philosophy of Science*, 39:277–8.

2. Scientific understanding

   Questions
   Is understanding a distinct aim of science from the aim of knowledge?
   Is understanding factive?

   Dellsén, F. (2016). Scientific progress: Knowledge versus understanding. *Studies in History and Philosophy of Science*, 56:72–83.
   Elgin, C. Z. (2007). Understanding and the facts. *Philosophical Studies*, 132:33–42.
   Hills, A. (2016). Understanding why. *Noûs*, 50:661–88.
   de Regt, H. W. (2017). *Understanding Scientific Understanding*. Oxford University Press, Oxford. (Chapter 2. Available via Oxford Scholarship Online).

3. Evidence and observation

   Questions
   What makes something *evidence*?
   Is scientific evidence observational?
   Is observation perceptual?

   Reading
   Van Fraassen, B. (1980). *The Scientific Image*. Oxford University Press, Oxford.
   Bogen, J. and Woodward, J. (1988). Saving the phenomena. *Philosophical Review*, 97:302–52.
   Williamson, T. (1997). Knowledge as evidence. *Mind*, 106:1–25.
   Bird, A. (2016). Evidence and inference. *Philosophy and Phenomenological Research*.

4. Scientific revolutions and paradigms

   Questions
   How does science develop according to Kuhn?

What is a paradigm and how do paradigms explain scientific development according to Kuhn?

Reading

Kuhn, T. S. (1962). *The Structure of Scientific Revolutions*. University of Chicago Press, Chicago, IL.

Bird, A. (2012). *The Structure of Scientific Revolutions and its significance*. The British Journal for the Philosophy of Science, 63: 859–83.

5. Bayesianism

Questions

Is Bayesianism a successful theory of confirmation?

What are Bayesianism's weaknesses?

Reading

Easwaren, K. (2011) "Bayesianism" I & II, *Philosophy Compass*

Clark Glymour(1980) , "Why I am Not a Bayesian" in his *Theory and Evidence*, Princeton, PUP , pp. 63–93; also in Papineau (1996), pp. 290–313.

Williamson, T. (1998). Conditionalising on knowledge. *British Journal for the Philosophy of Science*, 49: 89–121.

6. Inference to the Best Explanation

Questions

Can explanatory goodness be a reliable guide to truth?

Is Inference to the Best Explanation consistent with Bayesianism?

Reading

Peter Lipton (2004) *Inference to the Best Explanation* (2nd ed.). London: Routledge chapters 4 and 9.

Salmon, W. C. (2001) *Explanation and confirmation: A Bayesian critique of inference to the best explanation*. In G. Hon and S. S. Rakover (Eds.), Explanation: Theoretical Approaches and Applications, pp. 61–91. Dordrecht: Kluwer.

Michael Huemer (2009) Explanationist aid for the theory of inductive logic. *British Journal for the Philosophy of Science* 60: 345–75.

7. The Pessimistic Meta-Induction

Questions

What is the relationship between the success of a theory and its truth?

Does the track record of successful theories of the past give us reason to doubt current and future theories?

Reading

Laudan, L. (1981). A confutation of convergent realism. *Philosophy of Science*, 48:19–48.

Fahrbach, L. (2009). Pessimistic meta-induction and the exponential growth of science. In Hieke, A. and Leitgeb, H., editors, *Reduction–Abstraction–Analysis*,

pages 95–111. Ontos, Frankfurt. *Or.* Fahrbach, L. (2011). Theory change and degrees of success. *Philosophy of Science*, 78:1283– 92.

8. The No Miracles Argument

Questions
Does truth explain success?
What best explains the success of science?

Reading
Psillos, S. (1999). *Scientific Realism: How Science Tracks Truth*. Routledge, London.
Magnus, P. D. and Callender, C. (2004). Realist ennui and the base rate fallacy. *Philosophy of Science*, 71:320–38.

9. Social epistemology of science

Questions
In an advanced science, can a scientist's knowledge depend entirely on their own scientific achievements?
What is it for a group to know something? What is it for science to know something?

Reading
Hardwig, J. (1991). The role of trust in knowledge. *Journal of Philosophy*, 88: 693–708.
Tuomela, R. (2004). *Group knowledge analyzed*. Episteme, 1: 109–27.
Bird, A. (2010). Social knowing. *Philosophical Perspectives*, 24: 23–56.

10. Empiricism and the automation of science

Questions
In what ways and to what extent is science dependent on perception?
Does the possibility of robot or automated science disprove empiricism?

Reading
Bogen, J. and Woodward, J. (1988). Saving the phenomena. *Philosophical Review*, 97: 302–52. (As above.)
King, R. D.*et al.* (2009). The automation of science. *Science*, 324: 85–89.