

# 6AANA026 Philosophy of Science

Syllabus – Academic year 2018/19 (semester 1)

## Basic information

### *Credits*

15

### *Module Tutors*

Alexander Bird (Email: Alexander.Bird@kcl.ac.uk; Office: Philosophy Building 610)

### *Lecture time and venue*

Friday 09.00–10.00 Strand Building S –2.08 (i.e. in the basement, down two floors)

### *Seminar times and venues:*

6AANA026 Seminar 1: Friday, 12.00–13.00, North Wing D3

6AANA026 Seminar 2: Friday, 15.00–16.00, North Wing D3

6AANA026 Seminar 3: Friday, 14.00–15.00, Philosophy Building 304

<i>Module aims</i>	This module aims to give students an understanding of central topics in contemporary philosophy of science, in particular as they relate to contemporary epistemology.
<i>Module description</i>	The topics and questions to be covered include: <ul style="list-style-type: none"><li>• What is the aim of science?</li><li>• What is scientific evidence?</li><li>• How do scientists reason?</li><li>• Scientific revolutions and Kuhnian philosophy of science</li><li>• Inference to the Best explanation and Bayesianism</li><li>• What is scientific progress?</li><li>• The pessimistic meta-induction and the no-miracles argument</li></ul>
<i>Learning outcomes</i>	Key learning outcomes are: <ul style="list-style-type: none"><li>• An understanding of certain central topics in contemporary philosophy of science</li><li>• An understanding of the place of these topics in wider philosophy</li><li>• An ability to use the techniques of philosophical argument to analyse and discuss questions arising from the study of these topics</li><li>• Transferable skills:<ul style="list-style-type: none"><li>○ analysing arguments</li><li>○ constructing a coherent and effective argument</li><li>○ writing a clear and well-structured essay around an argument</li></ul></li></ul>

## *Assessment*

Formative assessment: **one 2,500 word essay**

Formative essays due: TBA

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*

Thursday 17.00–18.00

Friday 11.00–12.00

## *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 reading

## 1. The aim of science

### *Questions*

What does it mean to talk of the aim of belief and the aim of science?

What is the aim of belief?

What is the aim of science?

### *Reading*

Van Fraassen, B. (1980). *The Scientific Image*. Oxford University Press, Oxford.

Laudan, L. *Science and Values*

Sankey, H. (2000). "Methodological Pluralism, Normative Naturalism and the Realist Aim of Science". In *After Popper, Kuhn and Feyerabend: Recent Issues in Theory of Scientific Method*, Edited by: Nola, R. and Sankey, H. 211–29. Dordrecht: Kluwer.

## 2. Scientific progress

### *Questions*

How does progress relate to the aim of science?

Is progress to be understood in terms of puzzle-solving, verisimilitude, or knowledge?

Is understanding a distinct aim from 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.

Dellsén, F. (2016). Scientific progress: Knowledge versus understanding. *Studies in History and Philosophy of Science*, 56:72–83.

## 3. Evidence

### *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*

Easwaran, 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.