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Office Hours: Wednesdays, 16–17h
Please make an appointment with Silvia Stößer
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Introduction to the Philosophy of Science

Wednesdays, 12–14h
Max-Kade-Auditorium 1
Syllabus from 21 April 2023

The lecture introduces students to the philosophy of science by looking at the most important problems and debates: What are sciences, and how are they related to philosophy? How do scientific explanations work? Are there laws of nature? What roles do objectivity, rationality and other values play in scientific practices? Does science discover what is real?
The lecture is organised around five topics:

(1) *Sciences, Philosophy and History*: What are sciences, how are they related to philosophy and what role does history play?
(2) *Explanations, Interventions and Experiments*: How do scientific explanations work? How do scientific practices represent and intervene in whatever they study? What are experiments and why are they so central?
(3) *Objects, Values and Laws*: What are the components of scientific theories? Are there natural laws? Are "real sciences" value-free?
(4) *Realism, Anti-Realism and Relativism*: Is reality what scientific practices discover? Is there progress towards truth? How should we understand objectivity?
(5) *Sciences in Society*: What role does scientific knowledge play in democratic politics? What role should it play? How are sciences instituted?

General Reading

Cartwright, Nancy (2022): *A Philosopher Looks at Science*. Cambridge: CUP.
Okasha, Samir (2016): *Philosophy of Science. A Very Short Introduction*. 2nd ed. Oxford: OUP.
Bortolotti, Lisa (2008): *An Introduction to the Philosophy of Science*. Cambridge: Polity.
Oreskes, Naomi (2021): *Why Trust Science?* Princeton, N.J./Oxford: Princeton University Press.
Rosenberg, Alexander and Lee McIntyre (2020): *Philosophy of Science. A Contemporary Introduction*. 4th ed. New York/London: Routledge.

Workgroups

WG1: Thursdays, 16-18h, KG 1134
WG2: Thursdays, 16-18h, KG 1142
WG3: Thursdays, 18-20h, KG 1224
WG4: Thursdays, 18-20h, KG 1140

Requirements

Graded Examination I (20%): Students must give a short (10min) presentation of one core text in the workgroups. These presentations can be held by two students, but not by larger groups. They are intended to open up the discussion in class and should answer three questions:

(a) What is the main argument in the text? How can we express its main thesis?
(b) How does the argument work?
(c) Where do you see problems? Identify where you find an argument hard to understand and where you think an argument is inconclusive.

Please be aware that you should *reconstruct* the argument, not just summarise all of the text. Since you will not have time to include every detail, you must decide what is important and what is not. It is far better if we discover in the discussion that we do need some of the left-out passages than if you try to cramp everything into the presentation.

Graded Examination II (80%): The final exam will be a written exam on **19 July 2023**. The Re-sit date is **20 September 2023**. The exam consists of two parts: A first part with knowledge questions that require short answers about material covered in the lecture, and a second part with essay question to choose from. Further information about the exam will be given in the lecture.

Guiding Questions: To help you with the reading, we will upload guiding questions on ILIAS every week. You can use them to orient your text or write an answer in order to practice for the exam. You can also get feedback for your answers from your workgroup tutor but please talk to them before handing anything in.

Attendance & Punctuality: The attendance of the lecture and the workgroup is mandatory for LAS students. The UCF standard policy applies (see ILIAS LAS Info Board --> Study Organisation --> Handbooks and Policies). Note that you are expected to arrive punctually for workgroups and the lecture. Presuming that your time is more valuable than everybody else's time is simply arrogant, if not rude.

Philosophy students can earn 3 ECTS by attending the lecture and writing a short essay (2-3 pages) at the end of the term (due by **21 July 2023**). They are free to join the workgroups, if they are not filled to capacity. A list of essay questions will be provided two weeks before the due date; if you want to write about a topic of your own choosing, please contact me before you start.

All core *texts will be made available via ILIAS.*

Sessions

#	Date	Topic	Required Reading	Further Reading (Optional)
1	19.04.2023	Four Ideas of Science and an Overview	Francis Bacon (2009 [1620]), "The Inductive Method" Galileo Galilei (2009 [1623]), "Tradition and Experience"	Peter Machamer (2002), "A Brief Historical Introduction to the Philosophy of Science"
2	26.04.2023	Scientific Explanation, Vol. 1: Troubles with Induction	Wesly C. Salmon (2017 [1967]), *The Foundations of Scientific Inference*, 1–11 and 54–56.	Carl G. (Hempel 1998 [1962]), "Two Basic Types of Scientific Explanation"
3	03.05.2023	Logical Empiricism vs. Critical Rationalism	Naomi Oreskes (2021), *Why Trust Science?*, 15–28.	Samir Okasha (2016), *Philosophy of Science*, 1–15. Karl R. Popper (2002 [1963]), "Science: Conjectures and Refutations"
4	10.05.2023	Puzzles, Paradigms & Scientific Revolutions: Thomas Kuhn's Challenge	Thomas S. Kuhn (1998 [1962]), "The Nature and Necessity of Scientific Revolutions"	Thomas S. Kuhn (1970 [1962]), *The Structure of Scientific Revolutions*.
5	17.05.2023	After Kuhn: The Slow Demise of the Demarcation Question & Its Sudden Return	Naomi Oreskes (2021), *Why Trust Science?*, 28–49.	Alexander Bird (2013), "The Historical Turn in the Philosophy of Science"
6	24.05.2023	Scientific Explanation, Vol. 2: Natural Laws and Causation	Nancy Cartwright (1998 [1980]), "Do the Laws of Physics State the Facts?"	Alexander Rosenberg and Lee McIntyre (2020), *Philosophy of Science. A Contemporary Introduction*, 56–73.
7	31.05.2023	PENTECOST BREAK – NO LECTURE & NO WORKGROUPS		
8	07.06.2023	Experiments, Models and Metaphors	Emily Martin (1991), "The Egg and the Sperm"	Steven Shapin (1988), "The House of Experiment in Seventeenth-Century England"

#	Date	Topic	Required Reading	Further Reading (Optional)
9	14.06.2023	"If you can spray them, they are real…" Scientific Realism & Anti-Realism	Ian Hacking (1998 [1982]), "Experimentation and Scientific Realism"	Arthur Fine (1998 [1984]), "The Natural Ontological Attitude"
10	21.06.2023	Social Constructivism	Bruno Latour (2002), "The Science Wars: A Dialog" John Dupré (2004), "What's the Fuss about Social Constructivism?"	Alison (Wylie 1996), "The Constitution of Archaeological Evidence: Gender Politics and Science"
11	28.06.2023	Sciences, Humanities & Values	Helen Longino (2008), "Values, Heuristics, and the Politics of Knowledge"	Lorrain Daston and Peter Galison (2007), *Objectivity*
12	05.07.2023	The Authority of Scientific Knowledge	Naomi Oreskes (2021), *Why Trust Science?*, 49–68.	Massimo Pigliucci and Maarten Boudry (eds.) (2013), *Philosophy of Pseudoscience*
13	12.07.2023	Philosophy of Science: Contemporary Challenges and Future Issues	Open Discussion in the Workgroups, Q&A for the Exam	---
14	19.07.2023	Written Exam	---	---

Full Biography

Bacon, Francis (2009 [1620]): The Inductive Method. In: Timothy McGrew, Marc Alspector-Kelly and Fritz Allhoff (eds.), *Philosophy of Science. An Historical Anthology*. Malden, MA: Wiley-Blackwell, 190–193.

Bird, Alexander (2013): The Historical Turn in the Philosophy of Science. In: Martin Curd and Stathis Psillos (eds.), *The Routledge Companion to Philosophy of Science*. London/New York: Routledge, 79–89.

Cartwright, Nancy (1998 [1980]): Do the Laws of Physics State the Facts? In: Martin Curd and Jan A. Cover (eds.), *Philosophy of Science. The Central Issues*. New York/London: W. W. Norton & Company, 895–877.

Daston, Lorraine and Peter Galison (2007): *Objectivity*. New York: Zone Books.

Dupré, John (2004): What's the Fuss about Social Constructivism? In: *Episteme* 1 (1), 73–85.

Fine, Arthur (1998 [1984]): The Natural Ontological Attitude. In: Martin Curd and Jan A. Cover (eds.), *Philosophy of Science. The Central Issues*. New York/London: W. W. Norton & Company, 1186–1208.

Galilei, Galileo (2009 [1623]): Tradition and Experience. In: Timothy McGrew, Marc Alspector-Kelly and Fritz Allhoff (eds.), *Philosophy of Science. An Historical Anthology*. Malden, MA: Wiley-Blackwell, 135–137.

Hacking, Ian (1998 [1982]): Experimentation and Scientific Realism. In: Martin Curd and Jan A. Cover (eds.), *Philosophy of Science. The Central Issues*. New York/London: W. W. Norton & Company, 1153–1168.

Hempel, Carl G. (1998 [1962]): Two Basic Types of Scientific Explanation. In: Martin Curd and Jan A. Cover (eds.), *Philosophy of Science. The Central Issues*. New York/London: W. W. Norton & Company, 685–694.

Kuhn, Thomas S. (1970 [1962]): *The Structure of Scientific Revolutions*. 2nd, enlarged ed. Chicago: University of Chicago Press.

——— (1998 [1962]): The Nature and Necessity of Scientific Revolutions. In: Martin Curd and Jan A. Cover (eds.), *Philosophy of Science. The Central Issues*. New York/London: W. W. Norton & Company, 86–101.

Latour, Bruno (2002): The Science Wars: A Dialog. In: *Common knowledge* 8 (1), 71–79.

Longino, Helen E. (2008): Values, Heuristics, and the Politics of Knowledge. In: Martin Carrier, D. O. N. Howard and Janet Kourany (eds.), *The Challenge of the Social and the Pressure of Practice: Science and Values Revisited*. Pittsburgh, PA: University of Pittsburgh Press, 68–86.
Machamer, Peter (2002): A Brief Historical Introduction to the Philosophy of Science. In: Peter Machamer and Michael Silberstein (eds.), *The Blackwell Guide to the Philosophy of Science*. Malden, MA: Blackwell, 1–17.
Martin, Emily (1991): The Egg and the Sperm: How Science Has Constructed a Romance Based on Stereotypical Male-Female Roles. In: *Signs* 16 (3), 485–501.
Okasha, Samir (2016): *Philosophy of Science. A Very Short Introduction*. 2nd ed. Oxford: Oxford University Press.
Oreskes, Naomi (2021): *Why Trust Science?* Princeton, N.J./Oxford: Princeton University Press.
Pigliucci, Massimo and Maarten Boudry (eds.) (2013): *Philosophy of Pseudoscience. Reconsidering the Demarcation Problem*. Chicago, Ill.: University of Chicago Press.
Popper, Karl R. (2002 [1963]): Science: Conjectures and Refutations. In: ibid., *Conjectures and Refutations: The Growth of Scientific Knowledge*. London/New York: Routledge, 43–86.
Rosenberg, Alexander and Lee McIntyre (2020): *Philosophy of Science. A Contemporary Introduction*. 4th ed. New York/London: Routledge.
Salmon, Wesly C. (2017 [1967]): *The Foundations of Scientific Inference. 50th Anniversary Edition with an Introductory Essay by Christopher Hitchcock*. Pittsburgh, PA: University of Pittsburgh Press.
Shapin, Steven (1988): The House of Experiment in Seventeenth-Century England. In: *Isis* 79 (3), 373–404.
Wylie, Alison (1996): The Constitution of Archaeological Evidence: Gender Politics and Science. In: Peter Galison and David Stump (eds.), *The Disunity of Science*. Stanford, CA: Stanford University Press, 311–343.