

Philosophy of Science
Applied Cognitive Science Program
SPRING 2020

Instructor: Harald A. Wiltsche

Time and Location: see Course Outline

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Office Hours: by appointment

Overview and Objectives

The aim of this course is give an overview of some of the central issues in philosophy of science. We will discuss topics such as explanation, confirmation, falsification, modeling and idealization techniques, realism and anti-realism, scientific change or the relation between science and values. The course consists of a mixture of lectures and discussion seminars. Virtually all lectures proceed from concrete (historical or contemporary) case studies that are taken from different areas of research such as astronomy, theoretical physics, biology or medicine. The discussion seminar are meant as a preparation for writing a final group essay in which you will focus on your research project from a philosophical point of view. Course language is English.

Written Essay

Apart from active class participation, you are expected to write a group essay in which you are reflecting on your research project from a *philosophical* point of view (roughly around 3000 words). A pdf-version of the essay should be sent to my email address before the deadline. I will then grade the essays within 2 weeks, and give feedback. If your essay does not meet the expectations, you will have the chance to revise your paper once. Further information on how to write a philosophical paper is provided on a separate page.

Class Attendance

The official rule concerning attendance is that you have to be physically present in 80% of the meetings. However, if it is unavoidable to violate the 80% rule, write me an email or talk to me in class and we will figure something out. You will usually be able to compensate for your absence by means of a short written essay.

Suggested Background Readings

Although you are not strictly required to do additional readings for the course, you may find the following books helpful both for writing the group essay and for your future work.

- Okasha, Samir (2002): *Philosophy of Science. A Very Short Introduction*, Oxford: Oxford University Press.
- Potochnik, Angela; Colombo, Matteo; Wright, Cory (2019): *Recipes for Science. An Introduction to Scientific Methods and Reasoning*, London and New York: Routledge.
- Ladyman, James (2002): *Understanding Philosophy of Science*, London and New York: Routledge.
- DeWitt, Richard (2010): *Worldviews. An Introduction to the History and Philosophy of Science*, Malden: Blackwell.
- Nordin, Ingemar (2017): *Using Knowledge - on the rationality of science*, Lanham: Lexington Books.
- Massimi, Michela et al. (eds.)(2015): *Philosophy and the Sciences for Everyone*, New York and London: Routledge.
- Shrader-Frechette, Kristin (2014): *Tainted: How Philosophy of Science Can Expose Bad Science*, Oxford: Oxford University Press.

Course Outline

Lecture 1: Introduction (2020-01-31; 10:15-12:00; Room A31)

Lecture 2: Historical Introduction (2020-02-06; 08:15-10:00; Room P42)

Lecture 3: Scientific Reasoning (2020-02-07; 10:15-12:00; Room U2)

Lecture 4: Explanation and Realism I (2020-02-13; 08:15-10:00; Room S26)

Lecture 5: Explanation and Realism II (2020-02-14; 10:15-12:00; Room A31)

Lecture 6: Observation and Experiment (2020-02-20; 08:15-10:00; Room A32)

Lecture 7: Models and Idealization (2020-02-21; 10:15-12:00; Room A32)

Lecture 8: Scientific Change (2020-02-27; 08:15-10:00; Room A32)

Lecture 9: Science and Values I (2020-02-28; 10:15-12:00; Room S26)

Lecture 10: Science and Values II (2020-03-05; 15:15-17:00; Room S26)

Seminar 1: Project Presentations (2020-04-28; 13:15-17:00; Room A31)

Seminar 2: Writing Seminar (2020-05-05; 08:15-10:00; Room P42)

Seminar 3: Writing Seminar (2020-05-12; 08:15-10:00; Room S26)

Seminar 4: Writing Seminar (2020-05-19; 08:15-10:00; Room G34)

Seminar 5: Writing Seminar (2020-05-26; 08:15-10:00; Room G34)

Written Essay—Further Instructions

The aim of the written essay is to analyse the nature and purpose of your project from a *philosophical* point of view, thereby utilising the material you will get to know in this class. For guidance, below are some of the questions you could be asking yourself.

- What is the object of your study? How does its nature limit or determine your choice of methods?
- Which modes of inference are particularly common in your field (deduction, induction, abduction)? Are you relying on the HD-method a lot? Thinking of your field, are there any particular problems associated with any of these modes of inference?
- Thinking of your field, is there any reflection on the scientific realism debate? Do you think that your/one's stance in the debate has an impact on the way science is done in your/one's field? Is your aim that of explaining phenomena? If yes, do you recognise the DN-model in your research?
- What role (if any) do instruments play in your field? Are there any special requirements concerning calibration and/or the problem of artefacts? Is falsificationism able to account for your daily scientific practice? Does the Duhem-Quine thesis apply to your field, and if yes how exactly?
- Do models play a role in field, and if yes which kinds of models? Are there any special idealization techniques that are characteristic in your field? If yes, how is their use justified? What role does mathematics play in your field? Is it just a calculation device or do you use it for your representational purposes? If the latter is true, have you ever thought about Wigner's puzzle?
- Do or did you hold a cumulative view of science history? Do you recognise an overarching paradigm in your field? If yes, do you agree that the paradigm influences or even determines how you perceive the world, for instance in the lab? Do you see a potential problem in the idea that truth-claims are always relative to some paradigm or background theory?
- According to Kuhn, conservatism is inherent to science, partly because of the theory-ladenness of observation. Does this view correspond with your own experiences in the field? How do you deal with potential biases in your work?

The questions above are guidelines. They help to highlight some of the main points of the content of the course. You can write the essay explicitly as an answer to the questions, or you write a continuous narrative. Whatever you choose, it should be possible to clearly see your text as an attempt to answer these questions. If you read the text and realise it isn't really an answer to the questions, then consider revising. *And please do not get too detailed about your research. Remember this is philosophy and not a method description. The paper should be different from the kind of project description you may have had to write to your supervisors.* Naturally, if you are puzzled by these instructions, get in touch and we can find a solution.