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Philosophy of Physics

Q2, 2012

Lectures: Mondays 9-12, Auditorium G1 (1532-116)
Seminars: Wednesdays 11-14, 1525-231 (in English)
Thursdays 11-14 and 15-18, 1111-100

Course syllabus

- Week 45:** Thought experiments
- Week 46:** The problem of induction, falsificationism, and confirmation
- Week 47:** The historical turn in the philosophy of science
- Week 48:** Scientific explanation and the laws of nature
- Week 49:** Theories, observation, and models
- Week 50:** The realism-antirealism debate
- Week 51:** Social factors, responsibility, and limits of research

Course compendium: This course pack contains the *required readings* for the seminars. The presentation readings will be handed out to you once you decided which paper you want to present. If you have not yet bought a course pack, please get one from *Stakbogladden*.

Recommended textbooks: You will not have to buy a textbook. However you may find it helpful to read up on the topics discussed in the lecture and the seminars. The following books are recommended:

Godfrey-Smith, Peter (2003), *Theory and reality*, Chicago University Press.
[Probably the at the moment best available Philosophy of Science introduction]
** I've ordered copies of this book at the *Stakbogladden* (roughly 200kr)

Ladyman, James (2002), *Understanding philosophy of science*, London: Routledge

[One of the most widely used intros to PhilSci; contains an extended discussion of the problem of induction]

Chalmers, Alan (1999), *What is this thing called science*, 3rd edition.

[The classic introduction to PhilSci; contains many interesting historical examples]

Bortolotti, Lisa (2008), *Introduction to the philosophy of science*, Polity Press.

[Latest PhilSci intro; covers a broad range of topics]

Your duties for this course:

- Each week, you need to answer a “lecture query”, half-a-page each; upload your queries to the relevant section in AULA by FRIDAY 9am each week; it is recommended that you write your query in English
- Read the “required seminar text” in detail and get a rough idea about what the two other texts are about. There will be a set of questions guiding you through the required seminar text; *answer them before coming to the seminars!* If you come unprepared we may have to ask you to leave.
- You need to give a 15-20 min presentation on one (!) argument (and its “context”) that you need to identify in your assigned “seminar text” (2 students per presentation); it is strongly recommended that you send your tutor a rough presentation plan before your presentation by email
- There will be a 2 day take-home-exam at the end of this course; your grade for this course will be determined solely through this exam

Purpose of seminars

- Intensify the topics of the lecture with original philosophical texts
- Clarification of lecture material
- Articulation of your own views and free discussion

Seminar readings:

- You will find all of the required readings in the course compendium
- For each required reading there will be a list of questions that will guide you through the required readings
- Additionally to the required readings we expect you to get a grasp of the *main ideas* of the presentation readings (will be available on AULA)

Seminar presentations:

- For this course you will have to present one argument in class. Choose one of the following “presentation readings” for this purpose
- The presentation readings will be available for download on AULA

Note of caution

- All of the presentation readings you will find challenging. Make sure to spend a good amount of time on reading and understanding the papers!
- Some presentation readings you will find particularly challenging. I marked those with one (*) or two stars (**).

WEEK 45: Thought Experiments

Seminar reading (no student presentation):

- Bishop, M., "Why thought experiments are not arguments," *Philosophy of Science*, 66 (1999), pp. 534-541.

Background reading:

- Norton, J. "Why Thought Experiments Do Not Transcend Empiricism" pp. 44-66 in Christopher Hitchcock (ed.) *Contemporary Debates in the Philosophy of Science*. Blackwell, 2004.

WEEK 46: The problem of induction, falsificationism, and confirmation

Required reading:

- Popper, K. "The problem of induction", M. Curd and J. Cover (1998): *Philosophy of Science: the central issues*, WW. Norton, pp. 426-432.
- Popper, K. "Conjectures and refutations", C&C, pp. 3-10.

Presentation readings:

- Gillies, D. (1993), "The Duhem thesis and the Quine thesis", in G&G, pp. 302-319.
- * Salmon, W., "Rational Prediction", C&C, pp. 433-445.

Background reading:

- Godfrey-Smith: chapters 3, 14

WEEK 47: The historical turn and the philosophies of Kuhn, Lakatos, and Feyerabend

Required reading:

- Thomas S. Kuhn, "Logic of Discovery or Psychology of Research?", in C&C, pp. 11-19.
- Popper, K. (1970), "Normal Science and Its Dangers", in Imre Lakatos and Alan Musgrave, eds., *Criticism and the Growth of Knowledge*, Cambridge: Cambridge University Press, pp. 51-58.

Presentation readings:

- Kuhn, T.S., "The Nature and Necessity of Scientific Revolutions", in C&C, pp. 86-101
- * McMullin, E., "Rationality and Theory Change in Science", pp. 119-138

Background reading:

- GS: chapters 5, 6, 7.

WEEK 48: Scientific Explanation and Laws of Nature

Required reading:

- Hempel, C. "Two Basic Types of Scientific Explanation", CC, pp. 685-694.
- Hempel, C. "The thesis of structural identity", in C&C, pp. 695-705.

Presentation readings:

- ** Cartwright, N., "Fundamentalism vs. the patchwork of laws", in Papineau, D. (ed). *The Philosophy of Science*, pp. 315-326.
- ** Hofer, C. "For Fundamentalism", in: Hartmann et al. *Nancy Cartwright's Philosophy of Science*, pp. 307-322; AND Cartwright, C. "Reply to Hofer", *ibid*, pp. 322-323

Background reading:

- GS: chapter 13 (on explanation)

WEEK 49: Theories, observation, and models

Required reading:

- Giere, R. (1990), "Models and Theories", in his *Explaining Science: A Cognitive Approach*, University of Chicago Press: Chicago, pp. 62-91.

Presentation readings:

- Maxwell, G. "The Ontological Status of Theoretical Entities", in: Feigl, H and G. Maxwell (eds.), *Scientific Explanation, Space and Time*, vol. 3, *Minnesota Studies in the Philosophy of Science*, Minneapolis: University of Minneapolis Press, 3-14.
- Hanson, N.R., "Observation", in his *Patterns of Discovery*, chapter 1, 4-30.

Background reading:

- GS: chapter 2 (on positivism)

WEEK 50: The Realism-Antirealism Debate

Required reading:

- Worrall, J. (1989) "Structural realism, the best of both worlds", *Dialectica*, reprinted in: Papineau (ed.), pp. 139-165.

Presentation readings:

- ** Van Fraassen, B. "Arguments concerning Scientific Realism", C&C, pp. 1064-87.
- * Laudan, L. "A confutation of convergent realism", C&C, pp. 1115-1135.

Background reading:

- GS: chapter 12

WEEK 51: Social factors, responsibility, and limits of research

Required reading:

- Bloor, D. (1991), "The Strong Programme", in his *Knowledge and Social Imagery*, Chicago: University of Chicago Press.

Presentation readings:

- * Bloor, D. (1999), "Antilatour", *Stud. Hist. Phil. Sci.*, Vol. 30, No. 1, pp. 81-112.
- Merton, R (1957), "Priorities in Scientific Discovery: A Chapter in the Sociology of Science", *American Sociological Review*, Vol. 22, No. 6 (Dec., 1957), pp. 635-659

Background reading:

- GS: chapter 8