UNIVERSITY of BERGEN

MNF201 **Fall 2018**
VITENSKAP I VÅR TID
INTRO TO PHILOSOPHY OF SCIENCE

Lecturers	Sorin Bangu, Reidar Lie (Philosophy Dept.)
	Schedule of lectures and rooms: see timeplan, here http://www.uib.no/emne/MNF201 Check the **mitt.uib** website associated with the course often!
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	Important: please check your *university email account* often during the course, as this is the only address we will use to communicate with you.

Course description

The aim of the course is to provide the opportunity to reflect on the nature of science and some of the challenges (conceptual as well as practical) raised by the scientific activity. We will cover in some detail a number of issues in the philosophy of science, such as: the so-called 'demarcation problem', i.e. science v. pseudo-science, scientific realism, the use of probability and statistics, and the role of the social context in which scientific research takes place. Several sessions will be devoted to applying the abstract philosophical concepts and notions to scientific practice (more detailed descriptions below).

Readings

Obligatory:

- Godfrey-Smith, P. *Theory and Reality*. The University of Chicago Press, 2003. Below abbreviated as **GSP**. Available at Akademika or online sellers.
- Okasha, S. *Philosophy of Science. A Very Short Introduction*. Oxford UP, 2002. Abbreviated as **OK**. Available at Akademika or online sellers.

Recommended:

- Several articles and book chapters available for free online, or in .pdf form on **mitt.uib**.

Evaluation

- Attendance of 8 meetings (16 hours) + one paper 4000-6000 words long (10-15 pages), on a pre-assigned topic (see sample topics at the end of this document). Grade: Pass / Fail. Due date: TBA
- **The paper can be written in Norwegian or English (no penalties for grammar mistakes if the logical structure is not affected).**

Academic dishonesty, which includes plagiarism, is an extremely serious academic offense and carries penalties varying from failure in an assignment to suspension from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in University's documents. It is the student's responsibility to be familiar with this policy.

SCHEDULE (Orienteringsmøte in SPL 210; all other meetings in room SPL 208/209) [What's below is tentative. Our hope is that we'll cover everything announced, but depending on how the class discussion is going we might skip or add some material.]

0. ***Orienteringsmøte: 13.08, kl. 12.15***

1. ***Introductory meeting. What is Philosophy of Science?*** **(u 33, 13.08, kl. 14.15)**

2. ***Basic philosophical notions, terms and distinctions. A bit of logic*** **(u 34, 22.08)**

3. ***The Problem of Induction*** **(u 34, 24.08)**

The basis of modern science is experiment. But there is a serious philosophical problem with this – called 'the problem of induction'.

Readings:

On mitt.uib:
Rosen "The Problem of Induction"

4. ***The Nature of Science*** **(u 35, 29.08)**

What is science? What's the difference between science and pseudo-science? Is there such a thing as *the* scientific method? Is science different from other forms of inquiry? How should we understand scientific development: does science progress by accretion, or the process is rather non-linear? Does history of science play any role in answering these questions? These lectures will seek answers to these questions.

Readings:

- OK: Ch. 1
- GSP: Ch. 1, 4.

On mitt.uib:

- Popper "Conjectures and Refutations"

5. ***Scientific Change and Scientific Revolutions*** **(u 35, 31.08)**

Scientific ideas change. Pick virtually any scientific discipline you like, and you can be sure that the prevalent theories in that discipline will be very different from those of 100 years ago. Compared with other areas of intellectual endeavor such as philosophy and the arts, science is a changing activity, making progress as time goes by. Unsurprisingly, interesting philosophical questions can be asked about scientific change: Is there a discernible pattern to the way scientific ideas change over time? When scientists abandon

their existing theory in favor of a new one, how should we account for this? Are later scientific theories objectively better than earlier ones? Or, does the concept of objectivity make sense at all? We'll discuss several views on scientific change due mainly to Thomas Kuhn (works by I. Lakatos and P. Feyerabend are recommended as well).

Readings:

- OK: Ch. 5
- GSP: Ch. 5, 6, 7
  On mitt.uib:
- Kuhn "Logic of Discovery or Psychology of Research"
- Lakatos "Falsification and the methodology of research programs" pp. 91-137, 189-196.
- Feyerabend "*Against Method* revisited" Pp. 7-70 in Feyerabend, P. *Science in a Free Society* (London, New Left Books, 1978)

6. *Scientific Realism* (u 36, 5.09 + 7.09)

Should we believe that in addition to tables and chairs the world is populated with unobservable entities like electrons and genes? According to scientific realists we should, given the unquestionable success (both predictive and explanatory) of the theories featuring these entities; as realists often point out, if these theories weren't true their success would be nothing short of a miracle. Yet, as some philosophers argue, such an inference from success to truth is *not* vindicated by an examination of the history of science: many theories we regard today as false have also been considered successful in the past. More generally, since almost all theories in the history of science turned out to be false (by our present lights), we should perhaps (inductively) infer that our present theories are false as well. But, is this pessimism justified? How do realists respond to this challenge?

Readings:

- OK: Ch. 4
- GSP: Ch. 12

  - Articles:

- Leplin "A Theory's Predictive Success can Warrant Belief in the Unobservable Entities it Postulates"
- L. Laudan "A Confutation of Convergent Realism"
- Van Fraassen, "Arguments Concerning Scientific Realism" (Excerpts from Ch. 2 from *The Scientific Image*)

7. *Induction and Probability. Reasoning under Uncertainty* (u 37, 12.09)

No branch of science today can ignore probability theory; in fact, it is widely accepted that one of the features of modern science is that it is *essentially* probabilistic, both in its claims and in the nature of the reasoning employed to support these claims. We'll discuss some basic notions of probability theory, focusing on the project of understanding the

confirmation of scientific theories in probabilistic terms. More specifically, we'll look briefly at a probabilistic framework called 'Bayesianism'.

Readings:
- OK: Ch. 2, esp. pp. 33-39
- GSP: Ch. 3 (only pp. 39-46), 14
  On mitt.uib:
  Howson, C. & Urbach P. (2006) *Scientific Reasoning. The Bayesian Approach*. Chapters 1, 2a-c, 4a-c

8. *Science and Pseudo-Science* (u 41, 10.10; Reidar Lie)

This session will give a brief introduction to homeopathy and acupuncture as cases to illustrate the theoretical challenge of distinguishing science from pseudo-science. In particular we will discuss the problem of arguing that we should not worry about alternative medicine as long as people believe that "it works".

Readings: TBA

9. *Science and the social context* (u 41, 12.10 + u 48, 28.11)

Scientific research is not carried out in a vacuum, but is heavily influenced by social factors: scientists' interests, sources of funding and even the scientists' gender. This lecture will aim to examine the nature and the extent of these influences.

Readings:
- [GSP]: Ch. 8, 9
- OK: Ch. 7
- Free online: Anderson, Elizabeth, "Feminist Epistemology and Philosophy of Science", *The Stanford Encyclopedia of Philosophy* (Fall 2012 Edition), Edward N. Zalta (ed.)
  URL = http://plato.stanford.edu/archives/fall2012/entries/feminism-epistemology
  (Esp. section 5)
  On mitt.uib:
- Bloor "The Strong Programme in the Sociology of Science"
- Kitcher "Science, Truth and Democracy" (excerpts)

***10. Recap: main themes and arguments* (u 48, 30.11)**

In this last meeting we will leave time for each student to present their essay-topic (about 5 min / student; if wanted, in Norwegian).

Examples of ESSAY TOPICS (open to suggestions!)

- Scientific evidence for global warming

- Evolutionary theory v. creationism
- Alternative v. main-stream medicine
- Use and misuse of statistics
- Modeling
- Mathematical abstraction
- Are you a scientific realist or anti-realist?
- What is the aim of science: explanation or prediction?
- Is science gendered?
- How should science be funded?