Philosophy of science, 2 ECTS

Content
Philosophy of science is the part of philosophy which deals with philosophical problems that arise in science. The focus of the course is on philosophical problems that arise in the natural sciences.

Course structure
The course consists of two parts each of which consists of two lectures and one seminar. The first part introduces basic concepts in philosophy of science, such as truth, knowledge, evidence, hypothesis, confirmation, and refutation. The other part is about the nature of science and scientific change and the demarcation between science and pseudoscience and other deviations from good science.

Lecture 1: Knowledge and truth
What does it mean that a statement is true? Is truth relative? What is it to have evidence for a statement? What is required if one is to know that such-and-such is the case? Is knowledge possible?

Lecture 2: Scientific method
the distinction between formal and empirical sciences, scientific method in formal sciences: the traditional view on proof in mathematics and an alternative view, scientific method in empirical sciences: hypothetico-deductive method, statistical hypothesis testing, and inference to the best explanation

Seminar 1: Scientific method in practice
One or several scientific articles will be discussed with regard to what hypotheses and evidence are presented, what methods are used, which background assumptions are made, what results are achieved, etc.

Lecture 3: Logical positivism and Karl Popper
verifiability as a criterion of meaningfulness, the problem of induction and Karl Popper’s solution, falsifiability as a criterion of demarcation between science and non-science, objections to logical positivism and Popper

Lecture 4: Thomas Kuhn and afterwards
Thomas Kuhn’s theory of the development of sciences, paradigms, anomalies and scientific revolutions, Kuhn’s thesis of incommensurability, puzzle-solving capability as a criterion of demarcation between science and non-science, developments after Kuhn

Seminar 2: Pseudoscience and other deviations from good science
Different proposals of how science should be demarcated from pseudoscience and other deviations from good science, such as fraud in science, will be discussed; in addition, a concrete example of “deviation from good science” will be discussed with regard to how it deviates from good science and whether it should be characterized as pseudoscience, fraud in science, incompetence and negligence, or something else.

Instructor
Peter Melander, universitetslektor
Idé- och samhällsstudier (filosofi)
Examination
Each student will be asked to choose a scientific article from any field of science and write a “referee-report” about it which shows that the student can apply concepts, problems, arguments, etc. from the course.

Course literature
The course literature consists of a number of articles and short excerpts from books. All course literature will be made available for students as pdf-files and hyperlinks.


Huygens, C. (1690). Treatise on Light. (Excerpt from the preface.)


Further articles and excerpts from books may be added.