

Welcome to the course in Theory of science, Autumn semester, 2023

Introduction

Theory of science is a broad research area of fundamental value and relevance for all researchers. In this course, you will be introduced to several dualities and different polarized traditions that approach the practice of doing research from different perspectives.

Before you start this course please consider what science is in your practice and in which ways knowledge is produced as well as confirmed/legitimized. Are you familiar with concepts such as:

- Rationalism
- Empiricism
- Pragmatism
- Epistemology
- Ontology
- Verification
- Falsification

One duality that will be explored is between idealized and real-life images of research, pursuing images of knowledge-seeking as *it should be* or as *it is* (warts and all!). Therefore, theory of science is caught between the contrasting perspectives of *philosophy of science* (promoting ideal norms) and *sociology of science* (empirical investigations of real-life practices).

Another essential duality is between *empiricism* and *rationalism*, outlining different strategies for *producing* and *supporting* knowledge claims. These, in turn, are connected to *ontologies*, assumptions about human existence where the fundamental duality is between on the one hand *materialism* (our experience of the world is based on the material character of reality) and on the other hand *idealism* (our experience of the world is based on our ideas of it).

Still, yet another duality is that between, on the one hand, the *continental* (German and French) traditions of investigating meaning and interpretation, and on the other hand, the *Anglo-Saxon* tradition of pursuing methods for establishing reliable statements of verified and validated truths.

There is also a classical tension between the different perspectives on science suggested by *Karl Popper* (emphasizing the individual scientist) and *Thomas Kuhn* (emphasizing the collective group of researchers). These perspectives have underpinned the polarized discussions within theory of science today.

Finally, the most discussed duality within theory of science in recent decades has been between notions of scientific *realism* and *relativism*. Such discussions underpin the fundamental issue of what kind of knowledge is produced by science.

Regardless of your earlier experiences with theory of science, we hope that you will find this course both inspiring and valuable for your continuing doctoral work.

Note: The course consists of 5 + 2.5 credits (the second is the essay part that some of you will take). It is given as a part-time course at 50 %. This means that we expect your full attention for 20 hours every week. It is suggested that you do not take any other course that will interfere with this one, especially since it is mainly examined through active seminar activity at the campus according to the schedule.

Gustaf Nelhans and Erik Joelsson, course leaders

Goals of this course

As the subject area of theory of science is rich, a course such as this must either be very broad or specialized on a few topics. The choice has been made to supply an introduction to the most fundamental issues. Nevertheless, there are several important topic areas either missing or dealt with to a lesser degree, such as gender studies of science, research ethics, critical realism, critical rationalism, paradigm theory, post-Kuhnian philosophy, sociology of science, actor-network theory, the strong program, the radical program, the weak program, etc.

After finishing the central part of the course, 5 ECTS, the students should be able to:

- discuss differences between various historical and current philosophical and sociological positions concerning epistemology and scientific practice
- compare various elaborations on key ideas and concepts within theory of science
- evaluate different theories of the scientific method

For those students aiming for the additional 2.5 ECTS, there are two additional goals:

- construct an outline for a theoretical framework applicable to current PhD student work
- critically discuss the theoretical frameworks of other PhD students

Workshops: Learning by discussion

Theory of science is a fundamental subject area for researchers. However, it is challenging and difficult to take on simply by reading a bunch of books. In order to use this subject area as a resource for growing as researchers, we need to discuss these ideas and relate them to our work. The emphasis in the course is, therefore, on reading and discussing texts in five workshops.

The basic structure of the workshops is based on ideas of collaborative learning. Each workshop is focused on a book or selected parts of a book which all students should read in full. However, different students are responsible for various segments of the book, initiating discussions. The idea is to make the texts “come alive” in the workshops.

This is a course open for all PhD students registered at HB. Sometimes we also have participants from other universities. Students in this course usually have various specialities ranging from “soft” to “hard” research areas. For a course in theory of science, this heterogeneous mixture of PhD students is a valuable resource. Therefore, discussions tend to explore the differences between paradigms, theories, values and methods of different research approaches. Such discussions can be stimulating and facilitate the development of the individual research identity.

Schedule: Theory of Science, PhD course (5 + 2.5), Autumn 2023

Active participation in workshops 1–5, including written contributions, is required for 5 ECTS. Students also working toward the final 2.5 ECTS are to produce an essay on their theoretical framework, building on the resources of the course. Final papers will be discussed in workshop 6.

All activities are planned to be in on Campus.

Tuesday, Oct 10

(Zoom)

Introduction: 10-12 Course introduction

Introduction to the course, as well as to the complex research subject *Theory of science*. Lecture and discussion on the fundamental concepts and ideas of epistemology. Basic notions of scientific realism are discussed.

Tuesday, Oct 17

(Zoom)

Workshop 1: 10–16 Epistemology

Seminar discussion on texts relating to the main problems of epistemology and different traditions of epistemology. Lecture and discussion on positivism and some of the different methodological traditions of the humanities, social science, natural sciences and technological research. (Lit: *What is this thing called knowledge?*)

Tuesday, Oct 24

(Zoom)

Workshop 2: 10–16 Logical positivism, Karl Popper and Thomas Kuhn

Seminar discussion on different philosophical approaches to science and scientific method. Discussions on positivism, Karl Popper and Thomas Kuhn. Lecture on developments after Thomas Kuhn. (Lit: *Theory of science* Ch. 1–3).

Tuesday, Oct 31

(Zoom)

Workshop 3: 10–16 After Thomas Kuhn

Seminar discussion on the post-Kuhnian developments: sociology of science, feminism, science studies, naturalism, empiricism and scientific realism. Lecture and discussion on traditions within science and technology studies. (Lit: *Theory of science* Ch. 4–6).

Friday, Nov 7

(Zoom)

Workshop 4: 10–16 Science and technology studies

Seminar discussion on different research areas and research perspectives within science and technology studies. Introduction to the examination task (2.5 ECTS) of constructing a rough outline for a theoretical framework that connects to the course's themes and has relevance for the individual PhD thesis. (Lit: *An Introduction to Science and Technology Studies* Ch. 1-16-16).

Submission Thursday, Nov 16 noon! Papers will be distributed the same day.

Tuesday, Nov 21

(Zoom)

Final Seminar (Course 2, 2.5 ECTS): 9–16 Discussion of papers on the theoretical framework

Seminar discussion of individual theoretical framework papers.

Literature

Knowles, J. (2006). *Theory of Science: A Short Introduction*. Trondheim: Tapir Akademisk Forlag (147 pages) (– will be made available digitally through Canvas)

Pritchard, D. (2013). *What is this thing called knowledge?* London: Routledge. (200 pages)

Sismondo, S. (2009). *An introduction to science and technology studies*. Oxford: Blackwell publishing. (155 pages)

Make sure that you acquire the literature as quickly as possible. The book by Knowles will be distributed electronically through the Course portal at the beginning of Spring but can be requested from Gustaf Nelhans before if there is an interest.

You will find a discussion of the role and choice of literature in the PowerPoint presentation in the introduction.

Examination

In order to pass the whole course, you will have to collect points in four different ways.

1. Written input into all four literature seminars (3 hp)

- Take responsibility for one part of the literature
- Pose 3 discussion questions on a PowerPoint slide as bullet points based on your reading and/or your research interests

2. Be present and active in at least three of the four literature seminars (2 hp)

- The literature seminars support your learning process.
- Ideally, attend all four.
- Read all the literature according to the schedule
- Be active in discussions
- Present your questions for discussion
- If you miss one (1) seminar, there will be an extensive written assignment to cover the whole day.

3. Paper on the theoretical framework in course 2 (2 hp) (optional)

- The main learning output of the course is intended to be an increased ability to reflect upon the theoretical position of the thesis
- To conclude the course, you are to write an outline for a theoretical framework (more about that soon) about 2500 words long

4. Be present and active in the seminar on theoretical frameworks in course 2 (0.5 hp) (optional)

- Scrutinize the papers of two of the other students
- Lead the discussions on these two papers, together with another student
- Participate in discussions on your paper
- Participate in discussions on the other papers

Requirements for your final paper

- Will be a blueprint for a theoretical framework relevant to your thesis.
- Describe how your research problem is connected to a tradition in your field.
- Argue an epistemological position: what kind of knowledge do you intend to produce? How do you support it? How does it correspond to/explain/describe/critically scrutinize phenomena?
- Having stated an epistemological position, describe what kinds of theoretical resources you would like to have in your theoretical framework.
- What kind of methodological implications follow from this?
- Finally, distance yourself from what you have written and identify problems in what you have written (reflexivity) .
- Important: the final paper should be firmly grounded in the course literature.