FAK3014 The Theory and Methodology of Science - Minor Course 3.0 credits

Vetenskapsteori och forskningsmetodik - mindre kurs

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

The course syllabus is valid from Autumn 2023 according to the Head of school decision: A-2023-2373, 3.2.2Decision date: 2023-10-29

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Entry requirements for PhD studies.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The course provides an introduction to the theory and methodology of science and is intended for the beginning PhD student. One aim is to supply the basic concepts needed for placing the techniques and knowledge acquired in the student's other courses or research in the wider context of the natural sciences. Another aim is to provide the basic intellectual tools that allow for a reasoned and critical assessment of results and methods from the wide variety of disciplines that the student is likely to encounter during his or her continued career in research and/or in professional life.

The course is mainly focused on the general theoretical and methodological issues that arise in the natural and technological sciences; but basic theoretical issues, techniques and problems from the social sciences are also covered to provide the student with a wider outlook. Emphasis is placed on the fundamental problems common to the natural sciences and on the general strategies, methods and concepts that modern science has developed to address these problems.

After having completed the course, the student should, with regards to the theory and methodology of science, both orally as well as in writing, be able to:

- Identify definitions and descriptions of concepts, theories and problem areas, as well as identify the correct application of these concepts and theories.
- Account for concepts, theories and general problem areas, as well as apply concepts and theories to specific cases.
- Critically discuss the definitions and applications of concepts and theories as they applies to specific cases of scientific research.

Course contents

The following is an incomplete list of topics covered in the course.

- Scientific knowledge
- Hypothesis testing
- Observations and measurements
- Experiments
- Models
- Statistical reasoning
- Causes and explanations
- Qualitative methods
- Engineering design

Examination

- SEM1 - Seminar, 1.0 credits, grading scale: P, F
- TEN2 - Written exam, 2.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

A student may request a home exam, if it is not possible for the student to attend the written exam because the student is, at the point of the request, residing outside of Sweden and will be residing outside of Sweden for at least twelve months following the request. The examiner approves or denies these requests.

Transitional regulations

Former module TEN1 can be replaced by module TEN2

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.