AK2036 Theory and Methodology of Science with Applications (Natural and Technological Science) 7.5 credits

Vetenskapsteori och vetenskaplig metodik med tillämpningar (naturvetenskap)

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

Establishment

The official course syllabus is valid from autumn semester 2026 as decided by the Director of First and Second Cycle Education. Decision date: 2026-04-15

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Specific prerequisites

General requirements for master's programmes. Proficiency in English corresponding to English B / English 6 in Swedish gymnasium.

Intended learning outcomes

After having completed the course, the student should, with regards to the theory and methodology of science be able to:

· Identify definitions and descriptions of concepts, theories and problem areas, as well as identify the correct applications of these concept and theories.

· Account for concepts, theories and general problems areas, as well as apply concepts and theories to specific cases.

· Critically discuss the definitions and applications of concepts and theories as they apply to specific cases of scientific research.

These learning outcomes are examined via seminars, and in a written exam.

After having completed the course, the student should also be able to (applies to students that do not take the master's programme medical engineering (TMLEM):

· Summarise and present research reports or scientific articles in a way that makes them accessible to a non-expert audience.

· Account for standard structural and qualitative criteria for scientific writing and apply these to research reports or scientific articles.

· Identify and critically discuss specific theoretical and methodological problems in research reports or scientific articles.

These learning outcomes are examined in writing via a project part.

Students from the master's programme medical engineering (TMLEM) should be able to:

· Account for and apply the most common theories and methods of applied ethics and account for their relevance for medical technology.

· Carry out independent moral reflections concerning practical problems in the ethics of medical technology.

These learning outcomes are examined orally and in writing via a project part.

Course contents

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

- Scientific knowledge
- Definitions
- Hypothesis testing
- Observations and measurements
- Experiments

- Models
- Statistical reasoning
- Causes and explanations
- Engineering design
- Qualitative methods
- Research ethics
- Risk and risk assessment

The course consists of lectures, assignments, seminars, a project part, and a exam.

Examination

- SEM1 - Seminars, 1.5 credits, grading scale: P, F
- PRO1 - Project, 3.0 credits, grading scale: P, F
- TENB - Written exam, 3.0 credits, grading scale: A, B, C, D, E, FX, 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.

Other requirements for final grade

Fullfilled seminar requirements, project requirements and written exam.

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.