AK2040 Theory and Methodology of Science with Applications (Computational Science) 7.5 credits

Vetenskapsteori och vetenskaplig metodik med tillämpningar (beräkningsvetenskap)

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

Establishment

Course syllabus for AK2040 valid from Autumn 2011

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

180 ECTS credits university studies. Proficiency in English corresponding to English B in Swedish **gymnasium**.

Language of instruction

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

Intended learning outcomes

After completed course, the student should be able to

- account for and apply fundamental concepts from the theory and methodology of science on problem areas within the theory and methodology of science.
- account for fundamental theories concerning the epistemological and explanatory status of science.
- identify and critically discuss, both orally and in writing, fundamental theoretical and methodological issues in the technical, natural and social sciences.
- identify and critically discuss, both orally and in writing, specific metodological problems in a study, the design of an exeriment, the use of a particular method of measurement, or the use of a particular model.
- analyze the relationship between the basic results of a study and the conclusions that legitimately can be drawn on the basis of the results.
- identify and critically discuss fundamental theoretical and methodological problems within the student's area of study.
- accessibly present research reports and scientific articles within the student's own area of study to non-experts in that area.
- identify and critically discuss specific theoretical and methodological problems in research reports and scientific articles within the student's own area of study.

Course contents

- Scientific knowledge
- Hypothesis testing
- Causes and correlations
- Observations and measurements
- Experiments
- Models
- Laws and explanations
- Formalization and axiomatization
- The development of science
- Scientific writing
- Research ethics

Disposition

Lectures, seminars, and project work.

Course literature

To be announced at course start. The following literature has been used previously:

- Alex Rosenberg "Philosophy of Science: A Contemporary Perspective".
- Sven Ove Hansson "The art of being scientific" (compendium).
- Articles to be distributed during the course.

Equipment

None.

Examination

- SEM1 - Seminars, 1.5 credits, grading scale: P, F
- PRO1 - Project, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 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

Seminars (SEM1; 1.5 credits), written exam (TEN1; 3 credits), and project part (PRO1; 3 hp).

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.