



# ED1100 Engineering Science 7.5 credits

## Ingenjörsvetenskap

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

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

## Establishment

The official course syllabus is valid from autumn semester 2024 according to the decision of Director of First and Second Cycle Education: J-2024-0502. Date of decision: 2024-04-04

## Grading scale

P, F

## Education cycle

First cycle

## Main field of study

Electrical Engineering, Technology

## Specific prerequisites

Basic and specific requirements for engineering programmes.

## Language of instruction

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

## Intended learning outcomes

After passing the course, the student should be able to

- create mathematical models for given processes in the stages problem identification, assumptions, solution, interpretation, verification and implementation
- construct and graphically represent theoretical and empirical models from empirical data
- make estimates, check formulas and carry out dimensional analysis
- use the computer tools Python and Excel as support in problem-solving
- describe the main features of the historical development of technology and the natural sciences and discuss their relation
- constructively reflect on the role of male and female engineers in society
- show basic skills in communicating technology and natural sciences in writing and orally.

## Course contents

- The emergence of technology and the natural sciences.
- Dynamic models of processes in nature.
- Quantities, units and constants of nature
- Methodology for construction of mathematical models.
- Hypothetico-deductive research methodology.
- Dynamic iterative system, non-linear systems and chaos.
- Empirical and theoretical models.
- Use of derivatives in modelling.
- Graphic model fitting.
- The least squares and Chebyshev methods.
- Regression analysis of large data sets.
- Sources of errors in modelling.
- Estimates.
- Judging reasonableness.
- Analysis of edge cases.
- Proportionality.
- Dimensional analysis for checking computations and for finding new relations.
- Simulation.
- Differential equations in modelling.
- The computer tools Python and Excel.
- History of women's studies at higher technical education.

- Conceptions of the engineer.
- The roles of the engineer and the technology user from a gender perspective.
- Introduction to oral communication and scientific writing.

## Examination

- ANNA - Assignments, 4.5 credits, grading scale: P, F
- ANNB - Assignments, 1.5 credits, grading scale: P, F
- ANNC - Assignments, 1.5 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.

Grading is on P/F scale (pass-fail)

## Other requirements for final grade

Assignments, participation in seminars and lessons as well as presentations.

## 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.