SF1901 Probability Theory and Statistics 6.0 credits

Sannolikhetsteori och statistik I

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

Establishment

The official course syllabus is valid from the autumn semester 2026 as decided by the Faculty Board: dnr PA-2026-0014. Decision date: 2026-09-28

Grading scale

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

Education cycle

First cycle

Main field of study

Mathematics, Technology

Specific prerequisites

Basic differential and integral calculus.

Intended learning outcomes

To pass the course, the student should be able to do the following:

- construct elementary statistical models for experiments

- describe standard models and explain the applicability of the models in given examples
- define and calculate descriptive quantities like expectation, variance, and percentiles for distributions and data sets.
- with standard methods calculate estimates of unknown quantities and quantify the uncertainty in these estimates
- value and compare methods of estimation
- analyse how measuring accuracy affect conclusions and quantify risks and error probabilities when testing statistical hypothesis

To receive the highest grade, the student should in addition be able to do the following:

- Combine all the concepts and methods mentioned above in order to solve more complex problems.

Course contents

Basic concepts like probabilities, conditional probabilities and independent events. Discrete and continuous random variables, especially one dimensional random variables. Measures of location, scale and dependency of random variables and data sets. Common distributions and models: normal, binomial and Poisson distribution. Central limit theorem and Law of large numbers.

Descriptive statistics.

Point estimates and general methods of estimation as the method of maximum likelihood and least squares. General confidence intervals but specifically confidence intervals for mean and variance of normally distributed observations. Confidence intervals for proportions, difference in means and proportions.

Testing statistical hypothesis. Chi2-test of distribution, test of homogeneity and contingency. Linear regression.

Examination

- TEN1 - Examination, 6.0 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

Written examination.

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.