SF1911 Statistics for Bioengineering 6.0 credits

Statistik för bioteknik

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

Course syllabus for SF1911 valid from Spring 2020

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Language of instruction

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

Intended learning outcomes

To pass the course, the student should be able to

- solve problems that require knowledge about standard concepts and methods in probability theory
- solve problems that require knowledge about standard concepts and methods in statistics
- judge the applicability and limitations of different statistical methods and interpret statistical analyses of bioengineering data

Course contents

The course treats the most important practical statistical methods used in bioengineering and biomedical engineering and during the course these methods are implemented in software familiar to engineering students. The course focuses primarily on the practical aspects of statistics in biotechnology. Computer-aided exercise work with a variety of datasets constitutes an essential learning activity.

More specifically, the course contains the following topics:

- Bioengineering data and descriptive statistics, both visual and numeric presentation.
- Basic concepts such as probability, conditional probability and independent events. Bayes' formula. Discrete and continuous random variables, in particular one dimensional random variables. Measures of central tendency, dispersion and dependence of random variables and data sets. Common distributions and models, such as the normal, exponential, Poisson and uniform distributions. The Central limit theorem.
- Point estimates and general methods of estimation, such as maximum likelihood estimation and the method of least squares. Evaluation and comparison of point estimates, for example with respect to bias and efficiency. Confidence intervals and p-values. Two sample problems. Statistical hypothesis testing. Chi2-tests of goodness of fit, homogeneity and independence. Odds ratios. One- and two-way ANOVA. Design of experiments.

Specific prerequisites

- Completed course SF1524 Basic Numerical Methods and Programming.
- Completed course in Calculus in One Variable SF1625.

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.

Transitional regulations

During the academic year 2020/21 will re-registered students of previous academic years have the possibility to pass the course according to the previous course plan, that is , examination TEN1 with 6 credits. Starting with the academic year 2021/22, re-registered students

will be exanmined according to the recent version of the course plan, that is examination LABA (1.5 credits) and TENA (4.5 cedits).

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.