Statistics

Programme course

6 credits

Matematisk statistik

TNG006

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2017-01-25

Main field of study
Mathematics, Applied Mathematics

Course level
First cycle

Advancement level
G2X

Course offered for
- Electronics Design Engineering, M Sc in Engineering
- Communication and Transportation Engineering, M Sc in Engineering
- Media Technology and Engineering, M Sc in Engineering

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Calculus in several variables

Intended learning outcomes
The course is intended to teach students to understand and use basic probability and statistical theory, that is, the theory for dealing with random experiments. The emphasis is on developing the statistical background required for use in engineering, economy and natural sciences. After the course the students should be able to:

- Model and use both events and stochastic variables in different problems
- Use conditional probability
- Use the multiplication rule and combinations
- Good understanding, derivation and use of distribution functions
- Decide whether given random variables are independent
- Calculate the expected value and variance for functions of stochastic variables
- Use the Central Limit Theorem
- Point estimation by Maximum likelihood, moment and least squares methods
- Determine interval of confidence for mean and variance
- Testing a hypothesis
- Use regression analysis

Course content

- Probability theory: Sample space, events and probabilities. Combinatorics. Conditional probabilities and independent events. Discrete and continuous random variables, their probability distributions, expectations and variances. Normal, exponential, binomial, Poisson distributions etc. Functions of random variables. The central limit theorem.
- Statistics: Point estimation. Properties of estimators. The method of maximum likelihood, the method of moments and the least squares estimation. Confidence intervals. Testing statistical hypotheses. Simple linear regression.

Teaching and working methods

Lectures and sessions of exercises.

Examination

KTR1	Written test	0 credits	U, G
TEN1	Written examination	6 credits	U, 3, 4, 5

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för teknik och naturvetenskap

Director of Studies or equivalent

George Baravdish

Examiner

George Baravdish

Course website and other links

http://www2.itn.liu.se/utbildning/kurs/

Education components

Preliminary scheduled hours: 52 h
Recommended self-study hours: 108 h

Course literature

Gunnar Blom m. fl.: Sannolikhetsteori och statistikteori med tillämpningar. (Studentlitteratur) Problemsamling för kursen TNG006. Formelsamling i matematisk statistik (utgiven av ITN)

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.