Mathematical Statistics

Programme course

6 credits

Matematisk statistik

TAIU06

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

G1X

Course offered for

- Computer Engineering, B Sc in Engineering
- Chemical Analysis Engineering, B Sc in Engineering
- Mechanical Engineering, B 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, Linear Algebra.

Intended learning outcomes

This course intends to provide an introduction to mathematical modelling of random experiments and statistical theory/methodology. The course also illustrates applications, in particular within the fields of engineering and science. After completing the course the student should be able to:

- Identify simple experimental situations where random components can influence the result.
- Give an account of fundamental probabilistic concepts, such as random variable and distribution function.
- Construct relevant probabilistic models for simple random experiments.
- Compute important quantities in probabilistic models, such as probabilities and expected values.
- Give an account of fundamental concepts and methods within statistical theory, such as point estimator and confidence interval.
- Choose appropriate methods of analysis and apply these to simple probabilistic models that are constructed from observed data.
- Present conclusions drawn from performed calculations and judge the reasonableness of the conclusions.
- Use statistical software package.

Course content

Sample space, events and probabilities. Combinatorics. Conditional probability and independent events. Random variables and their probability distributions: exponential, normal, binomial och Poisson distributions. Expected value and standard deviation. Central limit theorem. Descriptive statistics. Point estimation of Expected value and standard deviation. Confidence interval and tests of hypotheses. Chi-square test. Simple linear regression. Engineering applications. Simulation.

Teaching and working methods

Lectures, problem classes and computer exercises.

Examination

LAB1	Computer Exercise	1 credits	U, G
TENA	Written Examination	5 credits	U, 3, 4, 5

Grades

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

Department

Matematiska institutionen

Director of Studies or equivalent

Ingegerd Skoglund

Examiner

Xiangfeng Yang

Course website and other links

http://courses.mai.liu.se/Lists/html/TAIU06-ing.html

Education components

Preliminary scheduled hours: 42 h
Recommended self-study hours: 118 h

Course literature

Jonsson, Dag/Norell Lennart: Ett stycke statistik. (Studentlitteratur).
Formelsamling i matematisk statistik utgiven av institutionen.

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.