Mathematical Statistics, first course

Programme course

6 credits

Matematisk statistik I, grundkurs

TAMS15

Valid from: 2017 Spring semester

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

Date determined
2017-01-25

Replaced by
TAMS80

Main field of study
Mathematics, Applied Mathematics

Course level
First cycle

Advancement level
G1X

Course offered for
- Mathematics, Bachelor´s Programme

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
Algebra and calculus, especially differentiation, integration, multiple integration and series.

Intended learning outcomes
The course gives an introduction to the mathematical modelling of random experiments, with a special emphasis on applications in science, technology, and economics. After completing the course the student will be expected to be able to:

- identify experiments where the result is influenced by random factors.
- describe the basic concepts and theorems of probability theory, e.g., random variable, density function, and the law of large numbers.
- construct suitable probabilistic models for random experiments.
- compute important quantities in probabilistic models, e.g., probabilities and expectations.
- construct and analyse probabilistic models for certain time-dependent randomly varying quantities, e.g. in form of time continuous Markov chains.
- follow a basic course in statistics.

Course content

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. Multidimensional random variables, covariance and correlation. Law of large numbers and the central limit theorem. Poissonprocesses. Birth- and death-processes. Brownian motion.

Teaching and working methods

Lectures and tutorials.

Examination

TEN1	Examination	6 credits	U, 3, 4, 5

Grades

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

Other information

Supplementary courses: Mathematical Statistics, second course. Queueing Theory. Probability Theory, second course. Stochastic Processes. Production and Operations Management. Financial Markets and Instruments.

Department

Matematiska institutionen

Director of Studies or equivalent

Ingegerd Skoglund

Examiner

Jörg-Uwe Löbus

Course website and other links

http://courses.mai.liu.se/GU/TAMS15

Education components

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

Course literature

Additional literature

Books

G. Blom, J. Enger, G. Englund, J. Grandell, L. Holst, *Sannolikhetsteori och statistikteori med tillämpningar* Studentlitteratur

Compendia

Institutionens formelsamling i matematisk statistik

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.