Mathematical Statistics

Programme course

6 credits

Matematisk statistik

TAMS27

Valid from: 2017 Spring semester

Determined by
Board of Studies for Computer Science
and Media Technology

Date determined
2017-01-25

Replaced by
TAMS42

Main field of study
Mathematics, Applied Mathematics

Course level
First cycle

Advancement level
G2X

Course offered for
- Computer Science 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
Series, Integral calculus (one and two variables), Linear algebra, differential calculus.

Intended learning outcomes
The course gives an introduction to mathematical modelling of experiments where the outcome is influenced by random factors. It is directed towards topics required for application in computer engineering. By the end of the course, the student should

- understand basic concepts in probability theory
- be able to set up relevant probability models for random experiments
- apply the techniques in the course to analyse these models

Course content
Sample space, events and probabilities. Elementary combinatorial probability. Conditional probability and independence. Discrete random variables and probability distributions, expectation and variance. Binomial, Poisson distributions etc. The Probability Generating Function. Continuous Random Variables. Uniform, Exponential and Normal Distributions. Functions of random variables. Moment Generating Function. Simulating a Random Variable. Sampling. The Law of Large Numbers. The Central Limit Theorem. Stochastic Processes: The Poisson Process, introduction to Markov chains.

Teaching and working methods
Teaching consists of lectures, tutorials and a computer laboratory.

Examination
TEN2	Written examination	6 credits	U, 3, 4, 5

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

Other information
Supplementary courses:
The course prepares the student for courses in:
Queueing Theory, which develops the queueing models and their applications.
Bayesian Networks, which discusses graphical modelling and algorithms for updating probabilities in causal networks.

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/TAMS27

Education components
Preliminary scheduled hours: 47 h
Recommended self-study hours: 113 h

Course literature
Sheldon Ross: A First Course in Probability, Pearson International Edition.
Exempelsamling utgiven av institutionen. Institutionens formelsamling i matematisk statistik. [Handbook of formulas published by the department.]

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.