

# 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://stydokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva](http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).