Probability, first course

Programme course

4 credits

Sannolikhetslära

TAMS14

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
- Biomedical Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, 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
Linear algebra, differential and integral calculus, series.

Intended learning outcomes
The aim of the course is to provide an introduction to the mathematical modelling of random experiments. The emphasis is on methods applicable to problems in engineering, economy and natural sciences. After completing the course the student should have the knowledge and skills required to:

- identify experimental situations where random factors may affect the results.
- construct relevant probabilistic models for simple random experiments.
- describe the basic concepts and theorems of probability theory, such as random variable, distribution function and the law of total probability.
- compute important quantities in probabilistic models, e.g., probabilities and expectations.
- follow a basic course in statistical theory.

Course content
Sample space, events and probabilities. Combinatorics. Conditional probabilities and independent events. Discrete and continuous random variables. Distribution functions, probability mass functions, probability density functions. Conditional distributions and independent random variables. Functions of random variables. Expectation, variance, standard deviation, covariance, correlation coefficient. Particular distributions, e.g., Gaussian, exponential, uniform, binomial and Poisson distributions. Law of large numbers and the central limit theorem. The Poisson process.

Teaching and working methods
Lectures and tutorials, dealing with theory and exercises.

Examination

TEN1	Written examination	4 credits	U, 3, 4, 5

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

Other information
Supplementary courses: Statistics, basic course. Stochastic Processes. Probability Theory, Second course. Probability and Bayesian Networks. Queueing Theory. Digital Image Processing. Signal Theory.

Department
Matematiska institutionen

Director of Studies or equivalent
Ingegerd Skoglund

Examiner
Torkel Erhardsson

Course website and other links
http://courses.mai.liu.se/GU/TAMS14

Education components

Preliminary scheduled hours: 38 h
Recommended self-study hours: 69 h

Course literature

G. Blom, J. Enger, G. Englund, J. Grandell, L. Holst: Sannolikhetsteori och statistikteori med tillämpningar. Studentlitteratur. Exempelsamling utgiven av institutionen. 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.