Probability, First Course

Programme course

4 credits

Sannolikhetslära

TAMS36

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

G1X

Course offered for

- Information Technology, 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

Calculus, algebra, differential and integral calculus, power 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 influence may affect the results.
- construct relevant probabilistic models for simple random experiments.
- describe basic concepts and theorems of probability theory, e.g., random variable, distribution function and the law of total probability.
- compute important quantities in probabilistic models, e.g., probabilities and expectations.

Course content

- Definition of probability
- Combinatorial methods
- Conditional probability and Bayes rule
- Discrete random variables, probability function, cumulative distribution function.
- Expected value, variance, covariance, correlation
- Special examples: Bernoulli, Binomial, Geometric, Hypergeometric, Negative Binomial, Poisson, and applications.
- Joint probability functions, conditional probability function, conditional expectation.
- Continuous random variables
- Special distributions: the exponential distribution, the normal distribution.
- Sampling and the Central Limit Theorem.
- The Poisson Process and applications.
- Scenarios illustrating applications of probability and statistics.

Teaching and working methods

Teaching consists of lectures and lessons dealing with theory and exercises together with work in PBL-group.

Examination

BAS1	Tutorial work	1 credits	U, G
TEN1	Written examination	3 credits	U, 3, 4, 5

Grades

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

Other information

Supplementary courses:
Statistics, 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/TAMS36

Education components

Preliminary scheduled hours: 52 h
Recommended self-study hours: 55 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.