Mathematical Statistics, First Course

Programme course

4 credits

Matematisk statistik, grundkurs

TAMS79

Valid from: 2017 Spring semester

Determined by
Board of Studies for Industrial Engineering and Logistics

Date determined
2017-01-25

Main field of study
Mathematics, Applied Mathematics

Course level
First cycle

Advancement level
G1F

Course offered for
- Industrial Engineering and Management, M Sc in Engineering
- Industrial Engineering and Management - 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
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 discrete 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. Law of large numbers and the central limit theorem. Poisson processes. Time discrete Markov chains.

Teaching and working methods
Lectures and tutorials.

Examination

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

Grades
Four-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/TAMS79

Education components
Preliminary scheduled hours: 40 h
Recommended self-study hours: 67 h

Course literature

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