Probability Theory, Second Course

Programme course

6 credits

Sannolikhetslära, fortsättningskurs

TAMS46

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

Second cycle

Advancement level

A1N

Course offered for

- Mathematics, Master's Programme
- Mathematics
- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering

Specific information

The course is offered every second year. It will not be available during 2017

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 and multivariate analysis. Basic courses in probability and statistics.

Intended learning outcomes

The course gives knowledge of probability theory at an advanced undergraduate level. After completing the course the student will be expected to be able to:

- describe advanced concepts and theorems of probability theory, e.g., different kinds of stochastic convergence and the Cramer-Slutsky theorem, and to prove some of the theorems.
- construct and analyse probabilistic models using advanced tools and methods, e.g., characteristic functions and conditioning.
- describe and prove some basic theorems of statistics.
- understand and assess probabilistic models and analyses occurring in other undergraduate courses, research reports, or the media.
- follow a graduate course in probability theory, and an advanced undergraduate course in statistics.

Course content

The transformation theorem. Conditioning. Probability generating function, moment generating function, characteristic function. Order statistics. The multivariate normal distribution, in particular orthogonal transformations and quadratic forms. Convergence concepts, e.g., convergence almost surely, in probability, in r-mean, and in distribution. The Borel-Cantelli lemma and the continuity theorem. The law of large numbers and the central limit theorem. The Cramer-Slutsky theorem.

Teaching and working methods

Teaching is performed in groups and consists of lessons dealing with theory and exercises.

Examination

TEN1	Written examination	6 credits	U, 3, 4, 5

Grades

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

Department

Matematiska institutionen

Director of Studies or equivalent

Ingegerd Skoglund

Examiner
Torkel Erhardsson

Course website and other links
http://courses.mai.liu.se/Lists/html/index-amne-matstat.html

Education components
Preliminary scheduled hours: 48 h
Recommended self-study hours: 112 h

Course literature

Additional literature

Books
Gut, A, (2009) *An Intermediate Course in Probability* 2nd ed

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.