



Course syllabus

Faculty Board of Science and Engineering
School of Computer Science, Physics and Mathematics

1MA201 Sannolikhetslära och statistik, 7,5 högskolepoäng
Probability Theory and Statistics, 7.5 credits

Subject Group

Mathematics

Level of classification

First Level

Progression

GIF

Date of Ratification

Approved by Organisational Committee 2009-12-01

The course syllabus is valid from autumn semester 2010

Prerequisites

Basic calculus, any course in multivariate analysis 7.5 hec.

Expected learning outcomes

The student shall be able to:

- Understand and describe the basic concepts in probability theory in particular the notions constituting Kolmogorov's axioms and the notion of independence
- Distinguish between independent and uncorrelated random variables
- Apply stochastic calculus
- Understand the different notions of convergence in probability theory in particular their relations
- Reproduce and apply the Laws of large numbers
- Understand the proof of the Central limit theorem and be able to apply the theorem
- Evaluate stochastic problems regarding a suitable distribution
- Understand and describe the basic concepts in statistics which are point estimates and statistical inference
- Interpret, communicate and discuss in probabilistic settings in particular solve assessment problems in small groups and present them to an auditorium.

Content

The course contents is:

Sample space, event, and probability distribution, the notion of independence, conditional probability, discrete and continuous distributions, distributions functions, one and higher dimensional random variables, moments, moment generating and characteristic functions, conditional expectation, joint and marginal distributions, basic notions of convergence in probability theory, the Law of large numbers, the Central limit theorem.

Point estimates and statistical inference.

Type of Instruction

Lectures and seminars. Compulsory assignments may be given during the course.

Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

The student's knowledge is assessed in the form of oral and/or written examinations. The principal assessment method for the course is determined at the beginning of the course.

On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

Course Evaluation

After the course a written evaluation of the course will take place according to the University guidelines.

Required Reading and Additional Study Material

Required reading

Bertsekas, Dimitri P. Tsitsiklis, John N., *Introduction to Probability*, Athena Scientific, Belmont, Massachusetts, 2002. 544 pages.