



## Course syllabus

Faculty of Technology

Department of Mathematics

1MA501 Sannolikhetslära och statistik, 7.5 credits  
Probability Theory and Statistics

**Main field of study**

Mathematics

**Subject Group**

Mathematics

**Level of classification**

First Level

**Progression**

G1F

**Date of Ratification**

Approved by Faculty of Technology 2014-10-03

The course syllabus is valid from autumn semester 2015

**Prerequisites**

Calculus I 7.5 credits (1MA402, 1MA102).

### Objectives

After completing the course, the student should be able to 1. solve problems, perform calculations, and conduct lines of reasoning within the part of mathematics that is covered by the course, and to communicate those solutions, calculations, and reasonings in writing, in particular

- describe the basic concepts of probability theory ; in particular concepts of Kolmogorov 's axiomatics and the concept of ' independent '
- explain the difference between uncorrelated and independent random variables
- use of stochastic methods of calculation
- explain and use the law of large numbers and the central limit theorem
- analyze stochastic problems with regard to different distributions
- understand and use basic concepts in statistics : point estimation , interval estimation and hypothesis testing

2. With a smaller amount of guidance implement a computer lab in the basic probability theory and statistics, and analyze the results of the lab with a written report within the specified time limits.

## Content

The course content comprises to:

Sample space, events, 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, confidence intervals, hypothesis testing.

Point estimates and statistical inference.

## Type of Instruction

Lectures, exercises, and computer lab.

## Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

Assessment of how well the student fulfills the objectives is achieved through

- written exam
- computer based laboratory assignment

## Course Evaluation

A course evaluation will be carried out and compiled after the course is completed. The compilation will be presented to the current board as well as to the students and filed.

## Credit Overlap

The course cannot be included in a degree along with the following course/courses of which the content fully, or partly, corresponds to the content of this course: 1MA201 Probability Theory and Statistics, 7.5 credits

## Other

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

## Required Reading and Additional Study Material

### Required reading

R E Walpole, R H Myers, S L Myers, K Ye, Probability & Statistics for Engineers and Scientists, Pearson, latest edition