



COURSE SYLLABUS

Matematisk statistik

Mathematical Statistics

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: MS1411

Educational level: First cycle

Course level: G1F

Field of education: Natural sciences

Subject group: Mathematics

Subject area: The course is not part of a main field of study at BTH.

Version: 11

Applies from: 2017-09-04

Approved: 2017-09-04

Replaces course syllabus approved: 2016-12-20

1 Course title and credit points

The course is titled Mathematical Statistics/Matematisk statistik and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval

This course is established by 2015-09-30. The course syllabus was revised by Head of Department of Mathematics and Natural Science and applies from 2017-09-04.

Reg.no: BTH-4.1.1-1790-2017.

3 Objectives

The purpose of the course is to obtain knowledge in probability theory as well as statistical theory and methods. Emphasis lies in probability theory and stochastic processes with technical applications.

4 Content

- Combinatorics
- Discrete and continuous stochastic variables in one dimension
- Orientation about multivariate stochastic variables, independence
- Various distributions, especially geometric, binomial, exponential, Poisson and normal (Gaussian) distributions as well as approximations
- Expected value, variance, standard deviation, covariance, correlation
- Markov chains
- Markov processes in continuous time with applications in reliability theory
- Point estimation including the ML-method
- Interval estimation
- Hypothesis testing
- Simple linear regression
- Applications in different technical fields

5 Aims and learning outcomes

Knowledge and understanding

After completion of the course, the student should:

- master fundamental calculations with common one- and two-dimensional distributions, normal approximation included, as calculation of the mean, variance, standard deviation and hazard function.
- master the calculation of reliability of series and parallel circuits.
- know basic probability theory including basic theory for Markov processes.
- know statistical principles for point and interval estimation, tests of hypotheses and linear regression.
- know some of the most important applications of probability theory and statistical theory.

Skills and abilities

After completion of the course, the student should:

- be able to solve simple problems in reliability theory.
- be able to formulate and solve statistical problems in written form.
- know some of the most important terms of probability theory and statistical theory.

Judgement and approach

After completion of the course, the student should:

- be able to analyse, perform synthesis and to evaluate the results from a reasonability perspective.

6 Learning and teaching

Teaching is conducted through lectures and exercises. The course assumes that the student independently solves exercises throughout the course.

English

7 Assessment and grading

Examination of the course

Code	Module	Credit	Grade
1705	Examination	7.5 ECTS	A-F

The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Fail,

supplementation required, F Fail.

8 Course evaluation

The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

9 Prerequisites

15 ECTS in Mathematics accomplished.

10 Field of education and subject area

The course is part of the field of education and is not part of a main field of study at BTH.

11 Restrictions regarding degree

The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

12 Course literature and other teaching material

Walpole, R.E., Myers, R.H., Myers, S.L. & Ye, K. (2012 or later). Probability and Statistics for engineers and scientists. 9:th edition or later. Pearson. ISBN 0-321-74823-9.

Material from the Department of Mathematics and Natural Science.

