



# IX1501 Mathematical Statistics

## 7.5 credits

### Matematisk statistik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

### Establishment

Course syllabus for IX1501 valid from Autumn 2019

### Grading scale

A, B, C, D, E, FX, F

### Education cycle

First cycle

### Main field of study

Mathematics, Technology

### Specific prerequisites

Entrance qualifications:

- IX1303 - Algebra och Geometry
- IX1304 - Calculus

# Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

### General Objectives

After course completion the student should be able to:

- formulate, analyze and solve problems in statistics significant to in the ICT sphere.
- apply and develop statistical models with the aid of mathematical programming language.
- review and comment a given solution to a problem.
- comment domain and propose improvements to a statistical model.
- make presentations of solutions of a statistical problem.

### Detailed Objectives

After course completion the student should be able to:

- apply basic stochastic models and use these to determine summary measures and probabilities.
- use normal approximation according to CLT.
- apply basic statistical models to an experiment.
- specify a standard model and comment the fitness for given data.
- describe data with summary measures, such as mean, variance and covariance.
- present data graphically in a suitable way.
- compute point estimates and confidence intervals.
- estimate error risks in hypothesis testing.
- compute correlation and regression line.

## Course contents

Probability theory: probability, conditional probability, independence one-dimensional random variables briefing about multi-dimensional random variables common distributions-measures (location, spreading and dependence) Law of Large Numbers, Central Limit Theorem Statistics: point estimates, confidence interval hypothesis test regression analysis, correlation, graphical presentation of data.

## Disposition

The teaching method is problem oriented and computer aided. The education time is evenly distributed among the three main topics

- conceptual understanding and modelling

- algorithms
- conclusions and synthesis

## Examination

- INLA - Assignment, 3.5 credits, grading scale: P, F
- TENA - Written exam, 4.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

The examiner decides, in consultation with KTH's coordinator for disabilities (Funka), about possible adapted examination for students with documented, permanent disabilities. The examiner may permit other examination format for re-examination of individual students.

## Other requirements for final grade

- Written exam (TEN1; 3,5 credits)
- Problem assignments (INL1; 4,0 credits)

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.