# DD2447 Statistical Methods in Applied Computer Science 6.0 credits

## Statistiska metoder i datalogin

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

## Establishment

The official course syllabus is valid from the autumn semester 2022 in accordance with the decision from the head of school: J-2022-0549.Decision date: 22/03/2022

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Computer Science and Engineering

## Specific prerequisites

Knowledge in algebra and geometry, 7.5 higher education credits, equivalent to completed course SF1624.

Knowledge in one variable calculus, 7.5 higher education credits, equivalent to completed course SF1625.

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Knowledge in probability theory and statistics, 6 higher education credits, equivalent to completed course SF1910-SF1924/SF1935.

Knowledge and skills in programming, 6 higher education credits, equivalent to completed course DD1310/DD1311/DD1312/DD1314/DD1315/DD1316/DD1318/DD1321/DD1331/DD1337/DD100N/ID1(

Knowledge in algorithms and data structures, at least
6 higher education credits, equivalent to completed course DD1320/DD1321/DD1325/DD1326/DD1327/DD2325/ID1020/ID1021.

Active participation in a course offering where the final examination is not yet reported in LADOK is considered equivalent to completion of the course.

Being registered for a course counts as active participation.

The term 'final examination' encompasses both the regular examination and the first re-examination.

## Language of instruction

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

## Intended learning outcomes

After passing the course, the student shall be able to

- explain and justify several important methods for machine learning
- give an account of several types of methods and algorithms that are used in the field of sample-based inference methods
- implement several types of methods and algorithms that are used in the field based on a high-level description
- extend and modify the methods that the course deals with

in order to be able to make a degree project in sample-based inference methods.

## Course contents

- Generative models.
- Bayesian inference.
- Probabilistic programming.
- Graphical models.
- Concealed Markov models with continuous states.
- Particle filters.

- Monte Carlo estimation.
- Sequential Monte Carlo.
- Markov Chain Monte Carlo.
- Clustering.
- The Dirichlet process.

# Examination

- INL1 - Assignment, 6.0 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.

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

# Other requirements for final grade

Written assignments and a project (INL1; 6 higher education 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.