



# ID2214 Programming for Data Science 7.5 credits

## Programmering för data science

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 ID2214 valid from Autumn 2018

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Computer Science and Engineering

## Specific prerequisites

Admitted to the Master's (120 credits) programme at KTH in the main field of study.

## Language of instruction

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

## Intended learning outcomes

The student is expected to be able to on completion of the course:

- apply methods to import combine and convert data to appropriate format for data analysis
- explain, implement and apply algorithms for supervised and unsupervised machine learning
- explain, implement and use evaluation methods and performance measurements for supervised and unsupervised machine learning
- apply methods to visualise and draw conclusions of results of data analysis.

## Course contents

- Syntax and semantics for programming languages that are particularly suited for data science, e.g. Python, Julia.
- Routines for importing, combining, transforming and selecting data.
- Algorithms for handling missing values, discretisation and dimensionality reduction.
- Algorithms for supervised machine learning, e.g. naïve Bayes, decision trees, random forests.
- Algorithms for unsupervised machine learning e.g. k-means clustering.
- Libraries for data analysis.
- Evaluation methods and performance metrics.
- Visualising and analysing results.

## Course literature

I. Witten, E. Frank, M. Hall and C. Pal, **Data Mining: Practical Machine Learning Tools and Techniques (4th ed.)**, Morgan Kaufmann, 2016 ISBN: **9780128042915**.

J. VanderPlas, Python Data Science Handbook: Essential tools for working with data (1st ed.), O'Reilly Media Inc., 2016 ISBN: 9781491912058.

## Examination

- INL1 - Assignment, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 3.0 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.

Written examination. Written assignments.

## **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.