ID2214 Programming for Data Science 7.5 credits

Programmering för data science

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

Establishment

Course syllabus for ID2214 valid from Autumn 2019

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

Having passed the course, the student should be able to:

- account for and discuss the application of i) technologies to convert data to appropriate format for data analysis ii) algorithms to analyse data through supervised and unsupervised machine learning as well as iii) technologies and performance measurements for evaluation of data analysis results
- implement and apply i) technologies to convert data to an appropriate format for data analysis ii) algorithms for supervised and unsupervised machine learning as well as iii) technologies and performance measurements for evaluation of data analysis results.

Course contents

Syntax and semantics for programming languages that are particularly suited for data science, e g Python.

Routines to import, combine, convert and make selection of data.

Algorithms for handling of 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 clustering of k-means.

Libraries for data analysis.

Evaluation methods and performance measures.

Visualisation and analysis of results of data analysis.

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.

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

Written examination. Written assignments.

In agreement with KTH´s coordinator for disabilities, it is the examiner who decides to adapt an examination for students in possess of a valid medical certificate.. The examiner may permit other examination forms at the re-examination of few students

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.