FSK3538 Data-driven Life Sciences 7.5 credits

Datadriven biovetenskap

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

Establishment

Course syllabus for FSK3538 valid from Spring 2022

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Enrolled PhD student.

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 should be able to:

- describe the field of data-driven life sciences, including an overview of the different application areas, and give examples of applications and their associated analysis methods
- apply statistical analysis and machine learning analysis to biological data sets and formulate models of biological phenomena
- present and review scientific literature in the field of computer-driven life sciences
- reflect on ethical consequences of data-driven life sciences and describe good practice around the computer life cycle (collection, handling, sharing and analysis)

Course contents

The course aims to introduce students to the field of computer-driven life sciences by letting them learn about their different application areas.

This course will introduce the student to data sets of different types, such as genomics, proteomics, metabolomics, transcriptomics, biomolecular structure, molecular dynamics simulations, imaging, video / audio recording, organism and habitat monitoring, population scale genetics, biobanks. Models of the biological phenomena and the related scientific breakthroughs based on the analysis of such data sets will be presented, analyzed and discussed.

Analysis techniques that will be introduced and used in this class belong to machine learning, artificial intelligence, other computational techniques for statistical analysis. In addition, visualization techniques will be introduced and discussed.

Another important aspect that will be introduced and discussed is related to ethics for data collection, management, analysis and sharing. The students will be specially trained in good practice related to computer-driven life sciences.

Examination

- LAB1 - Computer lab, 2.0 credits, grading scale: P, F
- PRO1 - Project, 5.5 credits, grading scale: P, 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.

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.