Bioinformatics

Single subject and programme course

6 credits

Bioinformatik

732A51

Valid from: 2015 Autumn semester

Determined by
The Quality Board at the Faculty of Arts and Sciences

Date determined
2014-11-18

Main field of study
Statistics

Course level
Second cycle

Advancement level
A1N

Course offered for
- Master's Programme in Statistics and Machine Learning

Entry requirements
- 180 ECTS credits passed including 90 ECTS credits in one of the following subjects:
    - mathematics
    - applied mathematics
    - statistics
    - bioinformatics
      or
    - computer science
- Passed courses in:
    - statistics, basic course
    - computer science, basic course
- English corresponding to the level of English in Swedish upper secondary education (Engelska 6)
  Exemption from Swedish

Intended learning outcomes
After completion of the course the student should on an advanced level be able to:
- account for concepts in molecular biology and apply various techniques used for generating data.
- accoount for major algorithms and principles of statistical models used for analysis of high-dimensional molecular data.
- apply some of the most important bioinformatics and statistical software tools to real molecular data examples.

Course content

The course introduces basic molecular biology concepts and how to analyze data with bioinformatics and statistics. More specifically, the course includes:

- Basics of molecular biology and genetics
- Hidden Markov models, genetic sequence analysis
- Sequence similarity, sequence alignment
- Phylogeny reconstruction
- Quantitative trait modelling
- Microarray analysis
- Network biology

Teaching and working methods

The teaching comprises lectures and computer exercises. The lectures are devoted to presentations of concepts and methods. The computer exercises provide practical experience of bioinformatics and statistical software usage for analysis of molecular genetic data. Homework and independent study are a necessary complement to the course. Language of instruction: English

Examination

Written reports on computer exercises. One final written or oral examination. Detailed information about the examination can be found in the course's study guide.

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it. If the coordinator has instead recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

Students failing an exam covering either the entire course or part of the course twice are entitled to have a new examiner appointed for the reexamination.

Students who have passed an examination may not retake it in order to improve their grades.

Grades

ECTS, EC

Other information

Planning and implementation of a course must take its starting point in the wording of the syllabus. The course evaluation included in each course must therefore take up the question how well the course agrees with the syllabus.

The course is carried out in such a way that both men´s and women´s experience and knowledge is made visible and developed.

Department

Institutionen för datavetenskap