

Bioinformatics

Bioinformatik

6 credits

Single subject and programme course

732A51

Valid from: 2024 Autumn semester

Determined by	Main field of study	
The Quality Board at the Faculty of Arts and Sciences	Statistics	
Date determined	Course level	Progressive specialisation
2014-11-18	Second cycle	A1F
Revised by	Disciplinary domain	
Chairman of the Course and Programme Syllabus Board at the Faculty of Arts and Sciences	Technology	
Revision date	Subject group	
2024-04-23	Statistics	
Offered first time	Offered for the last time	
Autumn semester 2015		
Department	Replaced by	
Institutionen för datavetenskap		

Course offered for

- Master's Programme in Statistics and Machine Learning

Entry requirements

- Bachelor's degree equivalent to a Swedish Kandidatexamen of 180 ECTS credits in one of the following subjects:
 - statistics
 - mathematics
 - applied mathematics
 - computer science
 - engineering
- Completed courses in
 - calculus
 - linear algebra
 - statistics
 - machine learning
 - programming
- English corresponding to the level of English in Swedish upper secondary education (Engelska 6)
Exemption from Swedish
- At least 30 ECTS credits passed from semester 1 and 2 Master's Programme in Statistics and Machine Learning, including the course Machine Learning 9 ECTS credits, or the equivalent

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.
- account 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 special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

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 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.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

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 conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.