Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Syllabus

BK0001.1 Bioinformatics, 15.0 credits

Bioinformatik

Version 1 in Slukurs. Corresponds to version 1 in Ladok

Syllabus approved

12 November 2020

The version applies to students admitted from autumn 2021

The version is not a module version

Subjects

Bioinformatic

Education cycle

Second cycle

Modules

Title	Code	Credits
Project	0102	5.0
Exam	0103	10.0

Advanced study in the main field

Second cycle, only first-cycle courses as entry requirements (A1N)

Grading scale

5:Pass with Distinction, 4:Pass with Credit, 3:Pass, U:Fail
The requirements for attaining different grades are described in the course assessment criteria which are contained in a supplement to the course syllabus. Current information on assessment criteria shall be made available at the start of the course.

Language

English

Prior knowledge

180 credits at first cycle, of which
• 60 credits biology of which 15 credits cell biology or molecular genetics or genetics
or
• 60 credits animal science of which 15 credits cell biology or molecular genetics or genetics
or
• 60 credits agricultural sciences of which 15 credits cell biology or molecular genetics or genetics
or
• 60 credits equine science of which 15 credits cell biology or molecular genetics or genetics
or
• 60 credits veterinary nursing of which 15 credits cell biology or molecular genetics or genetics
or
• 60 credits veterinary medicine of which 15 credits cell biology or molecular genetics or genetics
or
• 60 credits computer science and 7,5 credits cell biology or molecular genetics or genetics

and English 6

Objectives

The course aims to give a solid basis in basic bioinformatic methods. It covers the theories, algorithms and practical applications of computer-based methodology for the analysis of DNA/protein sequences, protein structures, and data produced by large-scale methods for understanding interactions of different biomolecules.

On completion of the course, the student should be able to:
- account for the fundamental concepts within bioinformatics
- independently carry out homology analyses of both protein - and DNA sequences and interpret the results

- use the most common commands in Unix/Linux,
- use the most common commands in R,
- independently build a "workbench" for bioinformatics with publically available softwares suited to the own needs,
- use biological databases
- describe technologies within High Troughput Sequencing (HTS or NGS) and methods for the analysis of expression data that have been retrieved with RNAseq technology,
- management and anlalysis of large scale data sets,
- manage the use of software solutions in computer clusters and cloud services.

Content

The course covers bioinformatic methods such as theories, algorithms and practical applications in computer-based methodology for the analysis of DNA/protein sequences, protein structures, annotation of genomes, metagenomics. The course also covers theories for the analysis of RNAseq expression data and different analytical methods within High Troughput Sequencing (sometimes called NGS).

Topics to be covered includes: biological databases, biostatistics, homology analyses, gene analyses (emphasis on open source softwares), web-based analytical tools, Unix OS, R, comparative genomics, functional genomics, metagenomics, molecular evolution, RNAseq expression analysis, management of large amounts of data, principles for the use of computer clusters, and cloud services and annotation of new genomes.

The course is based on lectures, exercises, project work and laboratory sessions. Apart from the written and the oral examination, compulsory components occur within e g exercises, project work and laboratory sessions.

Formats and requirements for examination

Passed written and oral examination. Passed participation in compulsory course modules.

- If the student fails a test, the examiner may give the student a supplementary assignment, provided this is possible and there is reason to do so.
- If the student has been granted special educational support because of a disability, the examiner has the right to offer the student an adapted test, or provide an alternative assessment.

- If changes are made to this course syllabus, or if the course is closed, SLU shall decide on transitional rules for examination of students admitted under this syllabus but who have not yet passed the course.
- For the examination of a degree project (independent project), the examiner may also allow the student to add supplemental information after the deadline. For more information on this, please refer to the regulations for education at Bachelor's and Master's level.

Additional information

- The right to take part in teaching and/or supervision only applies to the course date to which the student has been admitted and registered on.
- If there are special reasons, the student may take part in course components that require compulsory attendance at a later date. For more information on this, please refer to the regulations for education at Bachelor's and Master's level.

Responsible department

Department of Animal Breeding and Genetics

Supplementary Information

Finalized by: Programnämnden för utbildning inom veterinärmedicin och husdjur (PN - VH)
Replacement course: Ersätter: BI1324