Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

## Syllabus

## BI1218.1 Genome Analysis, 10.0 credits

### Genomanalys

The course is given Agricultural Science Programme - Animal Science (270 hec), Biotechnology - Master´s Programme, Agriculture Programme (admission before 1 July 2007) and Animal Science - Master´s Programme and as course independent of study programme

Syllabus discontinued 8 June 2016

Version 1 in Slukurs. Corresponds to version 1 and 2 in Ladok

### Syllabus approved

3 October 2013

The version applies to students admitted from autumn 2014

The version is not a module version

### Subjects

Biology/Animal science

### Education cycle

Second cycle

### Modules

| Title | Code | Credits |
|---|---|---|
| Single module | 0101 | 10.0 |

### Advanced study in the main field

Second cycle, has only first-cycle course/s 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

English B at upper-secondary level or the equivalent. Knowledge equivalent to 120 credits of which 90 credits animal science/biology or the equivalent. Genetics should be included.

## Objectives

The course intends to provide an advanced knowledge of methods for studies of eukaryotic and prokaryotic genome and about structure and evolution of these genome. The course contents is directed towards genome analysis on domestic animal and plants. Method and theory will be applicable on the majority organisms.

On completion of the course, the student should be able to:
- in detail describe structure and evolution of different eukaryotic genomes and genes and how the genes are regulated
- apply basic statistics relevant to genome analysis
- describe genetic recombination and its applications within genome analysis
- in detail describe various types of genetic variation and current methods for the analysis of DNA sequence variation
- describe principles of how one delineates through (including whole-genome sequencing) and how one uses genetic mapping respective "reverse genetics" to identify genes that cause hereditary diseases, the defence of plants regulates or controlled other important phenotypic properties
- use laboratory methods within molecular genetics or bioinfomatic methodology
- describe different methods for mapping of genes (including quantitative properties, QTL-analys)
- describe epigenetic signatures and methods for the analysing of these
- apply basic molecular pfylogenomic and evolutionary analysis
- describe different procedures for functional analysis of genes and DNA sequence

variation
- integrate knowledge in genetics, molecular genetics and biotechnology to solve complex problems of relevance for genome analysis
- independently search, summarise, interpret and review scientific articles about genetics, molecular genetics and genomics critically
- describe at a general level what bioinformatics is and its importance within genome research.

**Content**

The content focus on genome research on animal and plants. Both laboratory and theoretical learning is also directly applicable within, for example, the human genetics. Genome research is under fast development, and the course is based on current methodology and research. The following group discussions or computer exercises (C.E) are included in the course:
- Plant genomics
- Genetic variation
- Molecular Phylogenomic (C.E)
- Gene mapping
- Genome-wide association analysis (GWAS) (C.E)
- Genome-wide association and quantitative trait loci (QTL) analysis
- Annotation and copy-number variation analysis (C.E)
- Epigenetics

**Formats and requirements for examination**

Passed written examination and approved oral presentation of laboratory part and approved participation in compulsary laborations, group discussions and computer exercises.

- 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.

### Transitional regulations

• Exams: At least three retake sessions (renewed exams) must be offered within two years of the last course iteration.
• Compulsory elements: At least one opportunity for a retake session must be offered within two years of the last course iteration.

### Additional information

It is assumed that the student has knowledge of basic genetic mechanisms (the structure of the genetic make-up, replication, transcription), RNA-processing, translation, regulation of gene expression, general genetics and population genetics.

- 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:* Nämnden för utbildning på grund- och avancerad nivå, Fakulteten för veterinärmedicin och husdjursvetenskap
*Biology Area:* Genetics
*Replacement course:* BI0962