Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Syllabus

BI0962.1 Genome Analysis, 10.0 credits

Genomanalys

The course is given as course independent of study programme

Syllabus discontinued 5 November 2014

Version 1 in Slukurs. Corresponds to version 1 in Ladok

Syllabus approved

2 June 2008

The version applies to students admitted from autumn 2008 to autumn 2013

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

Knowledge equivalent to English B from upper secondary school. Knowledge corresponding to 120 credits including 90 credits Biology or Animal Science. 20 credits Cell Biology, Molecular Genetics, Genetics, Genetic Engineering / Animal or Plant Breeding is a requirement.

Objectives

The course is expected to provide advanced knowledge concerning methodologies for studies on prokaryotic and eukaryotic genomes, as well as advanced knowledge of genome organization and genome evolution. The contents of the course include genome analysis of domestic animals, plants and prokaryotic organisms. Methodological and theoretical aspects of the course are applicable to all organisms.

After completion of the course, the student should be able to:
- comprehensively describe organization and evolution of different procaryotic and eucaryotic genomes
- describe projects concerning complex genomes
- understand the principles for genome mapping and how different mapping techniques are used to identify genes underlying diseases, plant defense or control of phenotypic traits in both animals and plants
- use laboratory methods to define genetic variation at the molecular level
- integrate knowledge in genetics and biotechnology to solve complex problems of relevance for genome analysis
- independently search for, summarize, interprete and critically assess scientific articles in genetics, molecular genetics and genomics
- discuss ethical issues related to the genetics of complex traits and formulate his/her own point of view and argue for it in writing and orally
- summarize the importance of and how bioinformatics can be used in genome analysis.

Content

The contents of the course are to a large extent built upon genome analyses on animals, plants and prokaryotic organisms. Both the experimental and theoretical aspects of the course are however, applicable also in human genetics. Genome

science is evolving rapidly and the course is based on recent research developments in methodologies and theories.

The following parts are covered in the course:
- Genetic markers (microsatellites, Minisatellites and SNPs, DNA sequence analysis
- Genetic mapping including "genome-wide association mapping", construction of genetic maps, methods and computer programs for linkage analysis and positional cloning
- Physical mapping (fluorescence in situ hybridization (FISH), somatic cell hybrid panels, PFGE, BAC contigs and genome sequencing)
- Molecular evolution (genome evolution, Phylogenetic analyses, selection at the molecular level)
- Molecular disease genetics and functional genomics (mapping, cloning, diagnostics and phenotypic characterization)
- QTL analysis (mapping of genes influencing complex quantitative traits)
- Introduction to genetically modified organisms (GMO) including animals, plants and micro organisms (techniques covered: microinjection, plants transformation and gene targeting)
- Ethical aspects of genome analysis
- Basic bioinformatics

Implementation

Lectures are combined with tutored exercises, group exercises, computer exercises and an independent advanced assignment.
Lectures and seminars about 40 hours
Laboratory work about 80 hours (compulsory)
Tutored exercises about 10 hours
Group exercises about 15 hours (compulsory)
Computer exercises about 20 hours (compulsory)
Literature assignment about 20 hours (about 5 hours compulsory)
Examination and evaluation about 10 hours
Independent work and literature studies about 75 hours

Formats and requirements for examination

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- 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: Grundutbildningsnämnden, Fakulteten för veterinärmedicin och husdjursvetenskap
Biology Area: Genetics
Replacement course: BI0413, BI0636 och BI0351