Swedish University of Agricultural Sciences

P000042, Analysis of Genomes, 7.5 Hp

Syllabus

Finalized by: Fun-VH, 2023-04-18

Valid from: 2023H

Level within study regulation:

Third cycle

Subject:

- Bioinformatics
- Biology

Grading scale:

Pass / Failed

Course language:

Swedish

Entry requirements:

Admitted to a postgraduate program in animal science, biology, veterinary medicine, food science, nutrition, nursing, or related subjects, or to a residency program in veterinary science.

Objectives:

The course intends to provide advanced knowledge of theory and methods for analysis of eukaryotic genomes, including their organization and evolution. There is a focus on animal genomics, but theoretical and methodological aspects of the course are applicable on many different organisms.

On completion of the course, the student should be able to:

- navigate and utilise available genomic data,
- design PCR-primers and -probes, and optimize PCR,
- perform DNA sequencing and analyse obtained data,
- detect and analyse sequence variation,
- predict functional consequences of genomic variation,
- describe and explain state of the art and large-scale methods to analyse genetic variation (eg. whole genome sequencing), and gene expression analysis (eg. RNA-seq),
- apply and use basic molecular genetic laboratory and bioinformatics methods,
- efficiently and systematically plan a genomic laboratory project,
- independently search for, summarize, interpret, and critically assess scientific articles in genetics, molecular genetics, and genomics,
- integrate knowledge in molecular genetics, and laboratory methodology to solve complex problems of relevance for genome analysis,
- discuss how the content of the course is relevant to the student´s own research project.

Content:

The course is based on lectures, group discussions, exercises, and wet laboratory. The contents build largely on animal genome research. Theoretical teaching is for the most part directly applicable also within for example human or plant genetics. Genome science is rapidly evolving, and the course is based on current state-of-the-art methodology and research.

A large part of the course involves wet laboratory training including exercises and a laboratory project.

Computer exercises and group discussions will cover:

- genome sequence variation,
- genome browsing,
- primer design,
- sequence analysis,
- high throughput sequencing methodology

The aim of the computer exercises is to give the students useful tools for basic genetic and genomic analyses. Therefore, the computer exercises use free and open-source software that the student can download and use on their own laptop. In addition to the written and the oral examination, compulsory components occur within eg. exercises, group assignments and laboratory sessions.

Modes of assessment:

Passed participation including oral presentations and written reports in compulsory course modules. Written and oral examination. - If a student has failed an examination, the examiner has the right to issue supplementary assignments. This applies if it is possible and there are grounds to do so.

- The examiner can provide an adapted assessment to students entitled to study support for students with disabilities following a decision by the university. Examiners may also issue an adapted examination or provide an alternative way for the students to take the exam.
- If this syllabus is withdrawn, SLU may introduce transitional provisions for examining students admitted based on this syllabus and who have not yet passed the course.
- For the assessment of an independent project (degree project), the examiner may also allow a student to add supplemental information after the deadline for submission. Read more in the Education Planning and Administration Handbook.

Organisation:

Department of Animal Breeding and Genetics

Supplementary information

Other information:

- The right to participate in teaching and/or supervision only applies for the course instance the student was admitted to and registered on.
- If there are special reasons, students are entitled to participate in components with compulsory attendance when the course is given again. Read more in the Education Planning and Administration Handbook.