Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

SLUkurs

Syllabus

PFG0043 Quantitative Genetics, 4.0 credits

Syllabus approved

2013-12-10

Subjects

Biology

Education cycle

Third cycle

Grading scale

Pass / Failed
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

Basic statistics and genetics or equivalent

Objective, including learning outcomes

The course will cover the general concept of quantitative genetics for plant and animal breeding and the latest developments in genomic breeding. By the end of the course, students will be able to:

• Estimate variance components and calculate functions of variance components (e.g., heritability, genetic correlations) from different statistical models
• Understand the linear mixed models theory and applications to plant and animal breeding
• They will be able to estimate genetic relationships between individuals using pedigree and DNA markers
• Participants will learn computing skills and software
• They will be able to analyze large and complex data for predictions of genetic merit

Implementation
Scheduled activities:
Lectures and software demonstration 45 h
Examination and course evaluation 15 h
Self studies 50 h
Totally 110 h

Content

1. Introduction to ASReml, R software
2. Variance components, heritability and selection
3. Linear mixed models theory
4. Variance-covariance structures in mixed models
5. Genetic relationships among individuals
6. Breeding values (Additive)
7. Breeding values (Non-additive)
8. Multivariate models, correlated response
9. Spatial Analysis
10. Modeling genotype by environment and analysis of multi environment trials
11. Explanatory marker data analysis
12. Marker-trait association
13. Realized genomic relationships and GBLUP
14. Genomic selection

Requirements for examination

Assignments (6) and final exam will be graded using letters. Assignments will contribute 60% of the final grade. The exam will contribute 40% to the final grade. The following grading scale will be used to calculate the final grade:
A+ = 97-100 A = 94-96.9 A- = 90-93.9

B+ = 87-89.9 B = 84-86.9 B- = 80-83.9
C+ = 77-79.9 C = 74-76.9 C- = 70-73.9
D+ = 67-69.9 D = 64-66.9 D- = 60-63.9
F = 59.9 and below

Additional information

Implementation
Scheduled activities:
Lectures and software demonstration 45 h
Examination and course evaluation 15 h
Self studies 50 h
Totally 110 h

Responsible department

Department of Forest Genetics and Plant Physiology