Swedish University of Agricultural Sciences

P000161, Quantitative Genetics and Genomic Breeding in Forest Trees, 4.0 Hp

Syllabus

Finalized by: Finalized by: Harry Wu, 2025-12-11, 2025-12-11

Level within study regulation:

Third cycle

Grading scale:

Pass / Failed

Course language:

Swedish

Entry requirements:

Admitted as PhD. Basic training in statistics, computing and genetics

Objectives:

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

- Improve R programing skills and ASReml-R for genetic data analysis
- Construct additive relationship matrices among relatives.
- Partition additive, dominance, and epistatic genetic variances.
- Estimate heritability, genetic correlations, and genetic gain.
- Analyze progeny data across multiple traits and environments to predict breeding values.
- Estimate genotype × environment interaction and identify its underlying drivers.
- Perform genome-wide association analyses for QTL discovery.

- Apply genomic selection methods.

Content:

The course is carried out with lectures, guest lectures, programming using R and ASReml, compulsory quizzes and compulsory final assignment.

The course provides an intermediate level study to quantitative genetics and an advanced study on linear model and genomics tools in tree breeding program. The student develops an intermediate to advanced understanding of how the quantitative genetics and linear models applied to breeding value prediction and genomic selection to accelerate tree breeding program.

Modes of assessment:

Evaluation will be through assignments, with detailed assessment criteria provided at the start of the course. Grading will consist of quizzes (40%) and a final assignment (60%). - 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- If this syllabus is withdrawn, SLU may introduce transitional provisions for examining students admitted based on this syllabus and who have not yet passed the course.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 Forest Genetics and Plant Physiology

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.