Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

SLUkurs

Syllabus

PFS0170 Forest Genetics and Tree Breeding, 3.5 credits

Syllabus approved

2020-01-22

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 training in statistics and genetics or equivalent with a master degree in plant biology.

Objective, including learning outcomes

The purpose of this course is to familiarise participants with basic and advanced tree breeding concepts and tree breeding related genetics disciplines. Lectures will

give insight into how genetic variation among population and trees be explored for tree improvement program and to obtain long-term genetic advances of tree breeding program. The course will also let students to learn the whole process of tree breeding cycle from plus tree selection, progeny testing and mating design. Using both genetic theories and real examples of advanced tree breeding program of conifers, the optimal design of short- to long-term breeding program will be presented including delivery of genetic gain through seed orchard and clonal propagation.
The course will combine lectures and discussions. The instructor will present concepts for development followed by discussion for members of the class. Pertinent publications will be assigned, and numerous handouts will be given during the semester. Students are expected to become familiar with current literature. Normally, discussions will be rather general, and it will be the student's responsibility to seek out the necessary details of the subject matter covered. This is a reading course. With widespread reference reading, much of the value of the course will be obtained.
It covers from basic concepts of genetic variation, geographic variation, population and quantitative genetics concepts related to tree breeding. Tree breeding processes including selection, grafting, mating, progeny testing and design will be taught. It will also cover tree breeding program design, gene conservation and economics of tree breeding program

Content

Variation in forest trees, population genetics, tree improvement and forest productivity
Geographic variation, land races, exotic forestry
Breeding strategies, hybrids
Selection for growth and quality, pest resistance
Deployment - seed orchards, clonal forestry
Genetic testing, experimental design and field trials
Use of genetic test data, GxE, gain estimates, selection, deployment strategies
Economics of tree improvement

Requirements for examination

Examination will be in the form of assignment. Current information on assessment criteria shall be made available at the start of the course. Course grading as Quiz (40%) and final assignments (60%).

Additional information

Lectures and discussion 40 (6 days)
Examination and course evaluation 10 h
Self studies 50 h
Totally 100 h

Responsible department

Department of Forest Genetics and Plant Physiology