Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

SLUkurs

Syllabus

PNG0051 Linear mixed models and experimental design with applications, 3.0 credits

Syllabus approved

2013-09-24

Subjects

Mathematic Statistics

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

The course covers a huge subject in a short time. For this reason it is recommended that students have already completed a general statistics course at the PhD level or have equivalent general knowledge about statistical methods. Due to the focus on agricultural field experiments, it is desired that students have experience of such trials. However, this is not a requirement; students from other research areas may well benefit from the course, since the statistical methods concerned have many

applications. Students are expected to have acquired basic knowledge about the SAS system before the course starts (self-study material will be distributed before the course).

Objective, including learning outcomes

After the course, students should know how to
- analyse experiments using linear mixed models
- include temporal or spatial correlation in linear mixed models
- make use of split-plot, incomplete block, and row-column designs
- analyse series of experiments
- measure sensitivity of treatments to environments and apply the AMMI model for investigation of genotype-by-environment interaction

Content

Starting from traditional analysis of variance (ANOVA), this course mainly studies linear models with several variance components, so called linear mixed models. These models are useful for taking spatial variation into account, but can also be used for modelling correlation between repeated observations over time. Some useful experimental designs are considered: split-plot-designs, incomplete block designs and row-column designs. Options for analysis of series of experiments are discussed, including the multivariate additive main effects and multiplicative interaction (AMMI) model for investigation of sensitivity of genotypes to environments. Throughout the course, examples are taken from agricultural field trials. Computer exercise is a major part of the course, thereby using the SAS system.

Requirements for examination

A compulsory home assignment with problems covering the course content is distributed after the course. The home assignment should be completed within four weeks. Students are encouraged to set aside time for this in advance. Problems should be solved using the SAS System. February 28, at the latest, solutions should be sent to the lecturer. In order to pass the course, approved solutions are required. Furthermore, students must have participated actively in lectures and computer exercises and have submitted the home assignment before deadline (February 28, 2014).

Additional information

Responsible department

Department of Aquatic Sciences and Assessment