Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

SLUkurs

Syllabus

PFS0176 Multivariate analysis of spectroscopic data for characterization of biomaterials, 5.0 credits

Syllabus approved

2020-05-28

Subjects

Technology

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

MSc or PhD students in forestry or engineering/chemistry/biology

Objective, including learning outcomes

To provide a practical course on the use of multivariate data analysis for modelling spectroscopic data. It covers relevant background and theory required to select and

analyse an appropriate multivariate method for extracting information about one or more spectroscopic data sets. An ideal starting point for every experimenter who wishes to work effectively, extract maximal information and predict the future behaviour of their system.

Content

Repeat of univariate statistics (briefly), repeat of multivariate design principles (briefly), nature of multivariate data, exploratory analysis by principal component analysis and related methods, multivariate classification, multivariate regression, data pre-processing.

After the course, the students will be able to;
- Understand the nature of multivariate data originating from spectroscopic instruments used in research
- Be able to run commercial software, enter data, do calculations and present outcomes as tables and graphs
- Select and apply models for multivariate exploratory data analysis
- Select and apply multivariate classification methods
- Select and apply multivariate regression methods
- Understand the value of tables and graph that can be produced for use in reports, publications, theses

Be able to run and test data pre-processing methods specific to each spectroscopic measurement technique

Requirements for examination

Lecture and workshop attendance and approved group assignment (experimental work with a resulting written report, 1-2 students/group)

Additional information

Lectures on the theories behind the methods used. Examples and exercises in the statistical software SIMCA or EVINCE are used to introduce practical aspects and problems often encountered while using multivariate data analysis. One simple group task is performed where students do their own spectroscopic measurement and enter the data to provide a full data analysis report. In addition, individual guidance on multivariate data analysis for a research study is given.

Responsible department

Department of Forest Biomaterials and Technology