Statistical Tools for Chemical Analysis

Programme course

6 credits

Statistiska verktyg för kemisk analys

NKEB45

Valid from: 2017 Spring semester

Determined by
Board of Studies for Chemistry, Biology and Biotechnology

Date determined
2017-01-25

Main field of study
Chemical Engineering, Chemistry

Course level
First cycle

Advancement level
G1X

Course offered for
- Chemistry, Bachelor´s Programme
- Chemical Analysis Engineering, B Sc in Engineering

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
General Chemistry

Intended learning outcomes
This course aims at giving the student a basic knowledge in statistical methods for use in chemistry related areas. It also trains the ability to use modern spreadsheet software for calculations and data presentation. After the course the student should:

- be able to assess and handle uncertainties and errors related to chemical experiments
- know how to collect, organize, evaluate, interpret and present data obtained from chemical analysis
- know basic terminology in statistics and analytical chemistry
- know basic statistics for data evaluation and be able to calculate and interpret the results of descriptive statistics and significance tests
- know the basics of quality assurance and be able to use tools to monitor the quality of analytical measurements
- be able to perform linear regression calculations in order to evaluate correlation and to construct calibration curves with estimates of errors
- be able to use a spreadsheet software, for instance Microsoft Excel, for calculations using statistical methods and for data presentation

Course content
Basic terminology within analytical chemistry and statistics, statistics of repeated measurements, mean and standard deviation, confidence limits, statistical tests, ANOVA, calibration and linear regression, error propagation, methods for quality control. Microsoft Excel for calculations and data presentation, as well as for statistic evaluation of data from chemical experiments.

Teaching and working methods
Lectures, calculation exercises, laboratory exercises, computer exercises.

Examination

LAB1	Laboratory work	2 credits	U, G
TEN1	Written examination	4 credits	U, 3, 4, 5
TEN!		0 credits	
LAB		0 credits	

Grades
Four-grade scale, LiU, U, 3, 4, 5

Other information
Supplementary courses: Analytical Chemistry

Department
Institutionen för fysik, kemi och biologi

Director of Studies or equivalent
Magdalena Svensson

Examiner
Maria Lundqvist

Education components
Preliminary scheduled hours: 46 h
Recommended self-study hours: 114 h

Course literature

Miller&Miller, Statistics and Chemometrics for Analytical Chemistry (6th ed.)
Övrig litteratur delas ut i samband med föreläsningarna.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.