KD1280 Chemical Analysis 10.5 credits

Kemisk analys

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for KD1280 valid from Spring 2015

Grading scale

A, B, C, D, E, FX, F

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Completed upper-secondary school before 1 July 2011 and adult education at upper-secondary level before 1 July 2012

Specific entry requirements: mathematics E, physics B and chemistry A. In each of the subjects the grade Passed or 3 is required.

Completed upper-secondary school from 1 July 2011 and adult education at upper-secondary level from 1 July 2012 (Gy2011)

Specific entry requirements: Physics 2, Chemistry 1 and Mathematics 4. In each of the subjects a pass grade or better is required.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

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

1. explain flows of chemical substances between soil, water and air by describing natural cycles,

2. identify phase equilibria and assess when the equilibrium concept is applicable

3. reflect on the consequences of disturbances in natural systems seen from the perspective of sustainable development,

4. set up an equilibrium equation for acid -, basis -, gas -, solubility -, complexation - and redox reactions and calculate equilibria with appropriate approximations

5. describe and use analytical techniques such as spectroscopy, chromatography and electro-chemical methods and state appropriate analytical method for a given problem

6. plan and evaluate trial with statistical methods

7. use computer program for statistical evaluation and to solve equilibrium problem

8. carry out wet chemical laboratory work and apply the equilibrium concept, for example to separations,

9. reflect on routines and measures for a safe handling of chemicals

10. choose and apply sampling - and calibration principles,

11. assess the reasonableness of the calculations and measurement data and to be able to present these as a report.

Course contents

Based on natural cycles and a sustainable development, the course connects chemical analysis and analytical chemistry with environmental chemistry, chemical equilibria and inorganic reaction theory.

In the course, equilibria in nature and in closed systems are analysed through calculations and laboratory experiments. The student experiences laboratory methodology and learns the principles and use of several instrumental analytical techniques. Basic statistics are introduced and applied for experimental design, computing and evaluation. The contents

of the course are applied through sampling, preparation and chemical analysis of soil - or water samples collected during a field trip.

Course literature

1. Harris ”Exploring Chemical Analysis”

2. Burrows, Holman, Parsons, Pilling, Chemistry3, Oxford,

3. J.N. Miller & J.C. Miller,”Statistics and Chemometrics for Analytical Chemistry

4. Exempelsamling Kemisk jämvikt

5. Handledning i praktisk jämviktslära

Examination

- FÄL1 - Excursion, 1.0 credits, grading scale: P, F
- TEN2 - Written examination Chemical Analysis, 2.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Written examination in Chemical Equilibria, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- KON2 - Examination in Statistics, 1.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB2 - Laboratory Exercises in Analytical Techniques, 1.0 credits, grading scale: P, F
- LAB1 - Laboratory Exercises in Chemical Equilibria, 2.0 credits, grading scale: P, F

Based on recommendation from KTH’s coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.