



KH1124 General Chemistry 2

6.0 credits

Allmän kemi 2

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

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

Establishment

Course syllabus for KH1124 valid from Autumn 2023

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Language of instruction

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

Intended learning outcomes

The objective of the course is to consolidate and deepen knowledge in chemistry and provide necessary basis for use in coming courses in chemistry and chemical engineering. The course shall also provide training in use of equipment and several methods that are used in chemical laboratory.

After successfully completed course the student shall be able to:

- Perform stoichiometric calculations, including, e.g., molar ratios, limiting reactant, synthesis yield, excess and calculation of concentrations.
- Solve applied problems that include stoichiometric calculations of analysis in wet chemistry and chemical synthesis, including titrimetry, gravimetry, ion exchange analysis, back titration and analysis in several steps, and present the result using correct amount of significant digits.
- Explain basic concepts of chemical equilibrium and use these to perform equilibrium calculations (acid/base equilibria, gas equilibria, complex formation equilibria, solubility equilibria, redox equilibria), including buffer systems and introduction to equilibria.
- Explain basic concepts in kinetics and use these to solve problems in chemical kinetics.
- Define the rate of reaction and calculate it from the empirical expression of reaction rate, explain the concept of reactions order, and calculate temporal change in concentration in a reaction system.
- Explain the concept of reaction mechanism and elementary reactions and from these suggest the equation of reaction rate, using Arrhenius equation explain and calculate temperature dependence of reaction and describe the concept of catalysis as well as explain its chemical basis and implications.
- Employ selected software to solve chemical problems.
- Recognise and be able to use laboratory equipment in wet chemistry, e.g., burettes, pipettes, measuring flasks and balances.
- Independently plan and perform laboratory work with regard to working environment and safety regulations.
- Prepare solution and perform dilutions as well as standard titrations, with regard to accuracy
- Isolate and identify metal ions via practical application of inorganic equilibria.

Course contents

Stoichiometry: various ways to express concentration, dilution, limiting reactant, synthesis yield, titration, gravimetry, back titration, ion exchange analysis. Accuracy and error propagation.

Chemical equilibria: concepts of activity and standard state, gas equilibria, solubility equilibria, complex formation equilibria, acid – base equilibria, buffer, standard equilibrium diagrams.

Chemical kinetics: reaction rate, equation of reaction rate, integrated reaction rate, Arrhenius equation, catalysis, activation energy, elementary reactions, reaction mechanisms.

Numerical calculation tools to solve problems of chemistry.

Examination

- LAB2 - Laboratory Work, 2.0 credits, grading scale: P, F
- LABD - Computer lab, 0.5 credits, grading scale: P, F
- TEN1 - Written examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Assignments, 0.5 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.

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.