KA1020 Fundamental Chemistry 7.5 credits

Grundläggande kemi

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

Establishment

Course syllabus for KA1020 valid from Spring 2017

Grading scale

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

Education cycle

First cycle

Main field of study

Chemistry and Chemical Engineering, Technology

Specific prerequisites

Completed upper secondary education including documented proficiency in English corresponding to English A. For students who received/will receive their final school grades after 31 December 2009, there is an additional entry requirement for mathematics as follows: documented proficiency in mathematics corresponding to Mathematics A.

And the specific requirements of mathematics, physics and chemistry corresponding to Mathematics E, Physics B and Chemistry A.

Language of instruction

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

Intended learning outcomes

The course contains the foundations for the student to be able to critically evaluate and analyze different chemical problems in the fields of energy and environmental science.

After the course the student should be able to:

- Write balanced chemical reaction formulas
- Perform stoichiometric and thermochemical calculations
- Describe the electronic structure of atoms and the structure of the periodic system
- Outline the theoretical foundations of chemistry: chemical bonding, chemical equilibrium, chemical reactivity
- Describe different types of isomerism
- Deduce relations between the partial pressure and concentration for gases
- Calculate equilibria in solution and in the gas phase with the correct stoichiometry
- Calculate the pH in acid in basic solutions
- Calculate the galvanic cell potential as a function of the composition of the half cells
- Perform basic chemical laboratory work with respect to work environment and safety regulations, and have a good knowledge concerning the handling of chemicals
- Describe historically important advances in the field of chemistry, as well as problems in the area of energy and environmental science with connections to chemistry
- Describe and being able to use chemical nomenclature
- Apply the basics in chemical kinetics
- Describe the phenomena oxidation and reduction

Course contents

- Chemical reaction formulas, stoichiometry, and thermo chemistry

- An introduction to the theoretical foundations of chemistry: chemical bonding, chemical equilibrium, chemical reactivity

- Chemical equilibrium and the law of mass action with applications to acid-base equilibria, complex equilibria, redox equilibria, and partition equilibria

- Introduction to general thermodynamics

- Introduction to chemical instrumental methods of analysis

• Practical laborations, chemical work environment, safety regulations, chemical analysis and synthesis

• Historical examples of advances in chemistry and environmental problems with relations to chemistry

Disposition

The course consists oflectures, exercises and laboratory work.

Course literature

Chemistry[3]
Introducing inorganic, organic and physical chemistry
Third Edition
Andrew Burrows, John Holman, Andrew Parsons, Gwen Pilling, and Gareth Price

Examination

- TEN1 - Written exam, 5.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laborations, 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.

Other requirements for final grade

Written examination (TEN1; 5,5 credits)
Labaratoy Work (LAB1; 2 credits)

The final rating is the same as on the examan obtained by approved laboratory work.

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.