ML0023 Chemistry for Technical Preparatory Year I 9.0 fup

Kemi för basår I

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 ML0023 valid from Autumn 2015

Grading scale

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

Education cycle

Pre-university level

Specific prerequisites

The Mathematics of the upper secondary school 2a, 2b, 2c or Mathematics B

Language of instruction

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

Intended learning outcomes

Aim:

The goal of the course is to make the student well prepared for engineering studies at KTH. The student should understand the importance of chemistry in the world we live in.

Further, on completion of the course the student should be familiar with models, theories and calculations . The student should gain knowledge about different engineering applications.

Intended learning outcomes:

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

- carry out experiments with satisfactory precision and in a safe way, and analyse, present and interpret the results and explain these both orally and in written.
- use the periodic system to describe the structure of atoms, and be able to predict similarities and differences in the chemical properties of the elements.
- describe how models of various types of chemical bindings depend on the electron structure of the atoms and relate the properties of different substances to the type and strength of the binding and to the structure of the substance
- interpret, write and use formulae for chemical compounds and reactions and discuss stoichiometric aspects and carry out simple calculations
- interpret the change in enthalpy and the binding energies at chemical reactions and use these to discuss the energy conversion
- use the concepts of oxidation and reduction in spontaneous and non-spontaneous reactions
- identify common strong and weak acids and bases, carry out simple calculations of pH value, use the concept of neutralisation in connection with stoichiometric calculations and have knowledge of chemical buffer systems.
- used knowledge of chemistry in everyday, technically and environmentally related contexts.

Course contents

Matter and chemical binding

- Models and theories of the structure and classification of matter
- Chemical binding and its effect on for example existence, properties and fields of use for organic and inorganic subjects.

Reactions and changes

- Acid-base reactions including the notation of pH and the buffer effect.
- Redox reactions including electrochemistry.
- Precipitation reactions
- Energy conversion at phase transformations and chemical reactions

Stoichiometry

- Interpretation and writing of formulae for chemical compounds and reactions

- Amount of substance proportions, concentrations, limiting reagents and yield at chemical reactions.

Analytical Chemistry

- Qualitative and quantitative methods for chemical analysis, for example chromatography and titration.

Course literature

Liber

- Gymnasiekemi 1
  Andersson, Sonesson, Svahn, Tullberg 978-91- 47- 08557-6

Examination

- LAB1 - Laboratory Work, 2.0 fup, grading scale: P, F
- TEN1 - Examination, 7.0 fup, 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.

Other requirements for final grade

TEN1 - Examination, 7.0 credits, Grade P/F

LAB1 - Laboratory course, 2.0 credits, Grade P/F

Final grades are given if all examination parts are approved. The final grade is based on the points in the written examination.

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.