Fundamentals of Chemistry

Programme course

6 credits

Grundläggande kemi

TFKE59

Valid from: 2021 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2020-09-29

Main field of study
Chemistry

Course level
First cycle

Advancement level
G1X

Course offered for
- Master of Science in Biomedical Engineering
- Master of Science in Applied Physics and Electrical Engineering - International
- Master of Science in Applied Physics and Electrical Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering

Intended learning outcomes
The course will give the students an introduction to general chemistry and organic chemistry. After completing the course, the student should be able to

- perform stoichiometric calculations.
- describe the structures of atoms and molecules.
- discuss different types of chemical bonding and the relationship between bonding and state of aggregation, and other properties of solids, solutions, and gases.
- explain the meaning of chemical equilibrium, and its applications on equilibria of acids and bases along with solubility equilibria.
- explain the energetics and kinetics of chemical reactions.
- describe the laws of thermodynamics, in particular their application on chemical systems.
- describe the classification of organic substances, their properties and nomenclature.
- describe the conformation and stereochemistry of organic compounds and their common reaction types.
- perform some elementary chemical laboratory techniques, show some skill in theoretical analysis of experimental data and summon up the results in a laboratory report.

Course content

The electronic structures of atoms and molecules. Stoichiometry. Chemical kinetics and equilibria with emphasis on acid-base equilibria. Chemical bonding. The three laws of thermodynamics and the concepts enthalpy, entropy, and free energy. The functional groups of organic chemistry, nomenclature, properties, conformation and stereochemistry. Substitution, elimination and addition reactions in organic chemistry.

Examination

LAB1	Laboratory work	1 credits	U, G
TEN1	Written examination	5 credits	U, 3, 4, 5

To pass the experimental part, the presence at laborations are mandatory and the written reports must be approved.

Grades

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

Other information

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is Swedish, the course as a whole or in large parts, is taught in Swedish. Please note that although teaching language is Swedish, parts of the course could be given in English. Examination language is Swedish.
- If teaching language is Swedish/English, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English (depending on teaching language).
- If teaching language is English, the course as a whole is taught in English. Examination language is English.

Other

The course is conducted in a manner where both men's and women's experience and knowledge are made visible and developed.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

Department
Institutionen för fysik, kemi och biologi

Director of Studies or equivalent
Magdalena Svensson

Examiner
Eleonore von Castelmur

Education components
Preliminary scheduled hours: 52 h
Recommended self-study hours: 108 h

Course literature
Zumdahl & Zumdahl, Chemistry senaste upplagan / newest edition Material på LISAM / Material from the department found at LiSAM