



LTH

FACULTY OF
ENGINEERING

Course syllabus

Grundläggande kemi Fundamental Chemistry

KASA01, 9 credits, G1 (First Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED B/K

Date of Decision: 2023-04-18

General Information

Main field: Technology.

Compulsory for: W2

Language of instruction: The course will be given in Swedish

Aim

The course shall create an interest in chemistry and provide a theoretical and practical basis for further studies in chemistry within the educational programme. The course is the basis for the following chemistry courses.

The course should also provide an understanding for the chemical terminology, both in Swedish and English.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- be able to use chemical nomenclature in order to name and give formulas for inorganic and organic substances as well as to use basic chemical concepts and terminology.
- be familiar with basic models for the atom, electron configuration and the relationship between these and the periodic table as well as with atomic orbitals
- be able to explain and use thermodynamical data and expressions and to use the relationship between them.
- be able to understand and apply the concept of chemical equilibria

Competences and skills

For a passing grade the student must

- be able to describe and explain inter- and intramolecular forces within chemical substances
- be able to analyse and understand problems in chemical equilibrium
- be able to describe electrochemical cells and analyse processes in electrochemical cells as well as calculate cellpotentials
- be able to perform basic laboratory work and to perform riskanalysis in connection with this.

Judgement and approach

For a passing grade the student must

- be able to present chemical calculations using correct units and appropriate accuracy in a logical and relevant way.
- be able to collect, present and evaluate results from practical experiments

Contents

Fundamental chemical phenomena are discussed and explained using connections to everyday applications. The following topics will be covered:

- Fundamental chemical concepts and nomenclature.
- Basic experimental work
- The build up of atoms and the periodic table
- Chemical formulas, reaktions and stoichiometry
- The chemical bond
- Molecular geometry
- General introduction to enthalpy, entropy, internal energy and free energy.
- Intermolecular forces (dispersion forces, hydrogen bonds, dipole-dipole).
- Standard enthalpy of formation and reaction.
- Calorimetry.
- Chemical equilibrium with applications such as solubility, acid-base reactions, buffer solutions and titration.
- Electrochemistry including redox-processes, electrochemical cells and electrolysis.
- Corrosion.

Active work with solving problems plays an important role in the course.

The literature is in English and should be regarded as an introduction to the English language in the field of natural sciences.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Written final exam, written exercises during the course and laboratory work. Questions from the compulsory parts of the course comprise parts of the written exam (on the first occasion of exam). The result on the written exam will give the grade.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0117. **Name:** Written Examination.

Credits: 8. **Grading scale:** TH. **Assessment:** Written Examination

Code: 0217. **Name:** Written Exercises.

Credits: 0. **Grading scale:** UG. **Assessment:** Hand-in exercises

Code: 0317. **Name:** Laboratory Exercises.

Credits: 1. **Grading scale:** UG. **Assessment:** Laboratory assignments. **Contents:** Compulsory laboratory assignments related to the course content.

Admission

The number of participants is limited to: No

The course overlaps following course/s: KOOA01, KOOA05, KOOA10, KOOA15, KOOA20

Reading list

- Atkins, P, Jones, L, Laverman, L., Young K., Patterson J.: Chemical Principles: The Quest for Insight, 8:e upplagan. WH Freeman , 2023, ISBN: 9781319498498.
- Ellervik, U, Kann, N och Sterner, O: Organisk kemi, 3:e upplagan. Studentlitteratur, 2014, ISBN: 978-91-44-09991-0.
- Laboratory manual.

Contact and other information

Course coordinator: Prof. Jan-Olle Malm, Jan-Olle.Malm@polymat.lth.se

Course coordinator: Dr. Johan Reimer, johan.reimer@chem.lu.se

Course homepage: <http://www.kilu.lu.se/cas/education/undergraduate-education/ekosystemteknik/>