



KD1040 Chemical Thermodynamics 7.5 credits

Kemisk termodynamik

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

Establishment

Grading scale

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

Education cycle

First cycle

Main field of study

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 will give basic knowledge in thermodynamics and its applications in chemistry, chemical engineering and biological systems.

- Describe and use the state laws for gases.
- Describe and apply the four laws of thermodynamics.
- Describe and understand the equilibrium conditions.
- Describe and use the concepts of internal energy, enthalpy, entropy, free energy and chemical potential.
- Understand and apply the partial molar quantities.
- Analyze chemical equilibria in ideal and non-ideal systems.
- Analyze combinations and solutions thermodynamics.
- Analyze phase equilibria.
- Using phase diagrams to solve problems in one-and two-component systems.
- Apply the basic thermodynamics of chemical reactions in biological systems

Course contents

- Equations of state for gases, intermolecular forces
- The laws of thermodynamics, internal energy and entropy
- Criteria for equilibrium, free energy
- Partial molar quantities, the chemical potential
- Chemical equilibrium in ideal and non-ideal systems
- The thermodynamics of mixtures
- Phase equilibria, phase diagrams for systems containing one, and two components
- Chemical reactions in biological systems

The practical laboratory work includes

- Gases, liquids and supercritical fluids
- Liquid mixtures, vapour pressures and activity
- The thermodynamics of electrolyte solutions

Course literature

Atkins and de Paula
Atkins' Physical Chemistry, 9th edition

Examination

- TEN1 - Examination, 6.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 1.5 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.

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

Other requirements for final grade

Written examination 6 credits
Laboratory work 1,5 credit

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.