

Physical Chemistry

Programme course

6 credits

Fysikalisk kemi

TFKE17

Valid from: 2017 Spring semester

Determined by

Board of Studies for Chemistry, Biology
and Biotechnology

Date determined

2017-01-25

Main field of study

Biotechnology, Chemistry

Course level

First cycle

Advancement level

G1X

Course offered for

- Chemical Biology, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Completed General chemistry 1 and 2, Attended Organic Chemistry 1 or equivalent.

Intended learning outcomes

To give a fundamental knowledge in physical chemistry concerning thermodynamics. To give an explanation on thermodynamic base of physical, technical and chemical processes. To achieve this goal the student should have the following knowledges and capacities:

- Account for the properties of and difference between ideal and real gases
- Describe the condensation of substances and the critical point and give some technical application
- Apply the first law of thermodynamics to thermochemistry and the energetics of chemical reactions.
- Explain spontaneous processes by means of entropy and the second law of thermodynamics, and the impacts on them from the conditions applied.
- Apply the theory of phase equilibria in systems of one or more components and their practical applications
- Explain chemical equilibria and the impacts on them from outer conditions, and give some practical examples.
- Discuss loss of energy by entropy production and the concept of efficiency
- Be able to project, perform and describe laboratory work in relevant areas of physical chemistry.
- Consider the relevance of calculated or experimental results.

Course content

Thermodynamics: The idea of a state and the state equations of gases, ideal and real. The first law of thermodynamics and thermochemistry. The second law, entropy and spontaneous reactions. Gibbs free energy and equilibria. Mathematical relations between thermodynamic functions. Phase diagrams for one and two component systems and their dependence on temperature and pressure. Chemical equilibria and their dependence on conditions.

Teaching and working methods

Lectures/lessons and laborations. Laborations in special laboratories

Examination

LAB1	Laboratory work	1.5 credits	U, G
TEN1	Written examination	4.5 credits	U, 3, 4, 5

Grades

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

Other information

Supplementary courses: Physical Chemistry, Spectroscopy.

Department

Institutionen för fysik, kemi och biologi

Director of Studies or equivalent

Magdalena Svensson

Examiner

Lars Ojamäe

Course website and other links

<http://www.ifm.liu.se/physchem/courses/>

Education components

Preliminary scheduled hours: 54 h

Recommended self-study hours: 106 h

Course literature

Additional literature

Books

Atkins P.W., *Physical Chemistry*

Compendia

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.