



# FCK3307 Molecular Thermodynamics 7.5 credits

## Molekylär termodynamik

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 FCK3307 valid from Spring 2020

## Grading scale

P, F

## Education cycle

Third cycle

## Specific prerequisites

Eligible for studies at the third-cycle level.\*\*

## Language of instruction

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

## Intended learning outcomes

After completion of the course the student should have the knowledge and ability to

- Reflect over and describe in detail microscopic models and basic relationships in terms of entropy and enthalpy contributions that together determine the free energy for different molecular systems.
- Use the resulting formalism and concepts to describe and explain macroscopic behaviour in different materials and systems.

## Course contents

- Principles of probability.
- The Boltzmann distribution law.
- The statistical mechanics of simple gases and solids and the molecular interpretation of temperature and heat capacity.
- Chemical and phase equilibria.
- Solutions, mixtures and transfer of molecules between phases.
- Physical (i.e. diffusion, permeation and flow) and chemical kinetics.
- Electrostatics: Coulomb's Law, electrostatic potential and electrochemical equilibria.
- Intermolecular interactions and phase transitions.
- Adsorption, binding and catalysis.
- Thermodynamic properties of water
- Introduction to the thermodynamics of polymer solutions.

## Examination

- TEN1 - Written exam, 7.5 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.

## 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.