



LUND
UNIVERSITY

Faculty of Science

KEMB17, Chemistry: Surface and Colloid Chemistry, 15 credits

Kemi: Yt- och kolloidkemi, 15 högskolepoäng
First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2022-11-30 to be valid from 2022-11-30, autumn semester 2023.

General Information

The course is an elective first-cycle component of a Bachelor of Science degree in Chemistry.

Language of instruction: Swedish

Main field of studies

Chemistry

Depth of study relative to the degree requirements

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is to give general understanding of surface and colloid chemical phenomena and their many applications in manufacturing industry, environment, biology, food and medicine.

Knowledge and understanding

On completion of the course, the students shall be able to

- account for the basic concepts and terminology of surface and colloid chemistry
- describe the forces within surface and colloid chemistry
- explain key concepts such as adsorption, surface tension, wetting, colloidal stability, electrostatics, hydrophobic interaction, steric stability
- describe different experimental methods in surface and colloid chemistry such as rheology, dispersion and surface techniques and microscopy methods
- describe phase behaviour and phase diagrams of surface active substances such as surfactants, lipids and amphiphilic polymers

- account for common synthetic and biological colloidal systems.

Competence and skills

On completion of the course, the students shall be able to

- perform calculations to decide colloidal stability
- apply simple adsorption models
- describe aggregation of surface active subjects by means of simple models
- master phase diagrams of surface active substances
- apply surface and colloid chemistry thinking on applications in manufacturing industry, environmental work, biology, food and medicine
- discuss the behaviour of polymers in solution and their interaction with surface active subjects
- apply the concepts surface tension and wetting
- master phenomena that decide the stability of emulsions and foam
- perform simple experiments within surface and colloid chemistry
- present their experimental results orally and written.

Judgement and approach

On completion of the course, the students shall be able to

- present and evaluate calculations within surface chemistry with correct units and numerical accuracy in a logical and relevant way
- critically review and discuss experimental results independently and in groups
- assess risks with chemicals and handle these in a safe way
- reflect on available surfaces in colloids of different sizes
- assess suitable methods to study a certain surface and colloid chemical system
- demonstrate an understanding of how surface and colloid chemistry can be used in the service of the society.

Course content

The course contains two modules:

Modules: Theory 10 hp

The theoretical part covers the following:

- basic concepts and terminology and forces active in the surface and colloid chemistry
- the basic properties of surfaces, solid surfaces and liquid surfaces
- adsorption of surface active subjects surfactants and polymers
- phase behaviour and phase diagrams of surface active substances such as surfactants, lipids and amphiphilic polymers
- synthetic and biological colloidal systems
- colloidal stability, electrostatic and steric stabilisation
- emulsions and foam
- polymers in solution and surfactant-polymer systems
- rheological methods and properties
- dispersion and surface techniques
- microscopy methods.

Module 2 Laboratory sessions and associated compulsory component 5 credits

In this part, the students will:

- obtain an overview of important methods of measurement within surface and colloid chemistry and their applications
- apply knowledge of important surface and colloid chemistry principles through

- practical experiments
- report experiments orally and in writing and to critically review results and conclusions from experiments.

Course design

The teaching consists of lectures, exercises and laboratory sessions. Compulsory participation is required in the laboratory sessions and associated elements.

Assessment

Assessment takes the form of a written exam at the end of the course as well as participation in compulsory components throughout the course.

Students who do not pass a regular assessment will be offered another opportunity for assessment soon thereafter.

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.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.

For a Pass grade on the whole course, the student must have Pass grades on the exam, the laboratory reports and the compulsory components.

The grading scale for the exam is Fail, Pass and Pass with Distinction, whereas the laboratory reports and the compulsory components are graded according to the scale Fail and Pass.

The final grade is determined by the grade for the exam.

Entry requirements

To be admitted to the course, students must meet the general entry requirements for higher education, and have passed Physics 2 and 30 credits in chemistry included knowledge equivalent to:

- KEMA20 General Chemistry, 15 credits
- KEMA01 Organic Chemistry - Basic Course 7.5 credits and
- KEMA03 Biochemistry - Basic Course 7.5 credits

Students who have obtained the equivalent knowledge by other means may also be admitted to the course.

Further information

This course replaces KEMB07 Colloid and surface chemistry, 15 credits, and credits from that course cannot count towards a degree together with this course.

The course is offered at the Department of Chemistry, Lund University.

Subcourses in KEMB17, Chemistry: Surface and Colloid Chemistry

Applies from H23

- 2301 Subcourse 1: Exam, 10,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 2302 Subcourse 2: Laboratory work with compulsory components, 5,0 hp
Grading scale: Fail, Pass