

KEMM07, Chemistry: Surface and Colloid Chemistry - Advanced Course, 15 credits

Kemi: Yt- och kolloidkemi - fördjupningskurs, 15 högskolepoäng
Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-03-01 and was last revised on 2018-01-10. The revised syllabus applies from 2018-01-10, autumn semester 2018.

General Information

The course is an optional second-cycle course for a degree of Master of Science in Chemistry and is a compulsory course for a degree of Master of Science in Organizing Molecular Matter.

Language of instruction: Swedish and English
When necessary, the course in full is given in English.

Main field of studies

Organizing Molecular Matter

Chemistry

Depth of study relative to the degree requirements

A1N, Second cycle, has only first-cycle course/s as entry requirements

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Learning outcomes

The aim of the course is to provide advanced physical-chemical knowledge within the field of Surface and Colloid Chemistry, based on a molecular perspective, as well as a quantitative understanding of a selection of fundamental colloid and interfacial phenomena.

The aim of the course is that on its completion students will have acquired the following skills and knowledge:

- the ability to explain amphiphilic molecules' self association and the underlying thermodynamics

- the ability to explain surface energy and interfacial phenomena
- the ability to explain electrostatic interaction in colloidal systems
- the ability to describe the structure and properties of micelles of amphiphilic molecules
- the ability to explain different types of forces between colloidal aggregates, colloidal stability
- the ability to describe amphiphilic bilayer systems
- the ability to explain the effects of polymers in colloidal systems
- the ability to describe colloidal sols
- the ability to describe micro and macro emulsions
- the ability to explain phase balances and describe phase diagrams
- the ability to describe a number of applications (often biological and technical) where the above mentioned systems and phenomena are central
- the ability to suggest qualitative molecular interpretations of properties and phenomena in complex systems in applications

Course content

The theoretical materials treat surface and colloid chemistry based on a molecular physical-chemical perspective. The central themes are amphiphilic molecules' self association, polymers in colloidal systems, phase balances in solution, interfacial phenomena, electrostatic interaction in colloidal systems and forces between macro and mesoscopic surfaces separated by a liquid phase.

Laboratory work treats central experimental techniques like rheometry, calorimetry and AFM (atomic force microscopy), as well as computer simulations of polymers and of electrostatic phenomena in colloidal systems.

Course design

Teaching comprises teacher-led classes, based on the student studying the material in the text book in advance, with the help of computer-based learning modules, as well as compulsory computer exercises and laboratory work.

Assessment

Assessment is normally an oral examination that is preceded by an ungraded written diagnostic test. A re-sit examination is offered soon after the examination to students who do not pass.

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.

To be awarded pass on the whole course, students must pass the examination, pass the laboratory work and computer exercises.

The examination grades are: Pass with Distinction, Pass or Fail. Grades for the compulsory components are: Pass or Fail.

The final grade for the course is determined by the result of the examination.

Entry requirements

To be eligible for this course students must have basic eligibility and 90 higher education credits in completed Science courses, including passes in courses equivalent to:

- KEM101 General Chemistry 1 15 credits and KEM102 General Chemistry 2 15 credits, or

KEM111 Chemistry for Environmental and Biological Sciences – General Course 1 15 credits and KEM122 Chemistry for Environmental and Biological Sciences – General Course 2 15 credits, or

KEMA00 General and Analytical Chemistry 7.5 credits, KEMA01 Organic Chemistry – Basic Course 7.5 credits, KEMA02 Inorganic Chemistry – Basic Course 7.5 credits and KEMA03 Biochemistry – Basic Course 7.5 credits

and

- KEM103 General Chemistry 3, 15 credits
- KEM017 Surface and Colloid Chemistry, 15 credits and
- MAT015 Mathematics for Scientists 1, 15 credits or MAT131 Mathematics 1 Alpha, 15 credits
- English B.

Equivalent knowledge that has been gained in another way also provides eligibility for the course.

Further information

The course cannot be credited as part of a degree programme that also includes KEM064 Surface and Colloid Chemistry - Advanced Course, 15 credits.

Subcourses in KEMM07, Chemistry: Surface and Colloid Chemistry - Advanced Course

Applies from H13

- 0711 Surface and Colloid Chemistry - Advanced Course, 10,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 0712 Surface and Colloid Chemistry - Adv. Course, Comp. Elements, 5,0 hp
Grading scale: Fail, Pass

Applies from H07

- 0701 Surface and Colloid Chemistry - Advanced Course, 15,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 0702 Surface and Colloid Chem - Advanced Course, Comp Elements, 0,0 hp
Grading scale: Fail, Pass