Faculty of Science

KEMM67, Chemistry: Scattering Methods, 7.5 credits

Kemi: Spridningsmetoder, 7,5 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2019-01-22 to be valid from 2019-01-22, autumn semester 2019.

General Information

The course is an elective second-cycle component of a degree of Master of Science (120 credits) in Chemistry and compulsory for a degree of Master of Science (120 credits) in Organizing Molecular Matter.

Language of instruction: English

Main field of studies	*Depth of study relative to the degree requirements*
Organizing Molecular Matter	A1N, Second cycle, has only first-cycle course/s as entry requirements
Chemistry	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is to enable students to acquire basic knowledge and understanding of different scattering methods that are used to study the structural and dynamic properties of colloidal dispersions.

Knowledge and understanding

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

- account for different basic methods of static scattering and explain how they can be used to understand colloidal dispersions
- explain the general principles of dynamic (light) scattering experiments, and what the information from such experiments contains

- describe general experimental set-ups for light, X-ray and neutron scattering

Competence and skills

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

- calculate, analyse and interpret results from static scattering experiments, such as the static structure factor, different form factors and results of dynamic light scattering of colloidal dispersions

Course content

Lectures (5 credits): The course starts with basic scattering theory including derivation of the scattering resulting from the dispersion of spherical colloidal particles. This is followed by a presentation of different experimental methods such as Small-Angle Neutron Scattering (SANS), Small-Angle X-Ray Scattering (SAXS) and static and dynamic light scattering. Dispersions of spherical particles are used as the main model system, but non-spherical particles will also be discussed.

Laboratory sessions and exercises (2.5 credits): Computer exercises/exercises in data analysis and modelling of static scattering data. The scattering laboratory exercises include experiments on colloidal dispersions with SAXS and with static and dynamic light scattering.

Course design

The teaching consists of lectures, exercises, computer labs and scattering labs. Compulsory participation is required in computer labs, scattering labs and associated elements.

Assessment

The assessment is based on a written exam at the end of the course and on compulsory components throughout the course.

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 grade of Pass on the whole course, the student must have passed the exam and the compulsory components.

The grades awarded for the exam are Fail, Pass and Pass with Distinction. The grades awarded for the compulsory components are 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 requirements for English proficiency corresponding to English 6 from Swedish upper secondary school, and have passed 90 credits in science courses including courses equivalent to:

- KEMA20 General Chemistry 15 credits, or KEMA10 General Chemistry 7.5 credits and KEMA12 Inorganic Chemistry- Basic Course 7.5 credits, KEMA01 Organic Chemistry- Basic Course 7.5 credits and KEMA03 Biochemistry- Basic Course 7.5 credits,
- KEMB09 Physical Chemistry- Basic Course 15 credits,
- MATA02 Mathematics for Scientists 15 credits, or the equivalent

Students also satisfy the entry requirements if they meet the general entry requirements for higher education and requirements for English proficiency corresponding to English 6 from Swedish upper secondary school, and have passed courses equivalent to

- 75 credits in physics including FYSC11 Atomic and Molecular Physics 7.5 credits and FYSC13 Solid State Physics 7.5 credits
- 30 credits in mathematics

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

Further information

The course may not be included in a degree together with KEMM37 Scattering Methods 7.5 credits. The course is taught together with EXTN85 Scattering Methods 7.5 credits, at LTH.

Subcourses in KEMM67, Chemistry: Scattering Methods

Applies from H19

1901 Scattering Methods, 5,0 hp
Grading scale: Fail, Pass, Pass with distinction
1902 Scattering Methods, Compulsory Elements, 2,5 hp
Grading scale: Fail, Pass