



DEPARTMENT OF CHEMISTRY AND MOLECULAR BIOLOGY

KEM070 Analytical Chemistry: Introductory course, 15 credits

Analytisk kemi 1, 15 högskolepoäng

First Cycle

Confirmation

This course syllabus was confirmed by Department of Chemistry and Molecular Biology on 2016-10-11 and was last revised on 2017-10-04 to be valid from 2017-10-04, autumn semester of 2017.

Field of education: Science 100%

Department: Department of Chemistry and Molecular Biology

Position in the educational system

The course is classified at the level 30-60 credits for Degree of Bachelor. Alternatively, it can be read as a freestanding course.

The course can be part of the following programmes: 1) Marine Science, Bachelor's Programme (N1MAV), 2) Bachelor of Science in Environmental Science (N1MVN), 3) Bachelor's Programme in Molecular Biology (N1MB1), 4) Bachelor of Science Programme in Medicinal Chemistry (N1LMK), 5) Master's Programme in Chemistry (N2KEM), 6) Teacher Training Programme (L1LÄR) and 7) Bachelor of Science Programme in Chemistry (N1KEM)

Main field of studies

Chemistry

Specialization

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

Entry requirements

For admission to the course, completed courses KEM011 Basic chemistry 1 (15 credits) and KEM021 Basic chemistry 2 (15 credits) or equivalent knowledge are required.

Learning outcomes

On completion of the course the student should be able to:

Knowledge and understanding

- **describe** instrumental analytical methods such as liquid chromatography, gas chromatography and capillary electrophoresis as well as the underlying chromatographic theory,
- **describe** electrochemical and atomic spectroscopic analytical methods as well as mass spectrometry,
- **explain** extraction and solubility equilibria,
- **explain** spectrophotometry in the UV-vis spectral range (absorption and fluorescence) as well as X-ray fluorescence.

Competence and skills

- **calculate** ion equilibria,
- **evaluate** titrations (potentiometric and photometric),
- **apply** statistical methods as well as sampling techniques.

Judgement and approach

- **evaluate** the role of analytical chemistry in different applications.

Course content

Course includes:

- Calculation of ion equilibria and titration methods: general formulation of ion equilibria. Selection and graphical presentation of information on equilibria.
- Extraction and solubility equilibria, potentiometric and photometric titrations.
- Use of modern instrumental analytical methods. Chromatographic analytical methods. Liquid chromatography. Gas chromatography. Capillary electrophoresis. - Electrochemical analytical methods.
- Mass spectrometry.
- Spectrophotometry in the UV-vis range (absorption and fluorescence). Molecular spectroscopic methods. Atomic spectroscopic methods (atomic absorption and atomic emission). X-ray fluorescence.
- Applied statistics.

Sub-courses

1. **Analytical chemistry 1, theory** (*Analytisk kemi 1, teori*), 7.5 credits

Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)

This module treats the theoretical aspects of the main topics of the course: sample

preparation, chromatographic and spectroscopic analysis.

2. Analytical chemistry 1, practical parts (*Analytisk kemi 1, laborationer*), 7.5 credits

Grading scale: Pass (G) and Fail (U)

This module treats the practical aspects of the main topics of the course: sample preparation, chromatographic and spectroscopic analysis.

Form of teaching

Teaching is conducted in the form of lectures, exercises, lab tests, and laboratory sessions. The laboratory sessions in the course are compulsory.

Language of instruction: Swedish and English

As principal rule, the course is given in Swedish but can be given completely or partly in English if the circumstances require it.

Assessment

Examination takes place by continuous examination of completed course modules, written examination and presentations of completed laboratory exercises. To pass the whole course, approved results for both written examination and the laboratory exercises are required.

For students who have not passed the ordinary examination, additional examination sessions are offered.

If a student who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons against this (Chapter 6, Section 22 of Higher Education Law).

In case a course is discontinued or has undergone major changes the student should normally be guaranteed access to at least three examination sessions (this number including the regular examination session) during a period of at least one year based on the earlier set-up of the course.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

For the whole course, some of grades Pass with distinction (VG), Pass (G) and Fail (U) is awarded. A written examination is held at the end of the course.

The grading scale for module 1, theory, comprises the grades Fail (U), Pass (G) and Pass with distinction (VG). To pass the whole course, approved results for the compulsory laboratory exercises are required in addition. The grading scale for module 2 comprises the grades Fail (U) and Pass (G).

For students who have not passed the ordinary examination, additional examination sessions are offered.

Regarding application of ECTS scale for grades see the Vice-chancellor's decision 28/05/2007, dnrs G 8 1976/07.

Course evaluation

The course is evaluated on the teaching platform of the university, and the results become subject to discussion between the teachers in the course and representatives for the students.

The results of and possible changes to the course will be shared with students who participated in the evaluation and students who are starting the course.