Faculty of Health, Science and Technology
Chemistry

Syllabus

Analytical Chemistry

Course Code:	KEGB41
Course Title:	Analytical Chemistry *Analytisk kemi*
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:
KTA (Chemical Engineering)

Course Approval
The syllabus was approved by the Faculty of Health, Science and Technology 2016-08-24, and is valid from the Spring semester 2017 at Karlstad University.

Prerequisites
Attended courses in Introductory Chemistry (KEGA21, 7.5 ECTS cr) or Matter (CBGAM0, 7.5 ECTS cr) and Chemical Calculations (KEGA31, 7.5 ECTS cr) and Physical Chemistry (KEGBF2, 7.5 ECTS cr, or equivalent.

Learning Outcomes
The aim of the course is that students acquire basic knowledge of the most common instrumental chemical analysis techniques and develop basic skills in performing and analysing the results of chemical analysis.

Upon completion of the course, students should be able to:
1. characterise, evaluate and assess the result of chemical analyses with the help of basic statistical methods,
2. give accounts of the chemical, physical and measuring principles used in the most common instrumental chemical analysis techniques,
3. assess the potentials and limitations of the most common instrumental chemical analysis techniques applied to common analysis problems,
4. perform quantitative chemical analyses using the most common instrumental analysis techniques according to given instructions and evaluate the results obtained,
5. perform qualitative chemical structural analyses using molecular spectroscopy and mass spectrometry and interpret the results obtained.

Content
The course is divided into a theoretical and a laboratory unit.

The theoretical unit deals with the following concepts and components related to the learning outcomes:
i) analytical chemical nomenclature and methodology (calibration and validation of analytical methods, sampling, accuracy, precision, outliers, detection limits, measuring uncertainty) and basic applied statistics (confidence intervals, hypothesis testing with F- and t-tests and Grubbs' test, linear regression analysis);
ii) molecular spectroscopy (UV/VIS, fluorescence, IR, and NMR spectroscopy) and atomic spectroscopy (emission and absorption in flames and plasmas);
iii) pH and other ion selective measurements, amperometry, coulometry, conductometry;
iv) gas and liquid chromatrography;
v) mass spectrometry

In the laboratory unit some of the instrumental techniques are applied to quantitative analyses in the areas of process chemistry, environmental chemistry, and food production, and to qualitative chemical analyses.

Reading List
See separate document.

Examination
The theoretical unit is assessed on the basis of hand-in assignments and an individual written exam. The laboratory unit is assessed on the basis of mandatory attendance at laboratory sessions and lab reports according to instructions and within a given time frame.

Grades
One of the grades Distinction (VG) Pass (G), or Fail (U) is awarded in the examination of the course. Engineering students are awarded a grade on the scale 5 (Pass with Distinction), 4 (Pass with some distinction), 3 (Pass), or U (Fail).

Quality Assurance
Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate
A course certificate will be provided upon request.

Additional information
The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.

The courses KEGBAA, KEGBAF, BLGAK0, KEGBAM of CKGB61 cannot be included in the same degree programme as KEGB41.