

# Course description

<b>Course abbreviation:</b>	KCH/ANACH	<b>Page:</b>	1 / 3
<b>Course name:</b>	Analytical Chemistry		
<b>Academic Year:</b>	2016/2017	<b>Printed:</b>	22.05.2018 09:54

<b>Department/Unit /</b>	KCH / ANACH	<b>Academic Year</b>	2016/2017
<b>Title</b>	Analytical Chemistry	<b>Type of completion</b>	Exam
<b>Accredited/Credits</b>	Yes, 4 Cred.	<b>Type of completion</b>	Combined
<b>Number of hours</b>	Přednáška 2 [Hours/Week]		
<b>Occ/max</b>	Status A      Status B      Status C	<b>Course credit prior to</b>	NO
<b>Summer semester</b>	19 / -      0 / 0      0 / 0	<b>Counted into average</b>	YES
<b>Winter semester</b>	0 / -      0 / -      0 / -	<b>Min. (B+C) students</b>	not determined
<b>Timetable</b>	Yes	<b>Repeated registration</b>	NO
<b>Language of instruction</b>	Czech	<b>Semester taught</b>	Summer semester
<b>Substituted course</b>	None	<b>Internship duration</b>	0
<b>Preclusive courses</b>	N/A		
<b>Prerequisite</b>	N/A		
<b>Informally recommended courses</b>	N/A		
<b>Courses depending on this Course</b>	N/A		

## Course objectives:

### Aims

Bases of qualitative and quantitative chemical analysis of the inorganic and organic compounds.

## Requirements on student

### Requirements

Satisfying the requirements of exam to obtain at least grading "good".

1. The written test - 2 theoretical questions, 2 examples - minimum gain 75 % of the total points
2. The oral exam - 2 questions

Evaluation of the subject as well as the exam grading is made according to the articles No 31 - 33 in the Regulations on Study and Examinations University of Ostrava

## Content

### Content

1. Definition of analytical chemistry as a science. Basic concepts of analytical chemistry, classification of methods of analytical chemistry. General procedure of chemical analysis. Sample preparation to analysis.
2. The chemical equilibria in analytical chemistry - basic thermodynamic concepts, types of equilibria used in analytical chemistry. Assessment of the analytical reactions.
3. Qualitative chemical analysis. The group and selective reactions of the selected ions, methods of ions separation, tests of the selected ions. Identification of the organic compounds.
4. Quantitative chemical analysis. Principles of gravimetry and volumetry. Gravimetry - basic modes, procedure, gravimetric factor. Examples of the gravimetry practical use.
5. Volumetric analysis - principle, modes, calculation of determination result, classification of methods on base of the used reactions. Potentiometric determination of equivalence point - brief bases of potentiometry.
5. - 6. The neutralization volumetric methods. Acidobasic titration, assembling of titration curve, calculation of endpoint pH, acidobasic indicators. Types of acidobasic titrations. Examples of practical determination.
7. The precipitating volumetric methods - precipitation titration, explaining of titration curves; endpoint indication. Argentometric titration.
8. The compleximetric volumetric methods - compleximetry, mercurimetry. The organic analytical agents, chelates. Assembling of titration curve, indication of endpoint, metallochromic indicators. Examples of practical determination. Spectrophotometric indication of equivalence point - brief bases of the methods.

9. The redox volumetric methods - redox titration, explaining of titration curve, calculation of endpoint potential. Potentiometric monitoring of titration curve course. Examples of the oxidimetric and reductometric determination.
10. Analysis of the organic compounds. Quantitative elementary analysis, basic chemical principles of C, H, N, S determination. Analysis of the function groups of the organic compounds. The instrumental methods used for analysis of the organic compounds - brief bases, examples of application.
11. The analytical methods evaluation, bases of chemometrics. The development trends of the modern methods of analytical chemistry.

#### Prerequisites - other information about course preconditions

none

#### Competences acquired

Competences

The students acquire knowledge of principles of the classical analytical methods, they orientate in the practical applications of the classical analytical methods.

#### Fields of study

#### Guarantors and lecturers

- **Guarantors:** doc. Ing. Zuzana Navrátilová, CSc.
- **Lecturer:** doc. Ing. Zuzana Navrátilová, CSc.

#### Literature

- **Recommended:** Renger F., Kalous J. *Analytická chemie I, (skripta) VŠCHT Pardubice 1991.*
- **Recommended:** Okáč A. *Analytická chemie kvalitativní, Academia Praha, 1966..*
- **Recommended:** Holzbecher Z., Churáček J. a kol. *Analytická chemie, SNTL, Praha 1987..*
- **Recommended:** Šůcha L., Kotrlý S. *Teoretické základy analytické chemie. 1. vyd. Praha: SNTL 1971.*
- **Recommended:** ? OPEKAR F., JELÍNEK I. RYCHLOVSKÝ P., PLZÁK. *Základní analytická chemie (pro studenty, pro něž anal. chemie není hlavním oborem). 1.vyd. Praha: UK vydavatelství Karolinum 2002.*

#### Time requirements

Activities	Time requirements for activity [h]
Being present in classes	26
Self-tutoring	14
Preparation for an exam	50
Consultation of work with the teacher/tutor (incl. electronic)	10
<b>Total:</b>	<b>100</b>

#### assessment methods

##### professional knowledge

Oral examination

Written examination

#### teaching methods

##### professional knowledge

Monologic (explanation, lecture, briefing)

#### learning outcomes

##### professional knowledge - knowledge resulting from the course:

Competences

The students acquire knowledge of principles of the classical analytical methods, they orientate in the practical applications of

the classical analytical methods.

**Course is included in study programmes:**

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Applied Physics	Bachelor	Full-time	Biophysics	1	2014	2016	Povinné předměty	A	3	LS
Applied Physics	Bachelor	Full-time	Biophysics	1	2012	2016	Povinné předměty	A	3	LS
Chemistry	Bachelor	Full-time	Chemistry	1	2012	2016	Povinné předměty	A	2	LS
Biology	Bachelor	Part-time	Applied Ecology	1	2012	2016	Povinně volitelné předměty	B	2	LS