COURSE DESCRIPTION CARD - SYLLABUS

Course name
Analytical chemistry - gravimetric analysis [S1TCh2E>CAaw]

Course

Field of study
Chemical Technology

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture
0

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

Knowledge gained during the lectures on analytical chemistry and basic analytical chemistry laboratories. Basic knowledge of inorganic chemistry and analytical chemistry (acid-base reactions, oxidation-reduction reactions, complexometric reactions, precipitate-formation titrations and gravimetric analysis theory) and mathematical tools used in the chemical calculations. Usage a of basic chemical apparatus, volumetric glassware, knowledge of laboratory equipment for gravimetric analysis. Student is able to perform basic chemical analysis, interprets the results of analyses and draw appropriate conclusions.

Course objective

The aim of the course is familiarization Students with the practical use of the techniques and methods used in gravimetric analysis. Teaching the correct way to conduct the determination in gravimetric analysis (methodology, precipitation technique, filtration, drying, heating the sample and weighing operations).

Course-related learning outcomes

Knowledge:
1. Student has the necessary knowledge in the field of chemistry for the understanding of phenomena and processes occurring during gravimetric analysis used in analytical chemistry [K_W03,K_W11]

2. Student has a systematic, theoretically founded general knowledge in the field of precipitation technique, filtering, drying, heating the sample and weighing operations and determination of an analyte in the test sample [K_W08]

Skills:
1. Student can obtain the necessary information from the literature to conduct the gravimetric determination of an analyte in the test sample [K_U01]
2. Student is able to perform gravimetric analysis, interprets the results of the analysis and draw appropriate conclusions [K_U01, K_U18, K_U21]
3. Student is able to work both individually and in team during the laboratory work [K_U02]

Social competences:
1. Student understands the need for self-studying and improvement of their professional competences [K_K01]
2. Student is aware of the principles of engineering ethics [K_K02, K_K05]
3. Student can cooperate and work in a group, taking different roles [K_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Skills acquired in the course of the laboratory exercises are verified on the basis final test (carried out in a stationary or remote mode (e-Kursy platform), depending on the situation). The colloquium consists of 5-8 tasks/questions, differently scored depending on their level of difficulty. Passing threshold: 55% of points. After each experiment, Student is required to make a written report.

Programme content

Issue related to gravimetric analysis.

Course topics

The following tasks will be performed during the laboratory classes:
1. The assessment of risks occurring during the laboratory work.
2. Preparation of the crucibles.
3. Simultaneous determination of iron and nickel:
- separation of the iron (III) ions from nickel (II) ions using acetate method,
- gravimetric determination of nickel,
- gravimetric determination of iron as Fe2O3.
4. Calculating and interpreting the results.

Teaching methods

Performing determinations based on knowledge gained during lectures in analytical chemistry and discussions with the laboratory teacher - practical classes

Bibliography

Basic:
1. J. Minczewski, Z. Marczenko, Chemia analityczna, t.1 i 2, PWN Warszawa 2007/2020
2. A. Cygański, Chemiczne metody analizy ilościowej, WNT Warszawa 2005/2013
3. D.A.Skoog, D.M. West, F.J. Holler, S.R. Crouch, Podstawy chemii analitycznej, t.1, WNT Warszawa 2006/2007
4. A. Cygański, B. Ptaszyński, J. Krystek, Obliczenia w chemii analitycznej, WNT Warszawa 2004

Additional:
1. Z. Galus, Ćwiczenia rachunkowe z chemii analitycznej, PWN, Warszawa 2013/2020
2. R. Kellner, J.M. Mermet, M. Otto, H.M. Widmer, Analytical Chemistry, Wiley-VCH, Weinheim, 1984.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50