COURSE DESCRIPTION CARD - SYLLABUS

Course name
Analytical chemistry - titrants and acid-base standardization [S1TCh2>CAmioa]

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
polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
0

Laboratory classes
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

dr hab. inż. Ewa Stanisz
ewa.stanisz@put.poznan.pl

dr hab. inż. Mariusz Ślachciński
mariusz.slachcinski@put.poznan.pl

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 volumetric 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 volumetric analysis. Teaching the correct way to conduct the standardization process in volumetric analysis.

Course-related learning outcomes

Knowledge:
1. The student has a systematized, general theoretical knowledge of basic and analytial chemistry. Acquires the ability to plan chemical experiments and develop results [K_W08]
2. The student has the necessary knowledge of analytical chemistry to understand chemical phenomena and analytical processes.[K_W03]

Skills:
1. The student can assess the suitability of analytical methods and techniques appropriate for solving engineering tasks of a practical nature in analytical chemistry. [[K_U14]
2. The student can use the correct chemical terminology and nomenclature of chemical compounds [K_U17]
3. The student can select analytical methods for determination of chemical compounds. [K_U21]
4. The graduate can implement the process of self-learning. [K_U05]

Social competences:
1. The student understands the need to develop and improve their professional competences [K_K01]
2. The student can cooperate and work on a team [K_K03]
3. The student can appropriately determine the priorities for accomplishing the assigned task. [K_K04]

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

The following analytical tasks will be performed during the laboratory classes:
1. Preparation of the standard solution of 0.1 M hydrochloric acid (standardization with using of anhydrous sodium carbonate).
2. Preparation of the 0.1 M sodium hydroxide standard solution (standardization with using of the previously prepared standrd solution of hydrochloric acid). 3. Co-determination of hydrochloric and phosphoric acid (V).
3. Co-determination of hydrochloric acid and phosphoric acid (V).
4. Calculating and interpreting the results.
Before the cycle of laboratory classes, students are acquainted with the general principles of safety health at work in a chemical laboratory.

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.
3. A. Hulanicki, Reakcje kwasów i zasad w chemii analitycznej PWN Warszawa 1992

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