



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Analytical Chemistry - Titrants and Acid-Base Standardization

Course

Field of study

Chemical Technology

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

II/3

Profile of study

general academic

Course offered in

English

Requirements

elective

Number of hours

Lecture

0

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Magdalena Krawczyk-Coda

email: magdalena.krawczyk@put.poznan.pl

tel. 0616652283

Wydział Technologii Chemicznej

ul. Berdychowo 4, 60-965 Poznań

Responsible for the course/lecturer:

dr hab. inż. Ewa Stanisz

email: ewa.stanisiz@put.poznan.pl

tel. 0616652005

Wydział Technologii Chemicznej

ul. Berdychowo 4, 60-965 Poznań

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 of basic chemical apparatus, volumetric glassware, knowledge of laboratory equipment for titrimetric 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 during preparation of standard solutions which are used in titrimetric analysis. Teaching the correct way to conduct the determination in titrimetric analysis (methodology, selection and weighing of the solute, preparation of titrant and its using for co-determination of hydrochloric acid and phosphoric(V) acid - titration).

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 titrimetric analysis used in analytical chemistry - [K_W03, K_W11]
2. student has a systematic, theoretically founded general knowledge in the field of titrimetric analysis - [K_W08]

Skills

1. Student can obtain the necessary information from the literature to perform preparation of standard solution and its using for determination of an analyte in the test sample - [K_U01]
2. Student is able to perform basic chemical 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. The students understand the need for self-studying and improvement of their professional competences - [K_K01]
2. The student is aware of the principles of engineering ethics - [K_K02, K_K05]
3. Students 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 of final test. The colloquium consists of 5-8 tasks/questions, differently scored depending on their level of difficulty. Passing threshold: 55% of points. After each determination, the student is required to make a written report.

Programme content

The following tasks will be performed during the laboratory classes:

1. The assessment of risks occurring during the laboratory work.
2. Preparation of standard solution (selection, weighing and dissolution of the solute, titration).



- Using of prepared standard solution for co-determination of hydrochloric acid and phosphoric(V) acid.
- 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

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

Additional

- Z. Galus, Ćwiczenia rachunkowe z chemii analitycznej, PWN, Warszawa 1993
- 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	45	2,0
Classes requiring direct contact with the teacher	25	1,1
Student's own work (literature studies, preparation for laboratory classes, preparation for tests) ¹	20	0,9

¹ delete or add other activities as appropriate