



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Analytical Chemistry

		Course
Field of study		Year/Semester
Environmental Protection Technologies		II/3
Area of study (specialization)		Profile of study
-		general academic
Level of study		Course offered in
First-cycle studies		polish
Form of study		Requirements
full-time		compulsory

		Number of hours
Lecture	Laboratory classes	Other (e.g. online)
0	45	0
Tutorials	Projects/seminars	
0	0	
Number of credit points		
5		

		Lecturers
Responsible for the course/lecturer:		Responsible for the course/lecturer:
Dr hab. inż. Mariusz Ślachciński		
email: Mariusz.Slachcinski@put.poznan.pl		
tel. 616652314		
Wydział Technologii Chemicznej		
ul. Berdychowo 4 60-965 Poznań		

Prerequisites
Basic knowledge of inorganic chemistry, apparatus used in the chemical laboratory, mathematical tools used in the chemical calculations
The student uses the basic literature, can choose the analytical procedure and the appropriate instrumentation (chemical apparatus and laboratory glass)

Course objective

To familiarize students with the practical use of conventional techniques and methods used in analytical chemistry. Learning the proper way to conduct (methodology, preparation of standard solutions, titration, weighing, precipitation and filtration, washing, heating) the methods used in the laboratory (acid-base titration, oxidation-reduction titrations, complexometric titration, precipitation, gravimetric



techniques) as well as the acquisition of proficiency in analytical calculations which will shape the student's confidence in their own skills in performing the analyzes

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 the reaction used in analytical chemistry - [[K_W02,K_W07]]
2. Student has a systematic, theoretically founded general knowledge in the field of analytical chemistry - [[K_W07]]

Skills

1. Student can obtain the necessary information from the literature to conduct the determination of an analyte in the test sample - [[K_U01]]
2. Student is able to perform basic chemical analysis, interprets the results of analyzes and draw appropriate conclusions - [[K_U01, K_U06, K_U13]]

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:

Written control (carried out in a stationary or remote mode via e-Kursy platform) of the student's knowledge before the laboratory classes. Written reports of the performed exercises.

Programme content

Theoretical basis of analytical chemistry : ionic activity and ionic strength in solutions, strong and weak electrolytes; balance in the acid-base reactions, oxidation-reduction reactions/titration , complexes and complex formation/titration, precipitate-formation/titration, gravimetry; volumetric analysis (titration curves, indicators, analytical calculations,).

Teaching methods

Knowledge acquired during the lecture is verified during the written exam, containing 10 questions with different scores depending on the degree of difficulty. Carried out in a stationary or remote mode via e-Kursy platform. Passing threshold: 55% of points.

A series of laboratory exercises of classical analysis is preceded by checking the theoretical foundations of the methods used (carried out in a stationary or remote mode via e-Kursy platform). Students prepare written reports on completed exercises.



Bibliography

Basic

1. D.A.Skoog, D.M. West, F.J. Holler, S.R. Crouch, Podstawy chemii analitycznej, t.1 i 2, WNT Warszawa 2006/2007
2. J. Minczewski, Z. Marczenko, Chemia analityczna, t.1 i 2, WN PWN Warszawa 2007
3. A. Cygański, Chemiczne metody analizy ilościowej, WNT Warszawa 2019
4. A. Cygański, B. Ptaszyński, J. Krystek, Obliczenia w chemii analitycznej, WNT Warszawa 2004
5. M. Wesołowski, K. Szefer, D. Zimna, Zbiór zadań z analizy chemicznej, WNT Warszawa 2002

Additional

1. W. Ufnalski, Równowagi jonowe, WNT Warszawa 2004
2. A. Hulanicki, Reakcje kwasów i zasad w chemii analitycznej, WN PWN Warszawa 2012
3. Z. Galus, Ćwiczenia rachunkowe z chemii analitycznej, WN PWN Warszawa 2020

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	70	2,8
Student's own work (literature studies, preparation for laboratory classes, preparation for tests) ¹	55	2,2

¹ delete or add other activities as appropriate