COURSE DESCRIPTION CARD - SYLLABUS

Course name
The use of atomic spectrometry techniques in the pharmaceutical analysis [S1IFar1>ZTASPA]

Course

Field of study
Pharmaceutical Engineering

Year/Semester
2/4

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
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Good knowledge of inorganic, analytical and instrumental chemistry, apparatus used in the chemical laboratory, mathematical tools used in the chemical calculations. Usage a of chemical apparatus and volumetric glassware.

Course objective

The use of spectroscopic techniques (more detailed than in basic course): Absorption atomic spectrometry: atomization techniques, absorption interferences, quantitative analysis, special techniques in AAS. Optical emission spectrometry: theory of atomic spectra formation, modern excitation sources (inductively coupled plasma, microwave induced plasma, direct current plasma), quantitative analysis, qualitative and quantitative spectrographic technique. Assessment of the results of chemical analysis.

Course-related learning outcomes

Knowledge:
1. student has good knowledge in the field of chemistry for the understanding of phenomena and processes occurring during analysis, k_w4
2. student has theoretically founded good knowledge in the field of analytical chemistry and

instrumental analysis k_w04
3. knows classical and instrumental methods used in assessing the quality of substances for pharmaceutical purposes and in quantitative analysis in medicinal products k_w7

Skills:
1. student can obtain therelevant information from the literature to conduct the determination of an analyte in the real sample. k_u01
2. student is able to perform chemical analysis, interprets the results of analyzes and draw appropriate conclusions k_u2, k_u3, k_u10
3. student is is able to correctly interpret the results of analyzes and draws the appropriate conclusions from them, k_u5

Social competences:
1. students can understands the need for self-education and raising their competences in the field of instrumental analysis, k_k1
2. student is able to work both individually and in team during the laboratory work, k_k2

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
A series of laboratory exercises of instrumental 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.

Programme content

The practical use of spectroscopic techniques - Absorption atomic spectrometry: atomization techniques, absorption interferences, quantitative analysis, special techniques in AAS; Optical emission spectrometry: theory of atomic spectra formation, modern excitation sources (inductively coupled plasma, microwave induced plasma, direct current plasma), quantitative analysis, qualitative and quantitative spectrographic technique; Absorption UV-Vis spectrophotometry: theory of molecular electronic transitions, instrumental design, quantitative spectrophotometric analysis. Assessment of the results of chemical analysis.

Teaching methods

Laboratory classes: analyte determinations using analytical apparatus in accordance with the instructor"s instructions.

Bibliography

Basic
1. D.A. Skoog, D.M. West, F.J. Holler, S.R. Crouch, Podstawy Chemii Analitycznej T. 1 i 2, PWN, Warszawa, (1) 2006, (2)2007
2. J. Minczewski, Z. Marczenko, Chemia Analityczna. Analiza Instrumentalna T. 1-3, PWN, Warszawa, 1,2 (2007), 1(1985)
3. A. Cygański, Chemiczne metody analizy ilościowej, WNT Warszawa, 2019
4. A Cygański, Metody spektroskopowe w chemii analitycznej, WNT, Warszawa, 2020
5. I. Baranowska (red.) Analiza śladowa – Zastosowania, Wydawnictwo MALAMUT, Warszawa, 2013
6. J. Namieśnik, P. Konieczka, B. Zygmunt, Ocena i kontrola jakości wyników analitycznych, WNT, 2014.
7. A. Cygański, B. Ptaszyński, J. Krystek, Obliczenia w chemii analitycznej, WNT Warszawa, 2004
8. M. Wesołowski, K. Szefer, D. Zimna, Zbiór zadań z analizy chemicznej,WNT Warszawa, 2002
Additional
1. J. Dojlido, J. Zerbe, Instrumentalne metody badania wody i ścieków, Arkady, Warszawa 1997
2. A. Cygański, Chemiczne metody analizy ilościowej, WNT Warszawa, 2019

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	40	1,30
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	0,70