



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Instrumental Analysis

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)

15

0

0

Tutorials

Projects/seminars

0

0

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

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Wydział Technologii Chemicznej

ul. Berdychowo 4, 60-965 Poznań

Responsible for the course/lecturer:

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Wydział Technologii Chemicznej

ul. Berdychowo 4, 60-965 Poznań

Prerequisites

The student has knowledge of chemistry, physics and mathematics, necessary to understand the physicochemical phenomena used in instrumental techniques.

The student should use English.

The student has the ability to understand and analyze phenomena and situations.

The student is aware of the limitations of their own knowledge and understands the need for further education



Course objective

The aim of the course is to provide students with knowledge of selected modern instrumental methods.

Course-related learning outcomes

Knowledge

1. Student should know and understand the basics of instrumental analytical techniques, knows their general principles of operation. [K_W09]

Skills

1. The student has the ability to select the appropriate instrumental technique necessary to solve the analytical problem. [K_U12, K_U18]

2. The student has the ability to use specialized vocabulary in Polish and English. [K_U01, K_U08]

Social competences

1. The student understands the need for self-education and raising their professional competences. [K_K01]

2. The student is aware of compliance with the principles of engineering ethics in a broad sense. [K_K02, K_K05]

3. Student is able to interact and work in a group, taking on different roles in it. [K_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam

Programme content

These are sequentially selected instrumental techniques:

1. spectral (UV-VIS spectrophotometry, flame photometry, spectrography, atomic absorption spectrometry),

2 chromatographic (gas and liquid chromatography, combination of both techniques with mass spectrometry)

3. electrochemical (types of electrodes, polarography and its modifications).

For each of these groups of techniques, the theoretical foundations of physicochemical phenomena leading to the formation of the analytical signal and the method of its measurement, apparatus and methods of its calibration, measurement errors and their elimination are discussed. In addition, examples of applications in the analysis of real samples are presented.

Teaching methods

Lecture: multimedia presentation and discussion of examples



Bibliography

Basic

1. A. Cygański, Metody spektroskopowe w chemii analitycznej, WNT, Warszawa 1995
2. Z. Witkiewicz, Podstawy chromatografii, WNT, Warszawa 1995
3. A. Cygański, Podstawy metod elektroanalitycznych, WNT, 1999
4. J. Minczewski, Z. Marczenko, Chemia Analityczna. Analiza Instrumentalna, T.3, PWN, Warszawa 1985
5. P. Sudera, J. Silbering, Spektrometria mas, Wyd. Uniwersytetu Jagiellońskiego Kraków 2006

Additional

1. J. Dojlido, J. Zerbe, Instrumentalne metody badania wody i ścieków, Arkady, Warszawa 1997
2. W. Szczepaniak, Metody instrumentalne w analizie chemicznej, PWN, Warszawa 2002
3. D.A. Skoog, D.M. West, F.J.Holler, S.R. Crouch, Podstawy chemii analitycznej, T. 1 i 2, PWN, Warszawa 2006
4. Z. Witkiewicz, J. Hetper, Chromatografia gazowa, WNT, Warszawa 2001
5. J. Namieśnik, Z. Jamórgiewicz, M. Pilarczyk, L. Torres, Przygotowanie próbek środowiskowych do analizy, WNT Warszawa 2000

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,0
Classes requiring direct contact with the teacher	15	0,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	15	0,5

¹ delete or add other activities as appropriate