



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Advanced methods in electrochemical chemistry

Course

Field of study

Environmental Protection Technologies

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

II/4

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Grzegorz Milczarek,

prof. PP

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tel. 61 665 30 15

Wydział Technologii Chemicznej

ul. Berdychowo 4 60-965 Poznań

Responsible for the course/lecturer:

dr inż. Włodzimierz Zembruski,

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Wydział Technologii Chemicznej

ul. Berdychowo 4 60-965 Poznań

Prerequisites

The student has ordered knowledge of mathematics, physics and inorganic chemistry, basic knowledge about the properties of chemical compounds and electroanalysis, obtained during the first year of the study, necessary to formulate and solve simple tasks in the field of electroanalytical methods. In addition, he uses basic chemical apparatus in the field of electroanalysis and understands the need for further education.



Course objective

To familiarize students with the practical use of typical and modern electrochemical methods in the quantitative analysis of pollutants present in the environment. Systematization and extension of knowledge in the field of: electrochemical analysis regarding accumulation and digestion, potentiometry with the use of ion-selective electrodes, semiconductor transducers, electrochemical detectors and atmospheric pollution monitors, analytical systems for flow measurements and the use of electrochemical measurements in the ecology of surface water reservoirs.

Course-related learning outcomes

Knowledge

1. The student has ordered, theoretically founded knowledge covering key issues in the field of physical and analytical chemistry [K_W06]
2. The student has ordered, theoretically founded knowledge covering key issues in the field of electroanalytical methods [K_W15, K_W16]

Skills

1. The student is able to obtain information from literature, databases and other scientific sources, interpret them and draw conclusions and form opinions based on the collected information. [K_U01]
2. The student is able to develop and present an oral presentation on electrochemical methods of analysis in samples typical for environmental protection technologies. [K_U05]
3. The student is able to correctly use the terminology and nomenclature used in electrochemical analysis methods, also in English. [K_U08]

Social competences

1. The student is able to think and act in a creative and entrepreneurial way. [K_K06]
2. The student is aware of the importance and understands the non-technical aspects of electroanalytical methods, including their importance in environmental monitoring. [K_K02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired as a part of the lecture is verified in an optional way: (1) assessment of knowledge - colloquium or (2) development of a selected issue. Assessment threshold for the colloquium: 50% of the points.

Programme content

During the series of lectures, advanced electroanalytical methods will be presented: development and methods of conducting electrochemical analysis (including analytical systems for flow measurements); modern electrodes used; ways of working. Examples of the use of electrochemical detectors, atmospheric pollution monitors, and electrochemical water toxicity analyzers in environmental assessment will be discussed.



Teaching methods

Lecture: multimedia presentation, discussion.

Bibliography

Basic

1. Andrzej Cygański, Podstawy metod elektroanalitycznych, WNT, wyd. 3zm. 1999
2. Walenty Szczepaniak, Metody instrumentalne w analizie chemicznej, PWN, 2020

Additional

1. Elektroanaliza w ochronie środowiska naturalnego, Praca zbiorowa pod redakcją Roberta Kalvody, WNT, 1992.
2. Publikacje naukowe w polskich i zagranicznych czasopismach z zakresu elektroanalizy.

Breakdown of average student's workload

	Hours	ECTS
Total workload	45	3,0
Classes requiring direct contact with the teacher	30	2,0
Student's own work (literature studies, preparation for tutorials) ¹	15	1,0

¹ delete or add other activities as appropriate