COURSE DESCRIPTION CARD - SYLLABUS

Course name
Analytical and instrumental chemistry in environmental analysis [S1IChiP1>CAiIwAŚ]

Course

Field of study
Chemical and Process 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

The student has general knowledge in the field of analytical chemistry and instrumental analysis gained during the classes in analytical and instrumental chemistry. The student uses basic chemical equipment and laboratory glassware.

Course objective

The aim of this course is to familiarize students with the practical use of basic instrumental techniques and analytical methods used in environmental analysis.

Course-related learning outcomes

Knowledge:
1. k_w03 the student distinguishes and is able to assess the possibility of using a given analytical method and / or instrumental technique.
2. k_w07 the graduate knows the operation principles of the measurement systems. the graduate

understands the operation principle of the apparatus used in instrumental techniques.

Skills:
1. k_u08 the graduate can plan and conduct simple experiments, interpret their results and draw conclusions. selects and applies analytical methods and techniques in qualitative and quantitative analysis. has the ability to perform quantitative analysis.
2. k_u05 the graduate has the ability to self-study.
3. k_u12 the graduate applies whs (work health and safety) principles in the analytical laboratory.

Social competences:
1. k_k01 the graduate understands the need to develop and improve his/her professional competency.
2. k_k03 the graduate is aware of the importance of professional conduct and respect for professional ethics.
3. k_k04 the graduate is aware of the responsibility for his/her own work and the willingness to comply and responsibility for tasks carried out as a team.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Verbal and written control of the student"s knowledge prior to the commencement of laboratory classes (carried out in a stationary or remote mode (e-Kursy platform), depending on the situation). Written reports on the exercises performed.

Programme content

The laboratory classes include six exercises in the field of environmental analysis (two exercises in volumetric analysis and four in instrumental analysis):
1. Iodometric determination of the active chlorine in water.
2. Determination of oxygen dissolved in water by the Winkler method.
3. Voltammetric determination of lead.
4. Spectrophotometry - determination of nitrite nitrogen in water.
5. Photometric determination of sodium and potassium in environmental samples.
6. Determination of bromides in tap water.
Before the series of laboratory classes, students are familiarized with the general principles of safety work in the chemical laboratory, during the classes health and safety instructions regarding a given workplace are given.

Teaching methods

Performing experiments in accordance with the schedule of the subject and a written report including the appropriate chemical reactions along with mathematical calculations.

Bibliography

Basic
1. A. Cygański, Metody spektroskopowe w chemii analitycznej, WNT, Warszawa 1995
2. D.A. Skoog, D.M. West, F.J.Holler, S.R. Crouch, Podstawy chemii analitycznej. Tom 1 i 2, PWN, Warszawa 2006
3. A. Cygański, Podstawy metod elektroanalitycznych, WNT, 1999
4. J. Minczewski, Z. Marczenko, Chemia Analityczna. Tom 1, 2 i 3, PWN, Warszawa 1985
5. A. Cygański, Chemiczne metody analizy ilościowej, WNT, Warszawa 2005
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. H. Elbanowska, J. Zerbe, J. Siepak, Fizyczno – chemiczne badania wód, Wydawnictwo Naukowe UAM, Poznań 1999

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,20
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	0,80