COURSE DESCRIPTION CARD - SYLLABUS

Course name
Industrial and environmental analysis [S2TOZ1>APiŚ]

Course

Field of study
Circular System Technologies

Year/Semester
1/1

Area of study (specialization)
Material recycling and chemical recovery

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
15

Number of credit points

2,00

Coordinators

dr hab. inż. Agnieszka Zgoła-Grześkowiak prof. PP
agnieszka.zgola-grzeskowiak@put.poznan.pl

Lecturers

Prerequisites

The student has a structured knowledge of chemistry, basic knowledge of analytical chemistry and instrumental analysis, obtained in the course of the program at the first degree. The student should have the knowledge and skills acquired in the subject of mathematics necessary in chemical calculations to solve complex tasks in the field of study.

Course objective

The aim of the course is to familiarize students with topics related to industrial and environmental analysis.

Course-related learning outcomes

Knowledge:
The student has knowledge of assessing the effects of environmental pollution and degradation and their impact on human health and living organisms; has knowledge of the environmental aspects of the operation of an enterprise in a circular economy; has knowledge of monitoring industrial processes and the state of the environment; has knowledge of representative sampling and storage; has knowledge of measurement techniques used in analytics and circular systems technologies; has the knowledge necessary to carry out an assessment of the state of the environment and is aware of the consequences

of a planned production project, its impact on the environment and the responsibility for decisions taken [K_W04, K_W07, K_W10].

Skills:
Students are able to obtain information from professional literature and other sources and apply it to formulate conclusions; they can understand foreign-language texts (e.g., technical documentation, analytical procedures) in their discipline, interpret and critically evaluate them; they can assess the applicability of new techniques and technologies in the area of circular economy and environmental protection; they can plan and conduct experiments using appropriate methods, techniques and tools; they can prepare and deliver a presentation on a given topic [K_U01, K_U02, K_U05, K_U06, K_U15].

Social competences:
The student is ready to determine priorities for the implementation of a specific task; critically evaluates his/her knowledge, understands the need for further education and improvement of his/her professional, personal and social competence; is able to plan tasks in a mutlidisciplinary team in order to implement a change in the chemical process taking into account the principles of circular economy; is able to think and act in an entrepreneurial manner, while being aware of his/her social role and public interest [K_K01, K_K03, K_K04].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired in the lecture is verified during a written credit colloquium at the end of the semester. The credit includes the material presented in the lecture and posted on eKursy for self-study. The final course grade also includes lecture activities. Credit threshold: 50% of the points].
Skills acquired in project classes are verified on the basis of the completed individual project and credit in the form of oral verification of the submitted project, consisting of 3-5 open questions related to the project. Credit threshold: 50% of the points from the oral answer and the correctness of the prepared project.
If the classes will be held remotely, the forms of course credit remain the same and will be conducted using the tools provided by Poznan University of Technology (https://elearning.put.poznan.pl/).

Programme content

Steps to follow in environmental and industrial analysis.

Course topics

Methods of collecting solid, liquid and gaseous samples. Preservation and storage of material collected for testing. Preparation of samples for instrumental analysis. Modern analytical methods used in environmental and industrial analysis. Trace analysis. Chemical speciation. Monitoring and biomonitoring. Control and quality assurance of measurement results in analysis.

Teaching methods

1. Lecture: multimedia presentation, discussion. Supporting materials for classes posted on eKursy.
2. Project: multimedia presentation and performance of tasks given by the instructor - practical exercises, development of methodology for determination of contaminant in the selected matrix.

Bibliography

Basic:
1. J. Namieśnik, Z. Jamrógiewicz, M. Pilarczyk, L. Torres, Przygotowanie próbek środowiskowych do analizy, PWN, Warszawa 2000.
2. A. Hulanicki, Współczesna chemia analityczna, PWN, Warszawa 2001
2. J. Namieśnik, Z. Jamrógiewicz (red.) Fizykochemiczne metody kontroli zanieczyszczeń środowiska. WNT, Warszawa, 1998.
3. Praca zbiorowa pod red. P. Konieczki i J. Namieśnika, Ocena i kontrola jakości wyników pomiarów analitycznych. WNT,Warszawa 2013.
4. K. Danzer, E Than, D. MOlch, L. Kuchler, Analityka, Przegląd systematyczny, WT, Warszawa, 1993

Additional:
1. G.W. Ewing, Metody instrumentalne w analizie chemicznej, PWN, Warszawa 1980
2. J. Dojlido, J. Zerbe, Instrumentalne metody badania wody i ścieków, Arkady, Warszawa 1997

Breakdown of average student's workload

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