COURSE DESCRIPTION CARD - SYLLABUS

Course name
Utilization of electrochemical waste [N2TCh2-TCO>UOE]

Course

Field of study
Chemical Technology

Year/Semester
2/3

Area of study (specialization)
General Chemical Technology

Profile of study
general academic

Level of study
second-cycle

Course offered in
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
10

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

Has the necessary knowledge of chemistry to enable understanding of chemical phenomena and processes. Has the necessary knowledge about raw materials, products and processes used in chemical technology.

Course objective

Obtaining knowledge about the principles and assumptions of green chemistry focused on sustainable development, i.e. the production of a safe chemical product by modern, economic methods, while protecting the natural environment and the utilization and recovery of electrochemical waste.

Course-related learning outcomes

Knowledge:
1. Has expanded and depth knowledge in the field of green chemistry, allowing to formulate and solve complex tasks related to chemical technology. - [K_W2]
2. Has expanded knowledge of environmental problems related to the implementation of chemical processes. - [K_W8]

Skills:
1. Is able to determine independently the directions of further education and implement self-education. - [K_U5]
2. Has the ability to adapt knowledge in the field of green chemistry to solve problems in the field of chemical technology and planning new industrial processes. - [K_U12]
3. Is able to plan rationally the use of natural resources in the chemical industry, guided by the principles of environmental protection and sustainable development. - [K_U13]

Social competences:
1. Is aware of the limitations of science and technology related to environmental protection. - [K_K2]
2. Understands the need to provide to the public of information on the current state and directions of development of chemical technology, on the principles of use and handling of chemical products, about the risks associated with obtaining raw materials, chemical production and distribution. - [K_K7]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified by a written final test. Passing threshold: 51% of the maximum number of points.
In the case of on-line classes, the knowledge will be verified by a test consisting of 10 - 20 questions. Passing threshold: 51% of the maximum number of points.

Programme content

Standards and regulations regarding environmental protection and measures applied to prevent water, soil and atmosphere pollution with solid, liquid, gas and dust waste. Technological possibilities of waste reduction, recycling, methods used for material recovery. Methods for stabilizing and solidifying solid and liquid waste.

Teaching methods

Lecture.

Bibliography

Basic:
1. T.Stefanowicz, Gospodarka wodno-ściekowa i odpadowa w przemyśle elektrochemicznym, Wyd. Politechniki Poznańskiej, Poznań, 2001.
2. T.Stefanowicz, Otrzymywanie i odzysk metali oraz innych surowców ze ścieków i odpadów pogalwanicznych, Wyd. Politechniki Poznańskiej, Poznań, 1992

Additional:
1. B.Bartkiewicz, K. Umiejewska,Oczyszczanie ścieków przemysłowych, Wyd. Naukowe PWN, Warszawa 2020.
2. L.K Wang, N.K. Shammas, Y.-T. Hung (eds) Advances in Hazardous Industrial Waste Treatment CRC Press, Taylor and Francis Group, Boca Raton Fl. USA 2009.
3. M. Thomas; M. Osińska; A. Ślosarczyk, Long-Term Behavior of Cement Mortars Based on Municipal Solid Waste Slag and Natural Zeolite-A Comprehensive Physico-Mechanical, Structural and Chemical Assessment, Materials 2022, Volume 15, Issue 3, 1001

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	10	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	0,50