COURSE DESCRIPTION CARD - SYLLABUS

Course name
Basics of electrochemical technology - Synthesis of electrode materials for chemical power sources [S1TOZ1>PTEsmedcźp]

Course

Field of study
Circular System Technologies

Year/Semester
3/5

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
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

The student has basic knowledge of mathematics and physical chemistry. The student uses the basic techniques used in a chemical laboratory

Course objective

The aim of the course is to familiarize students with the theoretical and practical aspects of technical electrochemistry and to familiarize students with the processes of synthesis of electrode materials used in chemical power sources in practice, in accordance with the assumption of the circular systems economy.

Course-related learning outcomes

Knowledge:
1. has knowledge of physics and chemistry that allows to understand the phenomena and changes occurring in technological and environmental processes - [k_w02].
2. has knowledge of mathematics, physics and chemistry necessary to describe the ideas, concepts and principles of circular systems technologies and the characteristics of connections and dependencies between its components - [k_w03].

3. has systematized theoretical knowledge of inorganic, organic, physical and analytical chemistry - [k_w04].
4. has knowledge of the negative impact of manufacturing and processing technologies on the natural environment - [k_w08].

Skills:
1. can obtain information from literature, databases and other sources related circular systems technologies, integrate them, interpret them, draw conclusions and formulate opinions, also in a foreign language - [k_u01].
2. plans, selects equipment and scientific apparatus, carries out research, analyzes the results and formulates conclusions on this basis - [k_u03].
3. can plan and organize work individually and in a team - [k_u08].

Social competences:
1. in every situation behaves professionally, takes responsibility for decisions made in connection with professional duties, acts in accordance with moral principles and the principles of professional ethics - [k_k01].
2. demonstrates independence and inventiveness in individual work, effectively cooperates in a team, playing various roles in it; objectively assesses the effects of his own work and that of team members - [k_k02].
3. objectively evaluates the level of his knowledge and skills, understands the importance of improving professional and personal competences adequately to the changing social conditions and the progress of science - [k_k05].
4. demonstrates care and full responsibility for the specialist equipment entrusted to him for research - [k_k07].
5. is aware of the negative impact of human activity on the state of the environment and actively counteracts its degradation - [k_k10]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Passing laboratory classes on the basis of written tests and commitment during the course.

Programme content

1. Basics of electrochemical processes.
2. Electrode balances.
3. Types and construction of chemical power sources.
3. Mechanisms of electrode processes taking place in chemical power sources.
4. Methods of synthesis of electrode materials used in chemical power sources.

Teaching methods

Laboratory exercises, theoretical discussion.

Bibliography

Basic
1. A. Kisza – Elektrochemia cz. I i II (Jonika i Elektrodyka) WNT, W-wa, 2001.
2. R. Dylewski, W. Gniot, M. Gonet, Elektrochemia przemysłowa, Wyd. Politechniki Śląskiej, 1999.
3. A. Ciszewski, Technologia chemiczna. Procesy elektrochemiczne, Wyd. Politechniki Poznańskiej, 2008.
4. A. Czerwiński, “Ogniwa, akumulatory, baterie”, WNT, W-wa, 1999.
Additional
1. H. Scholl, T. Błaszczyk, P. Krzyczmonik, Elektrochemia, Wyd. Uniwersytetu Łódzkiego, 1998.
2. V. S. Bagotsky, A. M. Skundin, Y. M. Volfkovich, ELECTROCHEMICAL POWER SOURCES, Batteries, Fuel
Cells, and Supercapacitors, Wiley, 2015.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	16	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	9	0,50