



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Elektrotechniczne podstawy magazynowania energii (Electrotechnical basics of energy storage)

### Course

Field of study

Year/Semester

Technologia chemiczna (Chemical Technology)

I/1

Area of study (specialization)

Profile of study

Elektrochemia Techniczna (Technical Electrochemistry)

general academic

Level of study

Course offered in

Second-cycle studies

Polish

Form of study

Requirements

full-time

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

Tutorials

Projects/seminars

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr eng. Pawel Jezowski

### Prerequisites

The student should know the topics of electrical engineering, electronics and electrochemistry.

The student should be able to implement self-education.

The student should understand the need for further self-learning and for teaching other people (students).

### Course objective

The aim of the laboratory classes is to broaden the knowledge and practical use of previously acquired knowledge in the field of electrochemistry and electrotechnics to perform a set of laboratory exercises. During the course, the teacher presents the health and safety rules during the classes, dates of classes and the scope of knowledge necessary to complete the laboratory classes.

### Course-related learning outcomes

Knowledge

1. Has solid knowledge in the field of occupational health and safety - [K\_W10]
2. Has solid and extended knowledge of the selected specialty - [K\_W11]



### Skills

1. Has the ability to obtain and critically evaluate information from literature, databases and other sources and formulate opinions and reports on this basis - [K\_U01]
2. Has the ability to work in a team and lead a team - [K\_U02]
3. Has the skills necessary to work in an industrial environment and in research teams - [K\_U18]
4. Knows and obeys the safety rules related to the work performed - [K\_U19]

### Social competences

1. Is aware of the need for lifelong learning and professional development - [K\_K01]
2. Adheres to all teamwork rules; is aware of the responsibility for joint ventures and achievements in professional work - [K\_K04]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment: It consists of the assessment of involvement in the realization of individual laboratory exercises, their realization and the conscious organization of time necessary to perform the work. The subject is considered passed after obtaining a positive assessment of both the general course of laboratory classes, presentation of all reports on laboratory tasks and positive assessment of knowledge.

Summative assessment: Assessment of periodic progress of laboratory tasks performed, positively evaluated reports of completed tasks and knowledge, with possible consideration of attendance and active participation in classes.

### Programme content

Electrochemistry. Electrical engineering and electronics. Electricity storage. Electricity storage mechanisms. Phenomena occurring on the surface of the electrode / electrolyte phases. Chemical transformations generating electricity. Fuel cells. Thermoelectric phenomena. Primary and secondary cells. Semi-conductive materials. DC electric circuits. Electrical phenomena in the electrostatic and magnetic field. Ways to supply electronic circuits. Power and electricity. Occupational health and safety in electrical engineering. Electrical measurement.

### Teaching methods

Experimental work

### Bibliography

Basic

Elektrotechnika i elektronika dla nieelektryków, Praca zbiorowa WNT (ISBN: 978-8 363-62364-7)



Elektrochemia i równowagi jonowe w roztworach elektrolitów - teoria i zadania, Praca zbiorowa WPŚ (ISBN: 978-83-7880-394-2)

Poradnik galwanotechnika, Praca zbiorowa WNT (ISBN: 83-204-2610-3)

Carbons for Electrochemical Energy Storage and Conversion Systems, Praca zbiorowa CRC Press (978-14-2005-307-4)

Additional

Półprzewodniki i struktury półprzewodnikowe, Praca zbiorowa OWPW (ISBN: 83-708-5641-1)

### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	40	1,6
Student's own work (preparation for laboratory classes, preparation for tests) <sup>1</sup>	35	1,4

<sup>1</sup> delete or add other activities as appropriate