



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electrode materials in the chemical industry [S2TCh2-ES>MEwPC]

### Course

Field of study

Chemical Technology

Year/Semester

2/3

Area of study (specialization)

Applied Electrochemistry

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

15

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

prof. dr hab. Piotr Krawczyk

piotr.krawczyk@put.poznan.pl

### Lecturers

### Prerequisites

Student has a ordered knowledge of physical chemistry, electrochemistry and the basic knowledge in the field of electrochemical technology. He also has ability to use the basic techniques in a laboratory scale. The student is able to work individually and in a team, at the same time he feels the need to learn and improve his professional and personal competences.

### Course objective

The aim of the course is to deepen the knowledge and to consolidate the skills of planning, preparing and conducting electrochemical processes used in practice in the chemical industry.

### Course-related learning outcomes

Knowledge:

1. The knowledge in the field of basics of electrochemical processes -[ K\_W03, K\_W04],
2. The knowledge in the field of various electrochemical technologies -[ K\_W13, K\_W15],
3. The knowledge in related fields -[ K\_W12].

Skills:

1. The student has the ability to use the previously acquired theoretical knowledge in practice - [K\_U12, K\_U15, K\_U16].

Social competences:

1. The student understands the need for self-study and improvement of their professional competence -[K\_K01],
2. Student can act and cooperate in the group -[K\_K03].

### 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 exam (3 questions, duration 1h), on-line exam if needed (25 test question). Passing threshold will correspond to 50% of the maximum number of points.

In the case of laboratory classes, the knowledge test will consist in the assessment of written answers in subjects related to the subject of practical classes, if necessary, an on-line exam (15 test questions). Passing threshold will correspond to 50% of the maximum number of points.

### Programme content

Issues concerning planning, preparing and conducting electrochemical processes used in practice in the chemical industry.

### Course topics

1. Types of electrode materials used in chemical industry,
2. The construction and properties of electrode materials used in the chemical industry,
3. Methods of assessing the usefulness of materials in terms of their practical use,
4. The construction of electrodes used in the chemical industry in relation to the construction of electrochemical cells,
5. Methods of electrode characterization,
6. The most important methods of electrode materials synthesis,
7. Other structural elements of electrochemical sets used in the chemical industry,
8. Examples of processing of spent electrode materials used in the chemical industry.

### Teaching methods

Lecture, problem lecture, explanation, classes, project method, laboratory exercises, didactic discussion.

### Bibliography

Basic:

1. T. D. Burchell, Carbon materials for advanced technologies, Wyd. Pergamon, 1999,
2. R. Dylewski, W. Gniot, M. Gonet, Elektrochemia przemysłowa, Wyd. Politechniki Śląskiej, 1999,
3. A. Czerwiński, Ogniw, akumulatory, baterie, WNT, W-wa, 1999,
4. C.H. Hamann, A. Hamnett, W. Vielstich, Electrochemistry, Wiley-VCH, 2007,
5. A. Ciszewski, Technologia chemiczna. Procesy elektrochemiczne, Wyd. Politechniki Poznańskiej, 2008.

Additional:

1. J. Lipkowski, P.N. Ross, Electrocatalysis, Wiley-VCH, 1998.
2. H. Scholl, T. Błaszczuk, P. Krzyczmonik, Elektrochemia, Wyd. Uniwersytetu Łódzkiego, 1998.

### 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