STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Design of Electrochemical Processes		**1010702211010701129**
Field of study	Profile of study (general academic, practical)	Year /Semester
Chemical Technology	**general academic**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Indrustrial Electrochemistry	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
Second-cycle studies	**full-time**	
No. of hours		No. of credits
Lecture: **-** Classes: **-** Laboratory: **-** Project/seminars: **30**		**3**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
major	**university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)
technical sciences		**3 100%**
Technical sciences		**3 100%**

Responsible for subject / lecturer:

dr hab. Inż, Krzysztof Jurewicz
email: krzysztof.jurewicz@put.poznan.pl
tel. 61 665 3657
Wydział Technologii Chemicznej
ul. Berdychowo 4 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The student should have knowledge of the electrode reactions for electrolytic processes and chemical power sources, electrode potentials and electrochemical polarization. Students should have basic knowledge of electrical engineering on electrical circuits for AC and DC, and power supplies.
2	**Skills**	The student should be able to pursue self-directed learning
3	**Social competencies**	The student should understand the need for further self-learning and the learning of others (students)

Assumptions and objectives of the course:

Mastering the principles of design: processes of electrochemical engineering using various types of electrolytic cells in terms of ensuring selected technological-economic parameters such as performance, the conversion of reagents, the specific energy consumption and optimize them.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. The student has a broader and deeper knowledge of chemistry and other related fields of science, allowing the formulation and solving complex tasks associated with chemical technology - [K_W02]
2. The student has knowledge of complex chemical processes involving careful selection of materials, raw materials, methods, techniques, apparatus and equipment for chemical - [K_W03]
3. The student has an extended knowledge of advanced equipment and apparatus used in chemical technology - [K_W13]

Skills:

1. Student is able to properly verify the concepts of engineering solutions in relation to the state of the art in technology and chemical engineering - [KU_11]
2. Student is able to critically evaluate the practical utility of the use of new developments in chemical technology-[- [K_U17]
3. The student is able to design a complex process in the field of Chemical Technology and Engineering - [K_U24]

Social competencies:

1. The student has formed awareness of the limitations of science and technology related to chemical technology, including environmental - [K_K02]
2. Student is able to think and act in a creative and enterprising - [K_K06]

Assessment methods of study outcomes

Forming Evaluation: Written test of driving skills of design calculations. The test covers the tasks with assigned the number of points. The test is passed after obtaining more than 50% of the points.

Summary Evaluation: Evaluation individually made project of specified electrochemical process involving evaluation of the written test with (share 20%.

Course description

Seminars include the transfer of knowledge in the field of electrochemical engineering required for the design of technological electrolytic processes for the purification of wastewater from production, desalination of water as well as an optimizing specified parameters such as process performance, energy efficiency and time-space specific energy consumption of the selected electroplating processes. The task projects include two-and three-chamber membrane type as well as filter press type electrolysers.

Basic bibliography:

1. A. Ciszewski. Podstawy inżynierii elektrochemicznej. Wyd. Politechniki Poznańskiej, Poznań 2004 (ISBN 83-7143-384-0)

2. R. Dylewski, W. Gnot, M. Gonet. Elektrochemia przemysłowa. Wybrane procesy i zagadnienia. Wyd. Politechniki Śląskiej, Gliwice 1999 (Skrypt Nr 2172)

3. M. Gonet, R. Dylewski, Elektrochemia przemysłowa. Wyd. Politechniki Śląskiej, Gliwice 2002 (ISBN 83-7335-097-7)

4. A. Kisza. Elektrochemia. Tom I: Jonika. WNT Warszawa 2000 (ISBN 83-204-2545-7)

5. A. Kisza. Elektrochemia. Tom II: Elektrodyka. WNT Warszawa 2000 (ISBN 83-204-2545-6)

Additional bibliography:

1. Wł. Rekść, Elektrochemia techniczna. Wydawnictwo Politechniki Poznańskiej, Poznań 1990 (Skrypt Nr 1565).

2. A. Czerwiński. Akumulatory, bateria, ogniwa. WKŁ, Warszawa 2005 (ISBN 83-206-1564-X)

3. H. Sholl, T. Błaszczyk, P. Krzyczmonik. Elektrochemia. Zarys teorii i praktyki. Wydawnictwo Uniwersytetu Łódzkiego, Łódź 1998 (ISBN 83-7171-153-0)

Result of average student's workload

Activity	Time (working hours)
1. Seminarium zapoznające z zasadami projektowania procesów elektrochemicznych	30
2. Konsultacje związane z wykonaniem projektu	20
3. Przygotowanie do sprawdzianu pisemnego	10
4. Wykonanie projektu	15

Student's workload

Source of workload	hours	ECTS
Total workload	75	3
Contact hours	50	0
Practical activities	0	0