

1.	Field of study	Materials Science and Engineering
2.	Academic year of entry	2017/2018 (winter term)
3.	Level of qualifications/degree	first-cycle studies (in engineering)
4.	Degree profile	general academic
5.	Mode of study	full-time

Module: Materials electrochemistry

Module code: IM1A_EM

1. Number of the ECTS credits: 4

2. Learning outcomes of the module			
code	description	learning outcomes of the programme	level of competence (scale 1-5)
IM1A_EM_1	Understanding basic terms and definitions, selected electrochemical processes; understanding factors affecting the efficiency of the electrochemical process for engineering materials obtaining.	IM1A_W11	2
		IM1A_W14	4
IM1A_EM_2	The skill to apply knowledge related to the operation of scientific-research instruments and to measurement principles for electrochemical obtaining and characterising material properties, analysing and interpreting the obtained results and also formulating proper conclusions.	IM1A_K05	1
		IM1A_U08	2
		IM1A_U10	3
		IM1A_U21	3

3. Module description	
Description	The Materials electrochemistry module shall ensure students learning the physicochemical foundations of functional engineering materials for applications in electronics, technologies of electrochemical cells, power industry, renewable energy sources, sensors, medicine as well as materials corrosion. The module shall enable students mastering the methods of electrochemical obtaining and characterising electrochemical properties of materials for the aforementioned applications. The understanding of correlations between the nature of chemical bonds, crystallographic structure, electron structure and the transport properties, reactivity and stability of solids shall result in acquiring the skill to design materials of practical properties that were sought.
Prerequisites	The knowledge of the chemistry, physics, crystallography, and materials science modules is required.

4. Assessment of the learning outcomes of the module			
code	type	description	learning outcomes of the module
IM1A_EM_w_1	Written examination	Verification of the knowledge based on the lectures content, recommended literature and attended laboratory classes.	IM1A_EM_1, IM1A_EM_2
IM1A_EM_w_2	Written tests	Checking the skill to use the acquired knowledge to understand mechanisms of the course of electrochemical processes and to form the material properties.	IM1A_EM_1, IM1A_EM_2
IM1A_EM_w_3	Weekly reports	The assessment of mastering the skill of independent performance of a practical exercise using many electrochemical measuring techniques, of experimental results and measurement error analysis as well as of formulating the conclusions properly.	IM1A_EM_1, IM1A_EM_2
IM1A_EM_w_4	Interview	Assessment of understanding the mechanisms and kinetics of electrochemical processes from a theoretical and utilitarian point of view.	IM1A_EM_1

5. Forms of teaching						
code	form of teaching			required hours of student's own work		assessment of the learning outcomes of the module
	type	description (including teaching methods)	number of hours	description	number of hours	
IM1A_EM_fs_1	lecture	The lecture shall enable preparation to independent designing, electrochemical obtaining and characterising the practical properties of materials used in electronics, in electrochemical and fuel cells technologies, hydrogen power industry, sensors, corrosion, medicine and others based on the knowledge of the solid state chemistry and elements of the solid state physics. The lecture is delivered using demonstrations and modern audio-visual aids.	30	The work with the recommended literature comprising independent acquisition of knowledge related to issues presented during the lectures.	35	IM1A_EM_w_1
IM1A_EM_fs_2	laboratory classes	Individual and team performance of tests reflecting the lecture issues in teaching laboratories and using scientific-research instruments in scientific laboratories. Independent processing of obtained results, preparing graphs, analysis of experimental error and formulation of conclusions.	30	Preparation of theoretical basics and issues related to the subject matter of performed exercise. Independent preparation of a theoretical introduction. Individual preparation of exercise results.	25	IM1A_EM_w_2, IM1A_EM_w_3