



MODULE SPECIFICATION

Module code	
Module title in Polish	Chemia
Module title in English	Chemistry
Module running from the academic year	2017/2018

A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	
Level of qualification	first cycle (first cycle, second cycle)
Programme type	academic (academic/practical)
Mode of study	full-time (full-time/part-time)
Specialism	
Organisational unit responsible for module delivery	
Module co-ordinator	Prof.PhD hab. Elżbieta Bezak – Mazur
Approved by:	PhD hab., Lidia Dąbek, Professor of the University

B. MODULE OVERVIEW

Module type	core module (core/programme-specific/elective HES*)
Module status	compulsory module (compulsory/optional)
Language of module delivery	Polish/English
Semester in the programme of study in which the module is taught	semester 1
Semester in the academic year in which the module is taught	winter semester (winter semester/summer semester)
Pre-requisites	None (module code/module title, where appropriate)
Examination required	(Yes/No)
ECTS credits	5

* elective HES – elective modules in the Humanities and Economic and Social Sciences

Mode of instruction	lectures	classes	laboratories	project	others
Total hours per semester	30	15	15		



C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	The aim of the module is to familiarise students with matter structure, state of matters, physicochemical phenomena and processes taking place in the liquid and gaseous phase, the kinetics and thermodynamics of chemical reactions, phenomena taking place at phase boundaries (drawing particular attention to the chemistry of water solutions).
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Module outcome code	Module learning outcomes	Mode of instruction (l/c/lab/p/ others)	Corresponding programme outcome code	Corresponding discipline-specific outcome code
W_01	A student knows the structure and properties of substances, state of matters, physicochemical having an impact in the environment as well as in water and sewage technology.	l/l/c	IŚ_W01 IŚ_W07	T1A_W01 T1A_W02 T1A_W03 T1A_W08
W_02	A student knows a kinetic and thermodynamic description of chemical reactions.	l	IŚ_W01 IŚ_W07	T1A_W01 T1A_W02 T1A_W03 T1A_W08
W_03	A student understands the fundamentals of chemical as well as physicochemical phenomena and processes taking place in the environment and utilized in water and sewage technology, air purification, and soil remediation.	l/l/c	IŚ_W01 IŚ_W07	T1A_W01 T1A_W02 T1A_W03 T1A_W08
U_01	A student can make simple chemical calculations.	c/l	IŚ_U01	T1A_U08 T1A_U09
U_02	A student can make a simple experiment facilitating the assessment of the quantity and quality of substances occurring in the environment.	l	IŚ_U01 IŚ_U03 IŚ_U08 IŚ_U26	T1A_U02 T1A_U08 T1A_U09 T1A_U11 T1A_U15
U_03	A student can assess a hazardous state of the environment as a result of anthropopressure and exceeding a permissible level of concentration as regards chemical substances.	l/l/c	IŚ_U08 IŚ_U09	T1A_U01 T1A_U04 T1A_U08 T1A_U09 T1A_U10 T1A_U15
U_04	A student applies OHS principles.	l	IŚ_U26	T1A_U11
K_01	A student can work individually and co-operate in a team on the assigned task.	l/l/c	IŚ_K01	T1A_K03
K_02	A student is responsible for the reliability of the obtained results of his/her work (as well as their interpretation).	c/l	IŚ_K02	T1A_K02 T1A_K05
K_03	A student formulates conclusions and describes the results of his/her own works.	c/l	IŚ_K07	T1A_K07



K_04	A student understands the significance of utilising specialist examinations and equipment as regards environmental protection.	I	IŚ_K09	T1A_K02
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Module content:

1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1.	Basic notions and chemical laws.	W_01
2	Atom structure. A periodic table and the correlations between atom structure and physical as well as chemical properties of chemical elements.	W_01
3	Chemical compounds (their types and particle structure).	W_01
4-5	Obtaining, structure, and properties of inorganic and complex compounds. The elements of molecular spectroscopy.	W_01
6-7	Obtaining, structure, and properties of organic compounds.	W_01 U_03
8	States of matter (gases, liquids, and solid bodies).	W_01
9	The types of chemical reactions.	W_02
10	The elements of chemical thermodynamics. Spontaneous processes.	W_02 W_03
11	The elements of chemical kinetics. Catalysts.	W_02
12-13	Solutions and reactions in solutions.	W_02
14	Electrochemistry (electrode potentials, cells, and electrolysis). Electrochemical corrosion.	W_02, W_03
15	Phase equilibria. Phenomena at phase boundaries.	W_03

2. Topics to be covered in the classes

No	Topics	Module outcome code
1	Stoichiometric calculations.	W_01,U_01, K_01, K_02
2	Solution concentrations.	W_01,U_01, K_01, K_02
3	Ionic equilibria in electrolyte solutions: electrolytic dissociation, and ionic water product.	W_01,W_03, U_01, K_01, K_02
4	Ionic equilibria in electrolyte solutions: salt hydrolysis and solubility product.	W_01,W_03, U_01, K_01, K_02
5	The reaction of oxidation and reduction.	W_01,U_01, K_01, K_02, W_03

3. Topics to be covered in the laboratories

No	Topics	Module outcome code
1	Introductory class; OHS, fire-protection, and orientation regulations.	U_04
2	Preparing solutions with a determined concentration.	U_01 K_01 K_02 K_03
3	Qualitative analysis of cations.	U_01 U_02 K_01 K_02



4	Qualitative analysis of anions.	K_03 U_01,U_02, K_01, K_02, K_03
5	Equilibriums in water solutions (electrolytic dissociation, pH, buffer solutions).	U_01,K_01, K_02,K_03, K_04

Assessment methods

Module outcome code	Assesment methods <i>(Method of assessment; for module skills – reference to specific project, laboratory and similar tasks)</i>
W_01	An examination
W_02	An examination
W-03	An examination
U_01	A test
U_02	An entry test, correct completion of laboratory class assignments, and a final test
U-03	An examination and a test
U-04	An entry test, correct completion of laboratory class assignments, and a final test
K_01	Completing laboratory class assignments
K_02	Correct completion of a report on laboratory classes
K-03	Correct completion of a report on laboratory classes and a test
K-04	Completing laboratory class assignments



D. STUDENT LEARNING ACTIVITIES

ECTS summary		
	Type of learning activity	Study time/ credits
1	Contact hours: participation in lectures	30
2	Contact hours: participation in classes	15
3	Contact hours: participation in laboratories	15
4	Contact hours: attendance at office hours (2-3 appointments per semester)	2
5	Contact hours: participation in project-based classes	
6	Contact hours: meetings with a project module leader	
7	Contact hours: attendance at an examination	2
8		
9	Number of contact hours	64 <i>(total)</i>
10	Number of ECTS credits for contact hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	2.56
11	Private study hours: background reading for lectures	10
12	Private study hours: preparation for classes	5
13	Private study hours: preparation for tests	15
14	Private study hours: preparation for laboratories	6
15	Private study hours: writing reports	6
16	Private study hours: preparation for a final test in laboratories	6
17	Private study hours: preparation of a project/a design specification	
18	Private study hours: preparation for an examination	13
19		
20	Number of private study hours	61 <i>(total)</i>
21	Number of ECTS credits for private study hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	2.44
22	Total study time	125
23	Total ECTS credits for the module <i>(1 ECTS credit = 25-30 hours of study time)</i>	5
24	Number of practice-based hours <i>Total practice-based hours</i>	33
25	Number of ECTS credits for practice-based hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	1.32

E. READING LIST

References	
	<ol style="list-style-type: none">1. Chemistry for environmental and Earth science-Catherine V., A. Duke, Graig D. Williams. Borca Paton [etc.]:CRS Press, Taylor and Francis group. Aop. 2008.2. Chemistry for every student – Mariola Saternus, Agnieszka Fornalczyk. Gliwice. Wyd. Pol. Śląska 2012.3. Chemistry for environmental engineering; Clair U. Sawyer, Perry L. McCarty. Tokyo;McCraw-Hill Book Company 1978



Politechnika Świętokrzyska

WYDZIAŁ INŻYNIERII ŚRODOWISKA, GEOMATYKI I ENERGETYKI

Module website	