

## MODULE SPECIFICATION

Module code	
Module title in Polish	<b>Chemia 1</b>
Module title in English	<b>Chemistry 1</b>
Module running from the academic year	<b>2016/2017</b>

### A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	<b>Civil Engineering</b>
Level of qualification	<b>First cycle</b> <i>(first cycle, second cycle)</i>
Studies profile	<b>Academic</b> <i>(academic/practical)</i>
Mode of study	<b>Full-time</b> <i>(full-time / part-time)</i>
Specialism	
Organisational unit responsible for module delivery	The Department of Engineering and Environmental Protection
Module co-ordinator	Ewa Ozimina, PhD
Approved by	<b>Marek Iwański, Professor</b>

### B. MODULE OVERVIEW

Module type	<b>Core module</b> <i>(core/programme-specific/elective HES*)</i>
Module status	<b>Compulsory module</b> <i>(compulsory / non-compulsory)</i>
Language of module delivery	<b>English</b>
Semester in the programme of study in which the module is taught	<b>Semester 1</b>
Semester in the academic year in which the module is taught	<b>Winter semester</b> <i>(winter / summer)</i>
Pre-requisites	<b>None</b> <i>(module code/module title, where appropriate)</i>
Examination required	<b>No</b> <i>(yes / no)</i>
ECTS credits	<b>2</b>

Mode of instruction	lectures	classes	laboratories	project	others
<b>Total hours per semester</b>	<b>30</b>				

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

### C. LEARNING OUTCOMES AND ASSESSMENT METHODS

<b>Module aims</b>	The aims of the module are as follows: acquiring knowledge in terms of the structure and properties of substances, chemical reactions in water solutions, the fundamentals of thermodynamics and chemical chemistry, basic physicochemical properties of construction materials (drawing particular attention to binding materials as well as corrosion processes of construction materials), and the recycling of construction materials.
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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 is familiar with the structure and properties of substances, the reactions taking place in water solutions as well as substantial physicochemical processes which are vital in civil engineering.	l	B_W02	T1A_W01 T1A_W02 T1A_W03 T1A_W05
W_02	A student knows the processes and reactions occurring while obtaining and applying construction materials.	l	B_W02 B_W18	T1A_W01 T1A_W02 T1A_W03 T1A_W04 T1A_W05 T1A_W07 T1A_W08
W_03	A student understands the fundamentals of phenomena and processes accompanying materials corrosion.	l	B_W02 B_W18	T1A_W01; T1A_W02 T1A_W03 T1A_W04 T1A_W05 T1A_W07 T1A_W08
U_01	A student is able to assess hazard resulting from aggressive interaction of the environment on the construction material (a student can also suggest a solution).	l	B_U25 B_U16	T1A_U03 T1A_U04 T1A_U08 T1A_U09 T1A_U11 T1A_U13 T1A_U14 T1A_U15
K_01	A student is able to work individually and co-operate in a team on the assigned task.	l	B_K01	T1A_K01 T1A_K03 T1A_K04
K_02	A student is aware of hazards occurring in the material-environment system.	l	B_K05 B_K09	T1A_K01 T1A_K02 T1A_K05 T1A_K07

#### Module content:

##### 1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1.	Atom structure and the structure of chemical compounds, chemical bonds, compounds occurring in construction materials.	W_01
2.	The phenomena occurring in water solutions: electrolytic dissociation, pH, hydration, hydrolysis, buffer solutions, and solution concentrations.	W_01

3.	States of matter: gaseous, liquid, glass, and solid states. Phenomena on state boundaries: surface tension, surface wettability, surface active substances.	W_01
4.	Complex systems: mixtures, emulsions (their division and application, colloid systems – obtaining properties, durability).	W_01
5.	Chemical reactions; the types and diagrams of chemical reactions, energy effect of reactions, a phase state of substrates and reaction products; reversible and irreversible reactions. Chemical kinetics: the rate of chemical reaction, catalysis and catalysts.	W_01, W_03
6.	Metal chemistry, corrosion processes and the corrosion protection of metal structures.	W_01 W_03, K_04
7.	The elements of crystallochemistry, silicates and aluminosilicates.	W_01
8-10.	The chemistry of mineral construction materials (inorganic materials, cements, calcium, plaster, and slag-sulphate bonds; silicon bonds, glass, and ceramic materials.	W_01, W_02, W_03
11.	The modification of construction materials, cement additions and impurities.	W_02
12.	The corrosion of construction materials and cement materials.	W_03 K_04
13.	The chemistry of plastics and bituminous materials.	W_01, W_02
14.	Recycling processes of material waste in civil engineering.	W_02, W_03 K_02

2. Topics to be covered in the classes
3. Topics to be covered in the laboratories
4. Topics to be covered in the projects

### Assessment methods

Module outcome code	Assessment methods <i>(Method of assessment; for module skills – reference to specific project, laboratory and similar tasks)</i>
W_01	A test
W_02	A test
W_03	A test
U_01	A test
K_01	A test
K_02	A test

### C. STUDENT LEARNING ACTIVITIES

ECTS summary		
	Type of learning activity	Study time/ credits
1	Contact hours: participation in lectures	<b>30</b>
2	Contact hours: participation in classes	
3	Contact hours: participation in laboratories	
4	Contact hours: attendance at office hours (2-3 appointments per semester)	<b>3</b>
5	Contact hours: participation in project-based classes	
6	Contact hours: meetings with a project module leader	
7	Contact hours: attendance at an examination	

8		
9	<b>Number of contact hours</b>	<b>33</b> <i>(total)</i>
10	<b>Number of ECTS credits for contact hours</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>1.3</b>
11	Private study hours: background reading for lectures	<b>10</b>
12	Private study hours: preparation for classes	
13	Private study hours: preparation for tests	
14	Private study hours: preparation for laboratories	
15	Private study hours: writing reports	
16	Private study hours: preparation for a final test in laboratories	<b>10</b>
17	Private study hours: preparation of a project/a design specification	
18	Private study hours: preparation for an examination	
19		
20	<b>Number of private study hours</b>	<b>20</b> <i>(total)</i>
21	<b>Number of ECTS credits for private study hours</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>0.8</b>
22	<b>Total study time</b>	<b>53</b>
23	<b>Total ECTS credits for the module</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>2</b>
24	<b>Number of practice-based hours</b> <i>Total practice-based hours</i>	<b>0</b>
25	<b>Number of ECTS credits for practice-based hours</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>0</b>