



1. Course number and name

RB-S1-19-I09-E, **Chemistry**

2. Credits and contact hours*

5 ECTS, lectures: 30 hours**, laboratories: 15 hours**

3. Instructor's or course coordinator's name

Andrzej Śliwka PhD

4. Text book, title, author, and year

- Chang R.: General Chemistry, Random House, USA 1986
- Whitten K. W., Davis R. E., Peck M. L., Stanley G.: General chemistry, Brooks/Cole - Thomson Learning, USA 2004

a. other supplemental materials

- Cotton A. F. and others: Advanced inorganic chemistry, John Wiley & Sons, New York 1999
- Standards: EN 12390-10:2019, EN 12390-12:2020, EN 13295:2004, EN 14630:2007, EN 12390-11:2015, EN 13396:2004, EN 14629:2007, ISO 9297:1996

5. Specific course information

a. brief description of the content of the course (catalog description)

Lectures:

Basics of chemistry - revision. Building material chemistry tasks. States of matter with a detailed description of the properties of water. Types of chemical reactions with examples in construction. Chemical equilibrium. Thermodynamics and kinetics of processes. Characteristics of building materials and their modification with an indication of mineral binding materials. Corrosion of building materials. Fundamentals of electrochemistry. Chemical research - methods. Chemical equations and stoichiometric calculations. Concrete pH testing.

Laboratories:

Chemical reactions. PH test. Restoring the composition of hardened concrete. Corrosion and dissolution of metals. Microscopic observations.

b. prerequisites or co-requisites

Mathematics, physics.

c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

Required.



6. Specific goals for the course

a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic

The student can:

- write down chemical reactions,
- perform stoichiometric calculations,
- characterize the microstructure of building materials,
- conduct simple chemical research,
- determine the risk of corrosion.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

K1A_W01, K1A_U05, K1A_U06

7. Brief list of topics to be covered

1. Basics of chemistry - revision.
2. The tasks of building chemistry.
3. States of matter with a detailed description of the properties of water.
4. Types of chemical reactions with examples in construction.
5. Chemical equilibrium. Thermodynamics and kinetics of processes.
6. Characteristics of building materials and their modification with an indication of mineral binding materials.
7. Corrosion of building materials.
8. Fundamentals of electrochemistry.
9. Chemical research - methods.
10. Chemical equations and stoichiometric calculations.
11. Concrete pH testing.
12. Restoring the composition of hardened concrete
13. Determination of chloride content in concrete.
14. Determining the corrosion risk of reinforcing steel.
15. Microscopic observations of binders, gypsum hydration progress, structure of building materials.

*- Consultations were not included in the contact hours

** -per semester