



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Chemistry [S1IZarz1E>Che]

Course

Field of study

Engineering Management

Year/Semester

1/2

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

English

Form of study

full-time

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

A student starting this subject should have the basic knowledge of chemistry at high school level. He also should have the basic skills related to the activities in the chemical laboratory and to be ready to cooperate in a team.

Course objective

The aim of the course is to provide students with basic knowledge in the field of general chemistry, which is the chemical basis of material science, i.e. in the field of metal corrosion, the structure of the synthetic polymers and lubricants.

Course-related learning outcomes

Knowledge:

The student names and describes the structure of an atom and the periodic table of chemical elements [P6S_WG_16].

The student names and describes various types of chemical bonds and the systematics of inorganic compounds [P6S_WG_17].

Skills:

The student uses analytical, simulation, and experimental methods to formulate and solve tasks in the field of chemistry [P6S_UW_10].

The student applies typical methods to solve simple problems in the field of chemistry, such as stoichiometry, chemical reactions, electrochemistry, and corrosion of metals [P6S_UW_15].

Social competences:

The student is aware of and understands the importance of non-technical aspects and consequences of activities related to chemistry, including their impact on the environment, and the associated responsibility for the decisions made [P6S_KR_01].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Partial assessment:

a) in the scope of exercises: based on the evaluation of the current progress in the implementation of tasks assessed by written assignments - tests,

b) in the scope of lectures: based on answers to questions about the material learned in previous lectures.

Summative rating:

a) in the scope of exercises based on the results of average partial grades,

b) in the scope of lectures: an exam consisting of test and open questions. You can take the exam after passing the exercises.

Oral or written examination of the student's knowledge is carried out in a stationary form or online via the eKursy platform.

Programme content

The course program includes the following topics: Atom structure and periodic table of chemical elements. Chemical bonds. Systematics of inorganic compounds. Stoichiometry. Solutions and reactions occurring in aqueous electrolyte solutions. Oxidation and reduction reactions. Basics of electrochemistry. Metal corrosion on the example of steel, electrochemical corrosion mechanism, anode and cathode reactions. The role of electrolyte. Review of corrosion prevention methods. Non-metallic coatings. Metallic coatings. Sacrificial, cathodic and anode protection. Metal corrosion inhibitors. Basics of organic chemistry. Division of organic compounds. Chemical structure of polymers. Linear and crosslinked polymers. Polymer thermoplasticity. Review of the chemical structure of the most important polymers used.

Course topics

Lecture:

1. The structure of the atom.
2. Characteristics of the periodic table of chemical elements.
3. Nomenclature, structure and application of inorganic compounds.
4. Reactions in aqueous solutions of electrolytes.
5. Stoichiometry, solution concentrations.
6. Electropotential series of metals. Redox reactions.
7. Metal corrosion and corrosion protection.
8. Basics of electrochemistry. SEM.
9. Elements of organic chemistry, classification of organic compounds.
10. Chemical structure of polymers.

Accounting exercises:

1. Basic types of chemical compounds (structure, nomenclature).
2. Solution concentrations (percentage, molar).
3. Stoichiometry.
4. Electrolytic dissociation, hydrolysis of salts.
5. Oxidation-reduction reactions. Corrosion of metals.
6. Polymers.

Teaching methods

Lecture - informative lecture
Exercises - exercise method

Bibliography

Basic:

1. A. Bielański, Podstawy chemii nieorganicznej, PWN, Warszawa 2008, tom I i II.
2. L. Jones, P. Atkins, Chemia ogólna. Cząsteczki, materia, reakcje, PWN, Warszawa 2009.
3. I. Czarnecki, T. Broniewski, O. Henning, Chemia w budownictwie, Arkady, Warszawa, 1994; rozdziały: Chemia polimerów i Korozja materiałów metalicznych.

Additional:

1. J. Minczewski, Z. Marczenko, Chemia analityczna, PWN, Warszawa, tom I i II.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	55	2,00