



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Chemistry

### Course

Field of study

Year/Semester

1/1

Area of study (specialization)

Profile of study

general academic

Level of study

Course offered in

First-cycle studies

Poland

Form of study

Requirements

full-time

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

15

0

Tutorials

Projects/seminars

### Number of credit points

1

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr hab. Maciej Galinski

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Faculty of Chemical Technology

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### Prerequisites

Basic knowledge concerning the structure of matter, physic phenomenon, chemical proceses. Basics in chemistry.

Description of observed chemical and physical phenomenon, drawing of conclusions, analysis of results obtained.

The ability to self-acquire the knowledge, its analysis and verification..

### Course objective

Reminder of basic chemical phenomena, the structure of matter. Introduction to electrochemistry, description of corrosion phenomena, its mechanism and prevention. Chemical sources of energy storage



## Course-related learning outcomes

### Knowledge

Student has basic knowledge in the field of chemistry, in the construction of the periodic table of elements and their properties, the theory of chemical bonds of organic and inorganic compounds, types of chemical reactions, chemical analysis.

Has basic knowledge to understand lectures on metal and non-metal materials, environmental sciences, fuels and lubricants, building materials and soil, biomechanics and biological technical materials by agricultural and food machinery.

### Skills

He can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, as well as create and justify opinions

Has the ability to self-educate with the use of modern didactic tools, such as online lectures, internet websites and databases, teaching programs, e-book.

### Social competences

He understands the need and knows the possibilities of continuous training.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Ttest- written

## Programme content

Structure of the atomic nucleus. Nucleons, nuclides, element, isotope, mole, position on the periodic table, mass number, atomic number, elementary particles. Natural nuclear transformations. Ionizing radiation, radiation properties. Ionizing radiation detectors.

Types of solutions concentration. Electrolytes. Electrolytic dissociation. The Law of Mass Action. Equilibrium constant. The solubility product. Slightly soluble salts. Conductivity of electrolyte solutions, comparison with metals, temperature dependences of the conductivity of electrolyte solutions. Water hardness - permanent, temporary. Boiler stone. Methods of removing water hardness. Conductivity of electrolyte solutions. Oxidation and Reduction. The concept of an electrode in electrochemistry. Types of electrodes (I, II type, red-ox electrodes, standard potentials, electrochemical series, electrode potential - Nernst equation. Current flow through the electrode, release potential, overpotential. Construction of a galvanic cell, types of cells.

Corrosion, Type of corrosion. Corrosion protection methods. Electroplating. Types of galvanic coatings.

Chemical power sources. Construction and types of cells. Construction and types of accumulators. Examples of typical cells and batteries. Batteries. Fuel cells. Supercapacitors, Aspects of recycling.

Surface phenomena, surface tension, adsorption, wettability, surfactants.

Industrial methods of obtaining metals: sodium, potassium, zinc, aluminum, copper



## Electrochemical methods of metal refining

### Teaching methods

Lecture

### Bibliography

Basic

1. Adam Bielański "Podstawy chemii nieorganicznej", Wydawnictwo Naukowe PWN
2. Peter Wiliams Atkins "Chemia fizyczna", Wydawnictwo Naukowe PWN 2001
3. K. Pigoń, Z. Ruziewicz, Chemia Fizyczna, PWN Warszawa 2005

Additional

### Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,0
Classes requiring direct contact with the teacher	15	0,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	15	0,5

<sup>1</sup> delete or add other activities as appropriate