STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Chemistry		**1010601211010710060**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mechanical Engineering	**(brak)**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours				No. of credits
Lecture: **1**	Classes: **-**	Laboratory: **-**	Project/seminars: **-**	**1**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**1 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic information on the structure of matter, physical and chemical processes. Basic information on chemistry.
2	**Skills**	Description on observed phenomena, drawing the conclusions, analysing of the results.
3	**Social competencies**	Ability of the self-learning, analysing and verification.

Assumptions and objectives of the course:

Reminder basic chemical phenomena, structure of matter. Introduction to electrochemistry, Description of the corrosion processes its mechanism and prevention. Energy storage devices.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Has a basic knowledge in chemistry, in the construction of the periodic table and properties of the elements, the theory of chemical bonding, organic and inorganic compounds, types of chemical reactions, chemical analysis: - [[K1A_W03]]

2. in the extent necessary for an understanding of lectures on metallic and non-metallic materials, environmental protection, fuels and lubricants, building materials and soil, biomechanics and biological materials processed by agricultural and food machinery - [[K1A_W03]]

Skills:

1. Is able to obtain information from the literature, internet, databases and other sources. Can integrate the information to interpret and learn from them, create and justify opinions - [[K1A_U03]]

2. Has the ability to self-educate using modern teaching tools such as remote lectures, webpages and databases, educational software, electronic books - [K1A_U06]]

Social competencies:

1. Understands the need and knows the possibilities of lifelong learning - [[K1A_K01]]

Assessment methods of study outcomes

Test

Course description

Atomic nucleus composition. Nucleons, nuclides, chemical element, isotope, mol, position in the periodic table, mass number, atomic number, subatomic particles. Natural radioactive decays. Ionizing radiation - properties of radiations. Detection of irradiation - Geigera-Mullera counter. Scintillating Counter ? construction and operations.

Types of solution concentrations. Electrolytes. Electrolytic dissociation. Law of Mass Action. Equilibrium constant. Solubility product. Poorly soluble compounds. Conductivity of the electrolytes ? comparison with metals.

Temperature dependencies of the conductivities of the electrolytes. Water hardness ? permanent and temporary Limescale. Methods of removing water hardness.

Reduction and Oxidation. The concept of half-cell (electrode) in electrochemistry. Primary and secondary cells, standard electrode potentials, - Nernst equation. Current flow through the electrode Potential of the deposition, overpotential.

Types and construction of the galvanic cells.

Corrosion, Types of corrosion Methods of protecting. Types of the protecting layers. Chemical energy sources. Construction and types of the primary and rechargeable batteries. Description of examples of typical rechargeable batteries. Fuels cells, Supercapacitors, Recycling of energy storage devices principles.

Surface phenomena, surface tension, adsorption, wettability.

Commercial methods of metal production: sodium, potassium, zinc, aluminum, copper

Electrochemical method of metal refinement.

Basic bibliography:

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	15
2. Preparation to test	7
3. Consultaion	1
4. Participation in test	1

Student’s workload

Source of workload	hours	ECTS
Total workload	24	1
Contact hours	17	0
Practical activities	0	0