

COURSE DESCRIPTION CARD

Faculty of Civil Engineering and Environmental Sciences										
Field of study								Degree level and programme type		
Specialization/ diploma path								Study profile	Academic profile	
Course name	General chemistry for engineers							Course code	IS-FCEE-00226W/S	
								Course type	Erasmus	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	winter/summer	
	30		30					No. of ECTS credits	6	
Entry requirements	-									
Course objectives	The aim of the course is to acquaint students with basic chemical laws and preparing students for conducting scientific research. The student should to acquire the skills of using chemical terminology and nomenclature, basic laboratory equipment, describing properties of chemical compounds, presentation of chemical transformations using reaction equations, performing chemical calculations, performing qualitative and quantitative analyzes.									
Course content	<p><u>LECTURE:</u> Basic concepts and important chemical laws. Chemical reactions and their division. Inorganic compounds. Types of inorganic chemicals, their properties, preparation and reactions. Amphoterism. Reactions in aqueous electrolytes. Theories of acids and bases. Electrolytic dissociation, constant and dissociation degree. Power of electrolytes. pH scale. Buffer mixtures. Hydrolysis reactions. Processes of oxidation and reduction. Ways of expressing concentrations. Solubility product constant. Elements of chemical kinetics. Catalysis, catalyst. Elements of electrochemistry. Galvanic cells. Reduction and oxidation potentials. SEM . Electrochemical series of metals. Corrosion. Electrolysis. Fundamentals of analytical chemistry. Stoichiometric calculations.</p> <p><u>LABORATORY:</u> Basic laboratory glass. Reactions in aqueous electrolyte solutions: amphotericity, redox reactions. Analysis of cations, anions and salts in solution. Chemical properties of metals, a reactivity series. Corrosion. pH scale and buffer solutions. Kinetics of chemical reactions. Quantitative analysis. Introduction to titration methods (alkacimetry, manganometry, water hardness).</p>									
Teaching methods	lecture – informative and problematic; research laboratory									
Assessment method	Lecture - written exam; laboratory - reports, tests before each laboratory, colloquium									

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study	
L01	student has knowledge of general chemistry necessary for understanding chemical processes and knows the rules of environmental protection in relation to chemical threats	IS-FCEE-00022_W02	
L02	student knows the basic methods of physico-chemical analysis	IS-FCEE-00022_W07	
L03	student can use basic laboratory equipment, plan and carry out simple chemical experiments, interpret the obtained results and draw correct conclusions as well as develop documentation of completed experiment	IS-FCEE-00022_U02	
L04	student can obtain information from the scientific literature and other sources; properly use the acquired information, can verify them and interpret them	IS-FCEE-00022_U15	
L05	student is ready to explain cognitive and practical problems, consults other people in the event of a problem	IS-FCEE-00022_K03	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
L01	written exam, colloquium	L, LC	
L02	written exam, colloquium	L, LC	
L03	Colloquium	L	
L04	written exam, colloquium	L, LC	
L05	written exam, colloquium	L, LC	
Student workload (in hours)		No. of hours	
Calculation	attendance at lecture	30	
	attendance at laboratory classes	30	
	preparation for laboratory classes, execution of reports	50	
	studying for exam and the presence during exam (8h+2h)	10	
	attendance at consultations	5	
	TOTAL:	125	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		67	2,5
Student workload – practical activities		87	3,5
Basic references	Saternus M., Fornalczyk A., Chemistry for every student, Politechnika Śląska, Gliwice, 2013 Chojnacki J., Dołęga A., Dręczewski B. Selected topics in general and inorganic chemistry, Politechnika Gdańska, Gdańsk, 2001 Instructions for laboratory exercises, available at the Department of Chemistry, Biology and Biotechnology		

Supplementary references	Crowe J., Bradshaw T., Chemistry for the Bioscience, Oxford University Press, Oxford, 2010. Housecroft C.E., Inorganic chemistry, Pearson Education, Harlow, 2008	
Organisational unit conducting the course	Department of Chemistry, Biology and Biotechnology	Date of issuing the programme
Author of the programme	Assoc. Prof. Monika Kalinowska, DSc, PhD	15.03.2023

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,

S – seminar