

SYLLABUS

Course description

Course code		Course	CHEMIA		
ME/O/I/ST/A1			CHEMISTRY		
Language of instruction		English			
Academic year		2025/2026			
field of study:		Mechanical Engineering			
field of specialisation:		All			
Educational level		first-cycle studies			
Education profile		General academic			
Mode of study		Full-time studies			
Semester(s)		1			
Affiliation with a group of classes		A. Group of basic course			
Course status		Obligatory			
Types of classes, instruction hours, ECTS credits		Types of classes	Number of instruction hours	Number of ECTS credits	
		Lecture	15 [h]	3 ECTS	
		Lab	15 [h]		
Linkage of the course	with the education profile	Related to the conducted scientific activity in the discipline to which the field of study is assigned			0 ECTS
	with qualifications	It is used to acquire engineering competences by the student			3 ECTS
	with science discipline	Mechanical engineering			3 ECTS
Form of teaching		Traditional – classes organized at the University /classes conducted using distance learning methods and techniques			
Prerequisites		basic knowledge of chemistry, physics, and mathematics acquired in the secondary school			
Department		Faculty of Mechanical Engineering			
Coordinator		Ph.D. Małgorzata Wojtyniak			
The website of the basic organizational unit		www.uniwersytetradom.pl			
E-mail address, phone number of the coordinator		m.wojtyniak@uthrad.pl, tel. 48 361-76-55			

LEARNING OUTCOMES, CURRICULUM CONTENT, TEACHING CLASSES, VERIFICATION OF LEARNING OUTCOMES

Learning Objective:	<p>C1 - to familiarize students with basic chemical terminology</p> <p>C2 - gaining by students the knowledge regarding basic principles and concepts that are fundamental in chemistry, properties of chemical elements and compounds, the structure of atom, and basic states of matter.</p> <p>C3 - to acquaint students with the basic principles of work in a chemical laboratory, practical ability of conducting chemical experiments and preparation of research reports</p>
Curriculum Content:	<p><u>Lecture:</u> Fundamental principles and laws of chemistry. Structure of atom. Classification of elements and periodicity in properties. Chemical bonding. Chemical compounds. Mixtures (heterogeneous and homogeneous). States of matter. Electrolyte solutions. Reactions in aqueous solutions. Galvanic and electrolytic cells. Reactivity of metals. Corrosion and corrosion protection. Principles of organic chemistry.</p> <p><u>Laboratory classes:</u> Basic principles of work in a chemical laboratory including principles of occupational health and safety; presentation of laboratory test stands; guidelines for report preparation. Determination of the current efficiency of electrolysis, electroplated coatings. Concentration of a solution; solubility of selected salts in water. Refractive index measurement; determination of the percentage composition of solutions. Emulsions; determination of the emulsion type. Measurement of the electromotive force (SEM) of galvanic cells; pH of water solutions; salt hydrolysis. Reserve classes and credit.</p>
Didactic (educational) methods:	<p>Lecture with a multimedia presentation and discussion of examples.</p> <p>Execution of laboratory classes.</p>
Course assessment type, the criteria for assessing the achieved learning outcomes, and the method of calculating the final grade:	<p>The condition for passing the course is to achieve all the required learning out comes specified for the course....</p> <p>To credit the course a student has to obtain the required learning outcomes. Student is obliged to execute all experiments included in the curriculum.</p> <p>Lecture: written test (open tasks)</p> <p>Laboratory: interviews, execution of laboratory experiments and submitting reports. The grade is calculated as an arithmetic average of the partial grades (interviews and reports). The way of the final grade calculation is defined in the Rules of the Study.</p>

Learning outcomes for the course in relation to the field of study learning outcomes and the type of classes				Methods of verifying learning outcomes	
Learning outcome number	Description of the learning outcomes for the course (PEU) A student who has passed the course (W) knows and understands / (U) can / (K) is ready to:	Field of study learning outcome (KEU)	Types of classes	Form of verification (credits)	Methods of testing and assessment
W1	Knows and understands fundamental principles and laws of chemistry	K_WG03	Lecture	Pass with a grade	Written test
W2	Knows and understands modern theories of atom and molecule structures, in particular - electron configuration of atoms. Knows how to relate properties of an element to its positioning on the periodic table.	K_WG03	Lecture	Pass with a grade	Written test

W3	Knows and understands issues related to the solution chemistry. Knows basics of chemical calculations and properties of the main organic compounds.	K_WG03	Lecture	Pass with a grade	Written test
U1	Can use laboratory equipment and conduct simple chemical experiments. Is able to prepare calibration curves of the measuring systems.	K_UW02	Laboratory classes	Pass with a grade	Interviews, lab reports
U2	Can perform basic chemical calculations related to the fundamental laws of chemistry, solution concentrations, stoichiometry, and equilibrium states in electrolyte solutions.	K_UW02	Laboratory classes	Pass with a grade	Interviews, lab reports
U3	Can work well in a team.	K_KK01	Laboratory classes	Activity during classes	Observation
K2	Is aware of the impact of chemical compounds on the environment.	K_KK02	Laboratory classes		

Literature and teaching aids	
<ol style="list-style-type: none"> 1. Vining W.J., Young S.M., Day R., Botch B.: General Chemistry. Brooks/Cole Pub Co., 2014. 2. Weller M., Overton T., Rourke J., Armstrong F.: Inorganic Chemistry. Oxford University Press; 7th edition, 2018. 3. Morrison R.T., Boyd R.N.: Organic chemistry. Pearson, 7th ed., 1999. 4. Housecroft C. E., Sharpe A. G.: Inorganic chemistry. Harlow : Pearson Education, 2008. 5. Timm J. A.: General chemistry. New York : McGraw-Hill Book Company, 1966. 6. Streitwieser A., Heathcock C. H.: Introduction to organic chemistry. New York : MacMillan Publishers, 1976. 7. Brown W. H.: Organic chemistry. Belmont : Brooks/Cole Cengage Learning, 2009. 8. Inorganic Chemistry. Berlin : Akademie Verlag, 1981. 	

Student workload required to achieve the assumed learning outcomes – the balance of ECTS credits		
Attendance, participation	Student workload [h].	
	Student's self-study hours Classes without a teacher (ZBN)	Classes
Participation in lectures/classes/lab	X	30[h]
Preparation for lectures/classes/lab ,	45 [h]	X
Total student workload	45 [h]/ 1.8ECTS	30 [h]/ 1.2ECTS
ECTS points per subject	3 ECTS	

Additional information, comments
<p>In the case of students with special needs, including disabilities, and chronic illnesses, the methods and forms of verification of learning outcomes specified above (in the syllabus) are adapted to the individual needs of these students, as appropriate.</p> <p>Detailed rules and forms of support for students with special needs, including those with disabilities and chronically ill, during classes, credits, and exams are specified in: University Regulations (Regulamin Studiów Uniwersytetu Technologiczno-Humanistycznego w Radomiu), Study Regulations (Zasady Studiowania), and Procedure for Ensuring Accessibility of the Educational Process to Students with Special Needs, Including Those with Disabilities and Chronically ill (Procedura dotycząca zapewnienia dostępności procesu kształcenia studentom ze szczególnymi</p>

potrzebami, w tym: z niepełnosprawnością, przewlekle chorych).

