

SDAŃSK UNIVERSITY 的 OF TECHNOLOGY

Subject card

Subject name and code	Organic Chemistry, PG_00048603							
Field of study	Chemistry in Construction Engineering							
Date of commencement of studies	October 2023		Academic year of realisation of subject			2023/2024		
Education level	first-cycle studies		Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery			at the university		
Year of study	1		Language of instruction			Polish		
Semester of study	2		ECTS credits			6.0		
Learning profile	general academic profile		Assessment form			assessment		
Conducting unit	Department of Organic Chemistry -> Faculty of Chemistry							
Name and surname	Subject supervisor		dr hab. inż. Witold Przychodzeń					
of lecturer (lecturers)	Teachers							
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
of instruction	Number of study hours	30.0	15.0	30.0	0.0		0.0	75
	E-learning hours included: 0.0							
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study		SUM
	Number of study hours	75		15.0		60.0		150
Subject objectives	 To familiarize the student with the structure of the major classes of organic compounds and their reactivity To familiarize the student with the basic organic reaction mechanisms and with the methods of organic compounds synthesis To familiarize the student with the isolation and the purity analysis procedures and protocols for compounds prepared in the laboratory 							

Learning outcomes	Course outcome	Subject outcome	Method of verification		
	к6_коз	 Student is able to synthesise organic compounds according to literature procedures Student is able to apply basic techniques of isolation and purification of organic compounds: distillation, crystallization and extraction 	[SK2] Assessment of progress of work		
	K6_W03	 Student draws a correct structural and electronic formulas of organic compounds Student is able to recognize and name individual classes of organic compounds Student can determine and predict the effect of molecular structure on its physical and chemical properties Student knows the basic concepts of stereochemistry, distinguishes stereoisomers and determines their configurations Student recognizes and knows the basic mechanisms of organic reactions Student plans an organic synthesis consists of several steps 	[SW3] Assessment of knowledge contained in written work and projects		
	K6_U07	 Student has knowledge of the nomenclature of organic compounds according to IUPAC recommendations. Student identifies organic acids and bases, electrophilic and nucleophilic reagents. Student can determine the relative differences in the acidity / basicity of organic compounds. 	[SU2] Assessment of ability to analyse information		
Subject contents	LECTURE Common representation of structural formulas and reaction equations; isomerism and stereochemistry; resonance theory; structure influence on physico-chemical properties of compounds; acid-base reactions; concise characteristics of the main classes of organic compounds (aliphatic and cyclic hydrocarbons, aromatic hydrocarbons, alcohols, phenols and ethers, aldehydes and ketones, carboxylic acids and their derivatives, amines, bifunctional compounds, heteroaromatics) including their structure, nomenclature, physical and chemical properties, methods of their preparation with emphasis on the use of the selected representatives in the constraction field; main reaction types in organic chemistry and their mechanisms; introduction to chemistry of polymers and their application in construction and building materials. TUTORIALS During tutorials student should practice her/his skills to independently use the knowledge acquired during lectures e.g. for writing organic compounds formulas, ascribing compound to particular class, predicting its chemical and physical properties based on its structure, proposing the route of the target compound used in building chemistry to the correct class of compounds to which it belongs. LABORATORY During laboratory classes students become familiar with basic laboratory techniques for preparation, isolation and purification of organic compounds (filtration, extraction, distillation and crystallization). Student will learn to ellaborate the proper synthetic protocol (calculation of the reaction yield) and to write correct lab reports. Assesment: test from lecture material (50% of the final note), test from tutorial material (25% of the final note), test and reports from the experimental work (25% of the final note).				
Prerequisites and co-requisites	General Chemistry and Inorganic Ch	nemistry			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade		
	Laboratory: reports, points for written entrance tests	60.0%	25.0%		
	Written exam	50.0%	50.0%		
	Seminars: one written test	60.0%	25.0%		

Recommended reading	Basic literature	J. McMurry Chemia Organiczna, PWN, W-wa, 2005.		
		P. Mastalerz Chemia Organiczna, PWN, W-wa, 1986. A.		
		PREPARATYKA ORGANICZNA - Instrukcje do ćwiczeń laboratoryjnych: dla studentów II i III roku chemii Uniwersytet Łódzki 2017/2018, red. K. Gębicki i inni		
		I. Vogel Preparatyka Organiczna, WNT, W-wa, 1984.		
	Supplementary literature	P. Mastalerz Podręcznik Chemii Organicznej, Wyd. Chem., Wrocław, 1996.		
		W. Przychodzeń, K. Darowicki Charakterystyka chemiczna żywic i rozpuszczalników do farb oraz powłok ochronnych, Wyd. PG, Gdańsk, 2011.		
		O. Henning, L. Czarnecki, T. Broniewski, Chemia w budownictwie, Arkady, W-wa, 2000, 2010		
	eResources addresses	Adresy na platformie eNauczanie:		

Example issues/						
example questions/ tasks being completed	1. Suggest 4-step syntheses for compounds shown below:					
	a) 3-bromo-4-fluorotoluene from p-nitrotoluene					
	· · · ·					
	b) 4-O2NC6H4C(CH3)2COOH from isopropylobenzene					
	2. Draw the formula for an organic compound that is representative of the class mentioned:					
	a) terminal alkene oxide					
	b) ß-alkylpyridine					
	c) imide					
	d) <i>terta</i> arylammonium phenolate					
	3. Draw a fragment of the polymer structure containing at least two mers and the monomer structure from which it was obtained:					
	a) aromatic polycarbonate					
	b) aromatic polyurethane					
	4. What is the acidity order of the following compounds (assign the pKa values)					
	C6H5OH C6H11OH C6H11NH2 C6H5CCH p-HOC6H4COOH					
	5. Draw the structures of the products A F:					
	a) $/R/-1$ -bromo-1,3,3-triethylcyclohexane + CF ₃ CH ₂ OH = A + B					
	b) sodium 4-nitrobenzoate + C ₆ H ₅ CH ₂ Br = C					
	c) CH ₃ CH(OH)CH ₂ CH ₂ CH ₂ Br + CH ₃ CCNa = D (cyclic product)					
	d) Aniline + KNO2-H2SO4 = E					
	E + phenol dissolved in 10% aq NaOH = F					
Work placement	Not applicable					