



## Subject card

Subject name and code	Organic chemistry, PG_00035967						
Field of study	Chemical Technology						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2022/2023		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Organic Chemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Maria Milewska				
	Teachers		prof. dr hab. inż. Maria Milewska  dr inż. Jan Alfuth				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	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	60		5.0		60.0	125
Subject objectives	A main goal is to teach students basic problems of organic chemistry including: the structure, properties reactions and reactions mechanisms of organic compounds						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W02		The student knows the intermolecular interactions and supramolecular technologies leading to the creation of novel structures.		[SW1] Assessment of factual knowledge		
	K6_U03		The student gained the knowledge in the field of basic syntheses of organic and macromolecular compounds, has the knowledge on organic compounds of natural origin and the use of chiral syntheses in industry.		[SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	<p><b>Aromatic hydrocarbons</b></p> <p>Alkadiens. Aromaticity, benzenoic and nonbenzenoic aromatic systems. Hydrogenation of benzene ring. Electrophilic substitution. Side chain reactions in substituted aromatic compounds. Aromatic hydrocarbons of condensed rings. Oil cracking, reforming, octan number</p> <p><b>Aldehydes and ketones</b></p> <p>Nomenclature, preparation and chemical properties, nucleophilic addition to the carbonyl group, oxidation and reduction, the Cannizzaro reaction, enols and enolates, the aldol condensation, halogenation, the haloform reaction.</p> <p><b>Carboxylic acids and their derivatives</b></p> <p>Nomenclature, acidity, preparation, reactions, carboxylic acid derivatives: esters and amides; nucleophilic acyl substitution, decarboxylation, dicarboxylic acids, halogeno and hydroxy acids; keto-acids - ketoacid decarboxylation reaction; carbonic acid derivatives,</p> <p><b>Synthesis and reactions of -dicarbonyl compounds</b></p> <p>the Claisen condensation, acetoacetic and malonic ester syntheses; barbiturates.</p> <p><b>Nitrogen organic compounds</b></p> <p>Amines nomenclature, basicity, preparation, reactions, diazonium salts, the Sandmayer reaction; nitriles. Nitro compounds preparation and reactions.</p> <p><b>Phenols and aryl halides</b></p> <p>Phenols preparation, acidic properties, electrophilic substitution, oxidation, Aryl halides SNAr reactions</p> <p><b>Heterocyclic compounds</b></p> <p>structure, aromaticity, preparation and reactions</p> <p><b>Sulphur compounds</b></p> <p>electronic structure, preparation</p> <p><b>Natural compounds</b></p> <p>carbohydrates, amino acids. peptides, proteins structure, preparation and typical reactions</p>												
Prerequisites and co-requisites	<p>Structure of elements and their compounds, especially carbon; acids, bases and salts; reaction types, geometry of molecules.</p> <p>Completed the first part of the subject Organic Chemistry.</p>												
Assessment methods and criteria	<table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Midterm colloquium and tests from the exercise material</td><td>50.0%</td><td>60.0%</td></tr><tr><td>Midterm tests on the lecture material</td><td>50.0%</td><td>25.0%</td></tr><tr><td>Written and oral exam</td><td>50.0%</td><td>15.0%</td></tr></table>	Subject passing criteria	Passing threshold	Percentage of the final grade	Midterm colloquium and tests from the exercise material	50.0%	60.0%	Midterm tests on the lecture material	50.0%	25.0%	Written and oral exam	50.0%	15.0%
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Recommended reading	Basic literature	<p>1. J. D. Caserio, M. C. Roberts CHEMIA ORGANICZNA, PWN Warszawa, 1969</p> <p>2. R. T. Morrison, R. N. Boyd CHEMIA ORGANICZNA, PWN Warszawa, 1997</p> <p>3. J. McMurry CHEMIA ORGANICZNA, PWN Warszawa, 2017</p> <p>4. T. W. G. Solomons ORGANIC CHEMISTRY - 6th ed, John Wiley &amp; Sons, Inc. New York, 1996</p>
	Supplementary literature	<p>1. J. Gawroński, K. Gawrońska, K. Kacprzak, M. Kwit WSPÓŁCZESNA SYNTEZA ORGANICZNA, PWN Warszawa 2004</p> <p>2. J. March CHEMIA ORGANICZNA - Reakcje, mechanizmy, budowa, WNT Warszawa 1975</p> <p>3. H. O. House NOWOCZESNE REAKCJE SYNTEZY ORGANICZNEJ, PWN Warszawa 1979</p> <p>4. T. W. G. Solomons ORGANIC CHEMISTRY - 6th ed, John Wiley &amp; Sons, Inc. New York, 1996</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Give the product and mechanism of the reaction of benzene and $\text{AlCl}_3$ with a) an acyl chloride $\text{CH}_3\text{CH}_2\text{COCl}$ ; b) an acid anhydride $(\text{CH}_3\text{CH}_2\text{CO})_2\text{O}$ . What is the electrophile? Show contributing resonance structures. How can we use the acylation to synthesize unbranched alkyl side chains on an aromatic ring? Illustrate by preparing n-propylbenzene.	
Work placement	Not applicable	