



Subject card

Subject name and code	Organic Chemistry, PG_00054705						
Field of study	Biotechnology						
Date of commencement of studies	October 2022	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	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Organic Chemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Maria Milewska					
	Teachers						
Lesson type and method 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	10.0		55.0		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_W03	The student has a basic knowledge of the properties of organic and natural compounds and knows and understands the most important reaction mechanisms used to obtain organic compounds			[SW1] Assessment of factual knowledge		
	K6_U02	Student is able to apply knowledge of general, physical and quantum chemistry necessary to predict the properties of biomolecules and the course of bioprocesses			[SU1] Assessment of task fulfilment		

Subject contents	<p>Aromatic hydrocarbons</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>Aldehydes and ketones</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>Carboxylic acids and their derivatives</p> <p>Nomenclature, acidity, preparation, reactions, carboxylic acid derivatives: esters and amides; nucleophilic acyl substitution, decarboxylation, dicarboxylic acids, halogeno and hydroxy acids; keto-acids - β-ketoacid decarboxylation reaction; carbonic acid derivatives,</p> <p>Synthesis and reactions of β-dicarbonyl compounds</p> <p>the Claisen condensation, acetoacetic and malonic ester syntheses; barbiturates.</p> <p>Nitrogen organic compounds</p> <p>Amines – nomenclature, basicity, preparation, reactions, diazonium salts, the Sandmeyer reaction; nitriles. Nitro compounds – preparation and reactions.</p> <p>Phenols and aryl halides</p> <p>Phenols – preparation, acidic properties, electrophilic substitution, oxidation, Aryl halides – S_NAr reactions</p> <p>Heterocyclic compounds</p> <p>structure, aromaticity, preparation and reactions</p> <p>Sulphur compounds</p> <p>electronic structure, preparation</p> <p>Natural compounds</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 border="1"> <thead> <tr> <th data-bbox="456 1868 794 1899">Subject passing criteria</th> <th data-bbox="799 1868 1137 1899">Passing threshold</th> <th data-bbox="1142 1868 1481 1899">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1906 794 1937">Written examination</td> <td data-bbox="799 1906 1137 1937">60.0%</td> <td data-bbox="1142 1906 1481 1937">60.0%</td> </tr> <tr> <td data-bbox="456 1944 794 1989">Midterm colloquium; practical exercise, tests</td> <td data-bbox="799 1944 1137 1989">60.0%</td> <td data-bbox="1142 1944 1481 1989">40.0%</td> </tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	Written examination	60.0%	60.0%	Midterm colloquium; practical exercise, tests	60.0%	40.0%
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Written examination	60.0%	60.0%								
Midterm colloquium; practical exercise, tests	60.0%	40.0%								

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>
	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 & Sons, Inc. New York, 1996</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	