GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Organic Chemistry, PG_00054705		
Field of study	Biotechnology		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2024/2025
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	prof. dr hab. inż. Maria Milewska dr hab. inż. Grzegorz Cholewiński 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

Additional information:

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 compunds

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U02	The student gained the knowledge in the field of basic syntheses of organic compounds, has knowledge of bioorganic compounds and the application of their syntheses in industry.	[SU1] Assessment of task fulfilment
K6_W03	The student is able to predict the potential biological properties of biomolecules and organic compounds based on knowledge of their chemical structure. The student knows how to plan the synthesis of organic compounds, taking into account systemic and non-technical aspects, to obtain products with specific properties and applications.	[SW1] Assessment of factual knowledge

Subject contents	**Aromatic hydrocarbons** Hydrogenation of benzene ring. Electrophilic substitution. Side chain reactions in substituted aromatic compounds. Aromatic hydrocarbons of condensed rings. Oil cracking, reforming, octan number **Aldehydes and ketones** 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. **Caboxylic acids and their derivatives** 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, **Synthesis and reactions of -dicarbonyl compounds** the Claisen condensation, acetoacetic and malonic ester syntheses; barbiturates. **Nitrogen organic compounds** Amines nomenclature, basicity, preparation, reactions, diazonium salts, the Sandmayer reaction; nitriles. Nitro compounds preparation and reactions. **Phenols and aryl halides** Phenols preparation, acidic properties, electrophilic substitution, oxidation, Aryl halides SNAr reactions **Heterocyclic compounds** structure, aromaticity, preparation and reactions **Sulphur compounds** electronic structure, preparation **Natural compounds** carbohydrates, amino acids. peptides, proteins structure, preparation and typical reactions
Prerequisites and co-requisites	Structure of elements and their compounds, especially carbon; acids, bases and salts; reaction types, geometry of molecules. Completed the first part of the subject Organic Chemistry.
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterm colloquium, tests	60.0%	20.0%
Midterm colloquium; practical execise	60.0%	20.0%
Written examination	60.0%	60.0%

Recommended reading	Basic literature	1. J. D. Caserio, M. C. Roberts CHEMIA ORGANICZNA, PWN Warszawa, 1969 2. R. T. Morrison, R. N. Boyd CHEMIA ORGANICZNA, PWN Warszawa, 1997 3. J. McMurry CHEMIA ORGANICZNA, PWN Warszawa, 2017
	Supplementary literature	1. J. Gawroński, K. Gawrońska, K. Kacprzak, M. Kwit WSPÓŁCZESNA SYNTEZA ORGANICZNA, PWN Warszawa 2004 2. J. March CHEMIA ORGANICZNA - Reakcje, mechanizmy, budowa, WNT Warszawa 1975 3. H. O. House NOWOCZESNE REAKCJE SYNTEZY ORGANICZNEJ, PWN Warszawa 1979 4. T. W. G. Solomons ORGANIC CHEMISTRY - 6th ed, John Wiley & Sons, Inc. New York, 1996
	eResources addresses	Adresy na platformie eNauczanie: sem 4 CHEMIA ORGANICZNA BT - Moodle ID: 44097 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44097
Example issues/ example questions/ tasks being completed	1.Diethylpropion (Ph-CO-CH(NEt_2)-CH_3) is a compound used in the treatment of anorexia. Propose a synthesis of diethylpropion starting with benzene and usingany other needed reagents. 2.Starting with diethyl malonate, urea and any other required reagents, outline a synthesis of barbiturates: veronal and seconal	
Work placement	Not applicable	

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