



## Subject card

Subject name and code	Fundamentals of organic chemistry, PG_00063338						
Field of study	Nanotechnology						
Date of commencement of studies	October 2024	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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Chemistry and Technology of Functional Materials -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Grzegorz Cholewiński					
	Teachers	dr hab. inż. Grzegorz Cholewiński					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	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	30		3.0		17.0	50
Subject objectives	Acquisition by students of basic knowledge of organic chemistry						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W01] has knowledge of materials science and understands its key role in the progress of civilization	Student discusses relations between substance properties and types of underlying bonds. Student is also able to bind the properties of materials with the possibility of their use.			[SW1] Assessment of factual knowledge		
	[K6_W05] has knowledge of inorganic and organic chemistry, physical chemistry and chemical thermodynamics.	The student explains the chemical formulas of organic compounds. He can relate the structures of organic and bioorganic compounds with their properties. The student evaluates the reactivity of organic compounds. The student indicates which elements of the polymer structure determine its properties.			[SW1] Assessment of factual knowledge		
	[K6_U04] can plan and conduct experiments, critically analyze their results, draw conclusions and formulate opinions. Has laboratory experience.	Student is able to draw conclusions and formulate opinions. Student is able to analyze the obtained results.			[SU2] Assessment of ability to analyse information		
[K6_U01] can learn independently, obtain information from literature, databases and other properly selected sources	Student can individually in the textbooks or other literature search for relevant information.			[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information			

Subject contents	Organic compounds: classification, nomenclature, isomerism, properties, reactivity. Main groups of organic compounds (preparation, properties, uses): aliphatic and aromatic hydrocarbons, organic halides, alcohols and phenols, aldehydes and ketones, organic acids and their derivatives, organic compounds bearing nitrogen and other heteroatoms, heterocyclic compounds. Mechanisms of organic reactions. Methods of identification of organic substances. Macromolecules: methods of polymer synthesis, chemical structure of a polymer versus its properties. Biologically important organic molecules and macromolecules: structure and properties of proteins, lipids, sugars and nucleic acids.		
Prerequisites and co-requisites	Properties of chemical elements and their compounds, structure of chemical compounds versus their properties, theories of acids and bases, kinetics and thermodynamics of chemical reactions		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written colouqium	51.0%	100.0%
Recommended reading	Basic literature	<p>R. T. Morison; R. N. Boyd; Chemia organiczna, Wydawnictwo Naukowe PWN, Warszawa 2012.</p> <p>J. McMurry, Chemia organiczna, Wydawnictwo Naukowe PWN, Warszawa, 2011</p> <p>M. Cook, P. Cranwell, Chemia organiczna (seria Zrozumieć chemię), Wydawnictwo Naukowe PWN, Warszawa, 2021</p> <p>J. D. Caserio, M. C. Roberts, Chemia organiczna, PWN Warszawa, 1969</p> <p>P. Mastalerz, Chemia organiczna, Wydawnictwo Chemiczne, Wrocław, 2016</p>	
	Supplementary literature	<p>J. Gawroński, K. Gawrońska, K. Kacprzak, M. Kwit, Współczesna synteza organiczna, Wydawnictwo Naukowe PWN, Warszawa, 2004</p> <p>J. March, Chemia organiczna - reakcje, mechanizmy, budowa, Wydawnictwo Naukowe PWN, Warszawa, 1975.</p>	
	eResources addresses	<p>Adresy na platformie eNauczanie:</p> <p>Podstawy chemii organicznej - Moodle ID: 45101</p> <p><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=45101">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=45101</a></p>	
Example issues/ example questions/ tasks being completed	<p>Constitutional isomerism of organic compounds: types, examples. Alkane nomenclature. Nomenclature of particular classes of organic compounds. Transformations of organic compounds: short characteristics of ionic and radical reactions. Changes in organic compounds: substitution, addition, elimination and rearrangement reactions (general scheme and examples). Electronic effects of substituents: inductive and resonant effects. Influence of electronic substituent effects on the reactivity of aromatic compounds. Techniques of isolation and purification of organic compounds. For what purpose are spectrosopes used in organic chemistry: NMR, IR and MS? Addition polymerization of vinyl monomers. Condensation polymers: structure, preparation, application. Influence of macromolecule structure on its physical properties. Protein amino acids: structure, configuration (optical isomerism). Ionic structure of amino acids and their physical properties. Peptide synthesis. Primary and secondary structure of proteins. Lipids: an example of a triglyceride. Sugars: how is D-glucose built? Why do we digest starch and not digest cellulose? Nucleic acids: primary and secondary structure of DNA.</p>		
Work placement	Not applicable		

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