GDAŃSK UNIVERSITY OF TECHNOLOGY

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 coloqium	51.0%	100.0%

Recommended reading

Basic literature	R. T. Morison; R. N. Boyd; Chemia organiczna, Wydawnictwo Naukowe PWN, Warszawa 2012. J. McMurry, Chemia organiczna, Wydawnictwo Naukowe PWN, Warszawa, 2011 M. Cook, P. Cranwell, Chemia organiczna (seria Zrozumieć chemię), Wydawnictwo Naukowe PWN, Warszawa, 2021 J. D. Caserio, M. C. Roberts, Chemia organiczna, PWN Warszawa, 1969 P. Mastalerz, Chemia organiczna, Wydawnictwo Chemiczne, Wrocław, 2016
Supplementary literature	J. Gawroński, K. Gawrońska, K. Kacprzak, M. Kwit, Współczesna synteza organiczna, Wydawnictwo Naukowe PWN, Warszawa, 2004 J. March, Chemia organiczna - reakcje, mechanizmy, budowa, Wydawnictwo Naukowe PWN, Warszawa, 1975.
eResources addresses	Adresy na platformie eNauczanie: Podstawy chemii organicznej - Moodle ID: 45101 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=45101

Example issues/ example questions/ tasks being completed	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 spectroscopes 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.
Work placement	Not applicable

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