University of Gdańsk

Subject card

Subject name and code	Organic chemistry, PG_00050794						
Field of study	Environmental Protection						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2025/2026		
Education level	undergraduate studies		Subject group		Obligatory subject group 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	3		ECTS credits		2.0		
Learning profile	academic		Assessment form				
Conducting unit	Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Beata Liberek				
	Teachers						
Lesson types	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		5.0		15.0	50
Subject objectives	Acquiring knowledge of typical groups of organic compounds, their structure, nomenclature, physical properties and characteristic reactions; learning of types of organic reactions and selected mechanisms; acquainting students with the issues of isomerism, particularly stereoisomerism.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OŚL3_W01] Discusses the basic concepts of mathematics, physics, chemistry and biology. Describes physical, chemical and biological phenomena occurring in nature as well as geological, geomorphological and climatic conditions of the functioning of nature.	Lists and characterizes the basic groups of organic compounds; Associates the structure of an organic compound with its physical properties; Lists the types of bonds and explains how these are created; Names electronic effects and explains their impact on the stabilization, acidity and reactivity of an organic compound; Knows the basic reactions characteristic of a given group of organic compounds; Defines types of organic reactions; Knows the basic mechanisms reaction; Lists and characterizes types of isomerism, defines and distinguishes stereoisomers;	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[OŚL3_U11] Uses statistical methods as well as algorithms and IT techniques, including application software packages to describe environmental experiments and analysis of typical data in socio-economic activities based on science and natural sciences.	Classifies all chemical groups of organic compounds provided within the minimum curriculum; Predicts the properties of an organic compound based on its structure, proposes characteristic reactions; Recognizes and classifies isomers; Analyzes chemical data and describes the behavior of an organic compound in the environment.	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[OŚL3_K04] Demonstrates responsibility for the safety of her/ his own and others' work and for the workplace, and correctly follows the rules of conduct in emergencies.	Demonstrates independence and responsibility in decision-making; Complies with work rules in a team and can take responsibility for jointly performed tasks; Is guided by ethical principles in team and individual work; Is responsible for work safety for yourself and others.	[SK1] oral statement/conversation/ discussion [SK4] test/exam - oral or written
	[OŚL3_K05] Identifies the level of her/his knowledge and skills, demonstrates the need to update knowledge about the environment and its protection, demonstrates the need for continuous professional training and personal development.	Understands the importance of organic chemistry for environmental protection and other natural sciences; Is aware of the limitations of his own knowledge and competences, understands the need for further education.	[SK1] oral statement/conversation/ discussion [SK4] test/exam - oral or written
	[OŚL3_U09] Prepares in Polish/ English a short description of research, observation or problem task carried out during classes using appropriate scientific terminology.	Describes phenomena related to organic chemistry; Uses organic terminology.	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[OŚL3_U02] Plans, selects appropriate research and measuring equipment and devices, performs physicochemical measurements and experiments; analyses the results and draws conclusions based on them.	Analyzes and solves basic chemistry problems organic; Plans syntheses; Analyzes organic compounds based on physicochemical measurements. Analyzes the results and formulates conclusions.	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[OŚL3_W13] Defines the basic principles of occupational safety, ergonomics and hygiene.	Recognizes dangerous organic substances and knows how to deal with them.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion

Subject contents	Atomic orbitals; Hybridization; Chemical bonds; Dipole moment; Inductive effect; Formal charge; Lewis structures; Mezomeric effect; Intermolecular forces; Acidity and basicity; Nucleophile and electrophile; Types of organic reactions; Thermodynamic and kinetic of organic reactions; Alkanes: structure, nomenclature, bolding points and solubility, isomerism, occurrence, conformations, synthesis; Alkanes acidity, carboanions, organometallic compounds, protic and aprotic solvents; Alkanes burning; Alkanes halogenation: mechanism, reactivity, carbon radicals; Cycloalkanes: nomenclature, *cis-trans* isomerism, stability, cyclohexane conformations; Alkenes: nomenclature, structure, stereoisomerism, stability, physical properties, synthesis; Hydrogenation of alkenes; Electrophilic additions: Markovnikovs rule, carbocation; Radical addition of HBr; Alkenes polymerization; Alkines: nomenclature, structure, physical properties, synthesis; acidity; addition reactions; Aromatic compounds: benzene, conditions of aromacity, other aromatic compounds; Electrophilic substitution, substituents effect; Optical isomerism: chiral atom, configuration determination, Fischer projection, relative configuration, other types of chirality, biological significance; Halogenoalkanes: characteristic, nomenclature, physical properties, synthesis; Mechanism of nucleophilic substitution and eliminations; Alcohols: structure, nomenclature, physical properties, synthesis, acidity, typical reactions; Phenols: nomenclature, acidity, typical reactions; Ethers: nomenclature, physical properties, synthesis, cyclic ethers; Aldehydes and ketones: nomenclature, physical properties, synthesis; Nucleophilic addition: mechanism and reactions; Aldehyde oxidation; Alpha hydrogen acidity: tautomerization, aldol condensation; Carboxylic acids: structure, nomenclature, physical properties, synthesis, acidity; Carboxylic acid salts; Derivatives of carboxylic acids; structures, nomenclature, synthesis, acyl nucleophilic substitution; Esterification; Triglycerides; Amines: structures, nomenclature, physical properties, synthesis, basicity, typical reactions; Ammonium salts; Introduction to multifunctional compounds: amino acids and carbohydrates.
Prerequisites and co-requisites	Passed general chemistry course.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
A positive result is required in the exam, which consists of approximately 10 questions checking knowledge of the material covered during the lecture.	51.0%	100.0%

Recommended reading

Basic literature	J. McMurry, Chemia organiczna, G. Kupryszewski, Wstęp do chemii organicznej J. Wade, Organic Chemistry P. Y. Bruice, Organic Chemistry
Supplementary literature	R. T. Morrison, R. N. Boyd Chemia organiczna P. Mastalerz, Chemia organiczna
eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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