GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Organic chemistry, PG_00054692		
Field of study	Biotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
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	3	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Organic Chemistry -> Faculty of Chemistry -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Sławomir Makowiec	
	Teachers	dr hab. Sławomir Makowiec dr inż. Jan Alfuth dr inż. Monika Gensicka-Kowalewska	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	0.0	0.0	45

E-learning hours included: 0.0

eNauczanie source addresses:
Moodle ID: 1667 CHEMIA ORGANICZNA
https://enauczanie.pg.edu.pl/2025/course/view.php?id=1667

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	45	5.0	25.0	75

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_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	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents	**Chemical Bonding and Molecular Properties.** Bond Structure, Orbitals, Hybridization. The Structure of Methane, Ethene, and Ethyne - Sp3, Sp2, and Sp Hybridization. Polar Covalent Bonds; Electronegativity, Dipole Moment. Intermolecular Interactions. Chemical Structures, Formal Charges, Resonance. Acids and Bases in Organic Chemistry (Brønsted-Lowry, Lewis, and Pearson Theories). **Alkanes and Cycloalkanes - Constitutional and Geometric Isomerism.** IUPAC Nomenclature of Alkanes. Spatial Arrangement of Atoms in Saturated Hydrocarbon Molecules. Free-Radical Substitution. Conformational Analysis. **Halogenated Derivatives of Aliphatic Hydrocarbons.** Structure, Nomenclature, and Methods for Preparing Haloalkanes. Nucleophilic Substitution and Elimination Reactions. Optical Isomerism. Stereoisomers chiral molecules, enantiomers and diastereomers, configuration, CIP rules. **Unsaturated Hydrocarbons Alkenes and Alkynes.** Classification and Nomenclature (Z/E alkenes, alkynes, alkadienes). Physical and Chemical Properties of Alkenes and Their Structure. Addition and Elimination Reactions. Properties, Reactivity, and Preparation of Alkynes The Concept of Tautomerism. **Aromatic Hydrocarbons**. The Essence of Aromaticity, Reactivity, and Substituent Effects. **Alcohols** Classification and Nomenclature of Alcohols. Properties of Alcohols Their Acidity and Basicity, Hydrogen Bond Formation. Reactions involving the Breaking of Carbon-Oxygen and Oxygen-Hydrogen Bonds. **Ethers, Epoxides.** Ethers Structure and Nomenclature. Methods for obtaining chain and ring ethers. Ethers as solvents. . Epoxides and their reactions. **Organomagnesium compounds** Preparation, properties and use in organic synthesis
Prerequisites and co-requisites	Knowledge of inorganic and general chemistry, valence; concept of acids, bases and salts; types of reactions; molecular geometry.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Mini lecture tests in e-learning	60.0%	15.0%
Practical execise, tests	60.0%	40.0%
Midterm colloquium	60.0%	45.0%

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. March CHEMIA ORGANICZNA - Reakcje, mechanizmy, budowa, WNT Warszawa 1975 2. H. O. House NOWOCZESNE REAKCJE SYNTEZY ORGANICZNEJ, PWN Warszawa 1979 3. T. W. G. Solomons ORGANIC CHEMISTRY - 6th ed, John Wiley & Sons, Inc. New York, 1996
eResources addresses	

Example issues/ example questions/ tasks being completed	What conditions must a molecule meet to be aromatic? How effectively can the p orbitals of two carbon atoms overlap? Why does the addition of HCl to 2-methylpropene produce primarily 2-methyl-2-chloropropane? How do you obtain n-butylbenzene? Will KOH abstract a proton from acetylene? Why does nitration of toluene occur at the ortho and para positions?
Work placement	Not applicable

Document generated electronically. Does not require a seal or signature.