



Subject card

Subject name and code	Organic chemistry, PG_00054692						
Field of study	Biotechnology						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
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						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Maria Milewska					
	Teachers						
Lesson type and method 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						
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 compounds						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	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		
	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		

Subject contents	<p>Introduction</p> <p>Chemical bonds and properties of molecules. Character of chemical bonds. Description of covalent bond. Structure of methane, ethane and ethyne – hybridization sp^3, sp^2 and sp. Polarized covalent bonds; electronegativity, dipol moment. Intermolecular interactions. Lewis structures, formal charge, resonance. Classification of organic compounds – IUPAC nomenclature of organic compounds. Acids and bases in organic chemistry (theory .Brønsted-Lowry, Lewis, Pearson)</p> <p>Alkanes and cycloalkanes – constitutive and geometric isomerism.</p> <p>IUPAC nomenclature, homologs, physical properties. Conformational analysis of alkanes and cycloalkanes. Alkane and cycloalkane syntheses. Chemical reactions of alkanes - chain radical reactions.</p> <p>Alkyl halides</p> <p>Stereoisomers – chiral molecules, enantiomers and diastereomers, configuration, CIP rules, racemates, reactions leading to diastereomers. Structure, nomenclature and preparation of alkyl halides. Nucleophilic substitution and elimination – reaction mechanisms and stereochemistry, carbocations: stability and stereochemistry.</p> <p>Alkenes and alkynes</p> <p>Nomenclature, electronic structure, stereochemistry, synthesis and chemical properties, carbocation rearrangements, ionic and radical addition to multiple bonds, regioselectivity, stereospecificity, hydroxymercuration and hydroboration of alkenes, polimerization, epoxidation, oxidation and ozonolysis, allylic substitution.</p> <p>Hydroxycompounds</p> <p>Classification and nomenclature of alcohols and phenols. Properties of alcohols – acidity and basicity, hydrogen bond forming.</p> <p>Ethers, epoxides</p> <p>Ethers – structure and nomenclature. Ethers as solvents. Epoxides and their reactions. Epoxide resins and glues. Crown ethers.</p>											
Prerequisites and co-requisites	Structure of elements and their compounds, especially carbon; acids, bases and salts; reaction types, geometry of molecules											
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="448 1411 794 1444">Subject passing criteria</th> <th data-bbox="794 1411 1141 1444">Passing threshold</th> <th data-bbox="1141 1411 1487 1444">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 1444 794 1478">Practical exercise, tests</td> <td data-bbox="794 1444 1141 1478">60.0%</td> <td data-bbox="1141 1444 1487 1478">30.0%</td> </tr> <tr> <td data-bbox="448 1478 794 1514">Midterm colloquium</td> <td data-bbox="794 1478 1141 1514">60.0%</td> <td data-bbox="1141 1478 1487 1514">70.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Practical exercise, tests	60.0%	30.0%	Midterm colloquium	60.0%	70.0%
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Practical exercise, tests	60.0%	30.0%										
Midterm colloquium	60.0%	70.0%										
Recommended reading	<p>Basic literature</p> <ol style="list-style-type: none"> <li data-bbox="802 1525 1487 1576">1. J. D. Caserio, M. C. Roberts CHEMIA ORGANICZNA, PWN Warszawa, 1969 <li data-bbox="802 1648 1487 1700">2. R. T. Morrison, R. N. Boyd CHEMIA ORGANICZNA, PWN Warszawa, 1997 <li data-bbox="802 1749 1487 1783">3. J. McMurry CHEMIA ORGANICZNA, PWN Warszawa, 2017 											

	Supplementary literature	<p>1. J. Gawroński, K. Gawrońska, K. Kacprzak, M. Kwit WSPÓŁCZESNA SYNTEZA ORGANICZNA, WN PWN Warszawa 2004</p> <p>2. J. March CHEMIA ORGANICZNA - Reakcje, mechanizmy, budowa, WNT Warszawa 1975</p> <p>3. H. O. House NOWOCZESNE REAKCJE SYNTEZY ORGANICZNEJ, PWN Warszawa 1979</p> <p>4. T. W. G. Solomons ORGANIC CHEMISTRY - 6th ed, John Wiley & Sons, Inc. New York, 1996</p>
Example issues/ example questions/ tasks being completed	eResources addresses	
Work placement	Not applicable	