



Subject card

Subject name and code	STEREOCHEMICAL CONTROL IN ORGANIC SYNTHESIS, PG_00038889						
Field of study	Chemistry						
Date of commencement of studies	February 2025	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group			Optional subject group		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	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 types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	30.0	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		10.0		20.0	75
Subject objectives	Broadening of knowledge on mechanism of reactions used in organic synthesis, especially concerning relationship between structures of reagents/substrates and stability of transition product						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	K7_W02		The student has knowledge related to modern organic chemistry, including the synthesis of organic chemical compounds, necessary to perform syntheses and solve technical problems, taking into account the relationship structure of the compound and its reactivity			[SW1] Assessment of factual knowledge	
	K7_W03		The student knows the techniques for identifying organic compounds, necessary for solving specific tasks - also in industry			[SW1] Assessment of factual knowledge	
	K7_U01		Student is able to gain information from literature, databases and some other sources; then is able to integrate the gained information, make their interpretation, critical evaluation and draw conclusions as well as to formulate and substantiate his/her opinions on the course of organic compounds synthesis			[SU2] Assessment of ability to analyse information	

Subject contents	<p>1. Stereoselective syntheses: diastereoselective, enantioselective and doubly differentiating reactions</p> <p>2. Diastereoselective syntheses of achiral compounds</p> <p>3. Diastereoselective syntheses: strategies of control ('molecular walls', reactions of ring formation, metal coordination, pi-pi interactions, chiral and achiral supporting factors)</p> <p>nucleophilic addition - control of diastereoselectivity during addition on nucleophiles to the carbonyl group</p> <p>electrophilic reactions of alkenes</p> <p>reactions of aldol condensation</p> <p>pericyclic reactions: selected examples of cycloaddition and sigmatropic rearrangements</p> <p>hydrogenolysis in the presence of heterogenic and soluble catalysts</p> <p>4. Enantioselective syntheses</p> <p>employing chiral, nonracemic reagents (hydroboration with chiral borates, reduction with chiral hydrides, chiral organometallic complexes)</p> <p>employing chiral, nonracemic catalysts (epoxidation, cyclopropanation, hydrogenolysis, catalysis with chiral bases or Lewis acids)</p> <p>5. Doubly differentiating reactions</p> <p>interactions between chiral reagents</p> <p>control of stereoselectivity by reagent</p>											
Prerequisites and co-requisites	Knowledge of basic principles of organic chemistry											
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="453 1337 794 1368">Subject passing criteria</th> <th data-bbox="799 1337 1141 1368">Passing threshold</th> <th data-bbox="1145 1337 1484 1368">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 1375 794 1429">Preparation and presentation of two reports on given subject</td> <td data-bbox="799 1375 1141 1429">50.0%</td> <td data-bbox="1145 1375 1484 1429">50.0%</td> </tr> <tr> <td data-bbox="453 1435 794 1458">Written examination</td> <td data-bbox="799 1435 1141 1458">50.0%</td> <td data-bbox="1145 1435 1484 1458">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Preparation and presentation of two reports on given subject	50.0%	50.0%	Written examination	50.0%	50.0%
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Example issues/ example questions/ tasks being completed	1. Starting with cyclohexene and using any other needed reagents, outline a synthesis of 7,7-dibromobicyclo[4.1.0]heptane 2. Treating cyclohexene with 1,1-diiodoethane and zinc-copper leads to two isomeric products. What are their structure?
Work placement	Not applicable

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