University of Gdańsk

Subject card

Subject name and code	Contemporary organic synthesis, PG_00179536						
Field of study	Chemistry						
Date of commencement of studies	October 2025		Academic year of realisation of subject	2025/2026			
Education level	Master's 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	2		ECTS credits	2.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Laboratory of Glycochemistry -> Department of Organic Chemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Andrzej Nowacki					
	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	20.0	55

Subject objectives

To broaden and enhance the knowledge of organic chemistry.

To familiarize with the problems of modern organic synthesis.

To find solutions to the problems of modern synthesis.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_W11] Demonstrates general knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field.	The student recognizes the types of selective reactions; understands the importance of using protective groups to achieve selectivity; learns about techniques and methods useful in modern synthesis; learns about issues related to planning organic synthesis; becomes familiar with the role of metals in the synthesis of organic compounds; learns about methods of forming bonds between carbon atoms and carbon-heteroatom bonds; learns about the potential of oxidation and reduction processes in synthesis; learns about aspects related to asymmetric synthesis.	[SW4] test/exam - oral or written
[CHEMMU2_W04] Applies the acquired knowledge to an in-depth description of the properties of chemical connections, methods of their synthesis and analysis.	Based on the acquired knowledge, the student is able to solve problems related to planning the synthesis of different classes of organic compounds.	[SW4] test/exam - oral or written

Subject contents	1. Selective and specific reactions in organic chemistry. 2. Protective groups in organic synthesis. 3. Different techniques and methods of organic synthesis. 4. Planning of multi-step organic synthesis. 5. Chemistry of carbocations, carboanions, radicals and carbenes. 6. Metals of main and side groups in organic synthesis. 7. Selective formation of a single carbon-carbon bond. 8. Selective formation of a carbon-carbon double bond. 9. Selective formation of carbon-heteroatom. 10. Oxidation and reduction reactions in organic chemistry. 11. Stereochemistry in organic synthesis. 12. Selected elements of asymmetric synthesis. 13. Retrosynthesis in organic synthesis.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Passing grade, passing score on written exam consisting of about 15 open questions	51.0%	100.0%

Recommended reading

Basic literature	1. William Carruthers, Iain Coldham, Modern methods of organic synthesis. Cambridge University Press, 2002. 2. Vitomir Šunjić, Vesna Petrović Peroković, Organic chemistry from retrosynthesis to asymmetric synthesis, Springer International Publishing, Switzerland 2016. 3. Paul Wyatt, Stuart Warren, Organic Synthesis: Strategy and Control, John Wiley & Sons Ltd, 2007
Supplementary literature	Jacek Gawroński, Krystyna Gawrońska, Karol Kacprzak, Marcin Kwit, Współczesna synteza organiczna. Wybór eksperymentów, PWN, Warszawa 2004.
eResources addresses	

Example issues/ example questions/ tasks being completed	1. Define and explain the basic concepts of reaction selectivity. 2. Illustrate the importance of protecting groups in synthesis. 3. Give examples of reactions to form carbon-carbon bonds using metals. 4. List and discuss the basic methods used in asymmetric synthesis.
Work placement	Not applicable

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