


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Monographic lecture - Modern methods of chemical synthesis		13.3.1233	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	drugiego stopnia
Wydział Chemii	Chemia	form	stacjonarne
		specjalty	wszystkie
		specialization	wszystkie
Teaching staff			
dr hab. Elżbieta Jankowska, profesor uczelni			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		3	
Lecture		classes 30 h	
The realization of activities		tutorial classes 10 h	
classroom instruction		student's own work 35 h	
Number of hours		TOTAL: 75 h - 3 ECTS	
Lecture: 30 hours			
The academic cycle			
2023/2024 summer semester			
Type of course		Language of instruction	
obligatory		polish	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
<ul style="list-style-type: none"> multimedia presentation combined with a discussion solving problem tasks (designing reaction routes) 		Final evaluation	
		Graded credit	
		Assessment methods	
		<ul style="list-style-type: none"> solving problem tasks (designing reaction routes), individually and / or in a group written exam with open questions written test exam written exam with open questions written exam (test) 	
		The basic criteria for evaluation	
		To get a positive grade from the course the student has to: solve a problem task (design the synthesis route/s), either individually or in a team - pass the final test Assessment criteria in accordance with the University of Gdansk Studies Regulations	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
Completed course in "Organic Chemistry"			
B. Prerequisites			
Knowledge of basic issues in organic chemistry: functional groups occurring in organic compounds, nucleophilicity, electrophilicity, factors affecting the stability of organic particles, electronic and steric effects in the course of chemical reactions			
Aims of education			

<p>Familiarizing students with:</p> <ul style="list-style-type: none"> • basic rules of carrying organic synthesis • modern methods of organic synthesis, allowing the formation of new carbon-carbon and carbon-heteroatom bonds • modern techniques of organic synthesis • the concept of retrosynthesis <p>Enabling students to acquire skills of designing multi-step syntheses of organic compounds</p>	
<p>Course contents</p> <ul style="list-style-type: none"> • basic rules of carrying a synthesis of organic compounds: preparation of reagents, monitoring the progress of the reaction, isolation and purification of reaction products, analysis of the final product, keeping lab notes • creation of new carbon-carbon bonds using, inter alia, Heck reaction, Suzuki reaction, olefin metathesis, Michael reaction, Robinson annulation • creation of new carbon-heteroatom bonds using, inter alia, Sharpless, Jacobsen, Mitsunobu and Buchwald-Hartwig reactions • modern techniques of organic synthesis, including: microwave synthesis, solvent-free synthesis, synthesis using phase transfer catalysis, synthesis on a solid support, multicomponent reactions (including Mannich, Ugi, Passerini reactions) • recognition of syntons in organic molecules, designing synthetic pathways for selected organic compounds 	
<p>Bibliography of literature</p> <p>A.1. Used during classes: unpublished materials, prepared by a teacher.</p> <p>A.2. Studied independently by the student: J. Gawroński, K. Gawrońska, K. Kacprzak, M. Kvit, Contemporary organic synthesis, PWN 2004 J. Clayden, N. Greeves, S. Warren, Organic chemistry</p> <p>B. Supplementary literature J. Skarzewski - Introduction to organic synthesis, PWN 1999 G.S. Zweifel, M.H. Nantz, P. Somfai, Modern organic synthesis. An introduction, Wiley 2017</p>	
<p>The learning outcomes (for the field of study and specialization)</p> <p>The student:</p> <ul style="list-style-type: none"> • describes the structure of substrates and catalysts needed to carry out the reactions discussed during the lectures • describes the conditions that must be secured for the reaction to proceed effectively • explains the general mechanism as well as the regio- and stereoselectivity of the discussed reactions • characterizes the advantages and disadvantages of modern techniques of the organic syntheses discussed during the lecture • defines the terms related to a synthesis and a retrosynthesis 	<p>Knowledge</p> <p>The student:</p> <ul style="list-style-type: none"> • describes the structure of substrates and catalysts needed to carry out the reactions discussed during the lectures • describes the conditions that must be secured for the reaction to proceed effectively • explains the general mechanism as well as the regio- and stereoselectivity of the discussed reactions • characterizes the advantages and disadvantages of modern techniques of the organic syntheses discussed during the lecture • defines the terms related to a synthesis and a retrosynthesis
	<p>Skills</p> <p>The student:</p> <p>critically analyzes the possibility of using a selected chemical reaction to obtain the desired intermediate product; designs the optimal routes of multi-step syntheses; predicts the structure of products, based on the structure of substrates and the applied reaction conditions; predicts the side reactions that may obstacle obtaining the right product from the given substrates; proposes methods to solve common problems encountered during the synthesis, purification and analysis of organic compounds assesses the risks associated with a given type of a reaction and suggests precautions that will enable to safely carry out the desired chemical conversions</p>
	<p>Social competence</p> <p>The student:</p> <p>gets involved in a team work in solving project-type tasks; discusses in a group the methods of solving synthetic problems; presents the group's proposed solutions of synthetic problems</p>
<p>Contact</p> <p>elzbieta.jankowska@ug.edu.pl</p>	