

Course title Wykład dyplomowy - Nowoczesne metody syntezy chemicznej/Diploma lecture - Modern methods of chemical synthesis		ECTS code 13.3.0421	
Name of unit administrating study Faculty of Chemistry			
Studies			
Field of study	Type	Form	
Chemistry	Bachelor	Full-time studies	
Teaching staff Prof. dr hab. Franciszek Kasprzykowski, dr hab. Elżbieta Jankowska			
Forms of classes, the realization and number of hours		ECTS credits	
A. Forms of classes, in accordance with the UG Rector's regulations lecture		classes 30 h tutorial classes 5 h student's own work 15 h TOTAL: 50 h - 2 ECTS	
B. The realization of activities In-class learning			
C. Number of hours lecture 30 godz,			
The academic cycle Third year, summer semester			
Type of course optional subject		Language of instruction Polish	
Teaching methods <ul style="list-style-type: none"> Lecture with multimedia presentation Solving of problem tasks 		Form and method of assessment and basic criteria for evaluation or examination requirements	
		A. Final evaluation, in accordance with the UG study regulations Course completion (with a grade)	
		B. Assessment methods -written tests with open questions and problem tasks - the final grade will be based on the partial grades received during the semester (students own work)	
		The basic criteria for evaluation <ul style="list-style-type: none"> To pass the course, a positive exam grade and independent correct solution of problem tasks such as synthesis project are required Obtaining a positive grade is possible after achievement of 51% of the maximum number of points 	
Required courses and introductory requirements <ul style="list-style-type: none"> A. Formal requirements Organic Chemistry B. Prerequisites Knowledge of fundamental terms of organic chemistry: functional groups found in organic compounds, reaction mechanisms characteristic for particular types of organic compounds, the concepts of resonance, acidity and alkalinity in organic chemistry 			
Aims of education <ul style="list-style-type: none"> familiarization of students with the basic rules of conducting synthesis of organic compounds acquaint of students with modern methods used in organic synthesis, allowing the formation of new 			

carbon-carbon and carbon-heteroatom bonds

- familiarization of students with modern techniques of organic synthesis
- familiarization of students with the concept of "retrosynthesis" - developing the ability to design multi-stage synthesis of organic compounds

Course contents

- basic principles of synthesis of organic compounds: preparation of reagents, monitoring reaction progress, isolation and purification of reaction products, analysis of the final product, keeping laboratory notes
- reactions enabling the formation of new carbon-carbon bonds in molecules (including Heck's reaction, Suzuki reaction, olefin metathesis, Michael's reaction)
- reactions enabling the formation of new carbon-heteroatom bonds (e.g. Sharpless, Mitsunobu, Buchwald-Hartwig reactions)
- modern techniques applied in organic synthesis, including: synthesis on a solid support, microwave synthesis, solvent-free synthesis, synthesis using phase transfer catalysis
- the concept of "synthon", designing pathways for the synthesis of selected organic compounds

Bibliography of literature

A. Literature required to pass the course

A.1. Literature used during classes:

Unpublished materials prepared by the teachers.

A.2. Literature for individual studies:

J. Gawroński, K. Gawrońska, K. Kacprzak, M. Kwit, Współczesna synteza organiczna, PWN, Warszawa 2004

C. Willis, M. Wills, Synteza organiczna, Wyd. Uniwersytetu Jagiellońskiego, Kraków 2004

B. Extracurricular readings

J. Skarzewski - Wprowadzenie do syntezy organicznej, PWN, Warszawa 1999

Knowledge

Student can:

- describe substrates and catalysts needed to carry out reactions discussed in the lectures
- explain general mechanisms of reactions, as well as regio- and stereoselectivity
- characterize the advantages and disadvantages of modern synthesis techniques discussed in the lectures
- specify methods used to solve common problems encountered during the synthesis, purification and analysis of organic compounds
- define a terms related to synthesis and retrosynthesis of organic compounds

Skills Student can

- predict the structure of products, structure of substrates and applied reaction conditions
- predict side reactions that make it difficult to obtain the correct product from the given substrates
- evaluate the hazards associated with a given type of reaction and proposes ways to safely carry out the

syntheses

- develop a route for the synthesis of specified organic compound

Social competence

- Student understand the need for continuous learning
- Student commit himself in the work of the group in solving project-type tasks
- Student understands the importance of the chemist's attitude and the synthesis techniques he uses in reducing the negative impact of chemistry on the environment