


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Stereochemistry of organic compounds		13.3.0489	
Name of unit administrating study			
Faculty of Chemistry			
Studies			
faculty	field of study	type	pierwszego stopnia
Wydział Chemii	Chemia	form	stacjonarne
		specjalty	chemia biomedyczna
		specialization	wszystkie
Teaching staff			
dr hab. Andrzej Nowacki			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		3	
Auditorium classes, Lecture		classes - 45 h	
The realization of activities		tutorial classes – 5 h	
classroom instruction		student's own work – 25 h	
Number of hours		Total: 75 h - 3 ECTS	
Lecture: 15 hours, Auditorium classes: 30 hours			
The academic cycle			
2023/2024 winter semester			
Type of course		Language of instruction	
obligatory		polish	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
- multimedia-based lecture		Final evaluation	
- problem solving		Graded credit	
		Assessment methods	
		- written exam with open questions	
		- (mid-term / end-term) test	
		The basic criteria for evaluation	
		Lecture:	
		Achievement of at least 51 % of the total number of points from the written exam	
		Achievement of at least 51 % of the total number of points from test.	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
none			
B. Prerequisites			
none			
Aims of education			
familiarize students with basic and advanced problems concerning the spatial structure of organic compounds			
familiarize students with obtaining and discrimination of stereoisomers			
familiarize students with the basic aspects of stereocontrolled organic synthesis			
Course contents			
Course contents			
A. Topics of the lecture: Molecular architecture, basic concept and issues in stereochemistry. Nature of stereoisomers. Molecular symmetry of			

organic compounds. Configuration: relative and absolute, determination of absolute and relative configuration. Discrimination and properties of stereoisomers: the nature of racemates; racemization; biological properties of stereoisomers. Separation of stereoisomers. Prostereoisomerism and prochirality. Stereochemistry of alkenes: nature of cis-trans isomerism, determination of configuration of cis-trans isomerism (chemical and physical methods). Conformation of acyclic molecules. Cyclic molecules – conformation and configuration. Stereochemistry of fused, bridged and caged ring systems. Conformation and reactivity. Stereoselective i stereospecific synthesis: diastereoselective and enantioselective synthesis. Chiroptical properties: optical activity, optical rotatory dispersion (ORD), circular dichroism (CD), application of ORD and CD in determination of configuration and conformation. Chirality in molecules devoid of chiral centers: allenes, spiranes; biphenyls, helicenes, molecules with planar chirality.

B. During seminar the contents of the lectures will be discussed in more detail and practical problems will be solved In particular, the molecular symmetry and chirality will be discussed in depth.

Bibliography of literature

Literature required to pass the course

M. Nogradi – Stereochemia, podstawy i zastosowania, PWN, Warszawa 1988

W. M Potapow – Stereochemia, PWN, Warszawa 1986

D. G. Morris – Stereochemia, PWN, Warszawa 2008

G. Hallas – Stereochemia związków organicznych, PWN, Łódź 1971

J. Gawroński, K. Gawrońska – Stereochemia w syntezie organicznej, PWN, Warszawa 1988

Extracurricular readings

E. L. Eliel, S. W. Wilen, L. N. Mander – Stereochemistry of organic compounds, Wiley & Sons, New York 1994

K. Mislow – Introduction to stereochemistry, Dover Publications, New York 2006

The learning outcomes (for the field of study and specialization)

Knowledge

knowledge of problems concerning three-dimensional structure of organic compounds
 knowledge of methods concerning separation of stereoisomers and their discrimination
 knowledge of problems concerning the stereochemical requirements and the stereochemical outcome of chemical reactions

Skills

Students analyze the symmetry and conclude about chiral/achiral of given compound based on it
 Students determines chirality descriptors with respect to chiral center, axis and plane.
 Students recognize prochiral centers, including assigning descriptors
 Students discriminate racemic mixtures in solid
 Student predict the conformer stability

Social competence

Students are able to identify their level of knowledge and skills and understand the necessity of life-long learning in stereochemistry area and personal development.

Contact

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