

Course title Stereochemia związków organicznych / Stereochemistry of organic compounds		ECTS code 13.3.0489	
Name of unit administrating study Faculty of Chemistry			
Studies			
Field of study	Type	Form	
Chemistry	Bachelor	Full-time studies	
Teaching staff Dr Andrzej Nowacki			
Forms of classes, the realization and number of hours		ECTS credits 3	
A. Forms of classes, in accordance with the UG Rector's regulations lecture, auditorium classes		classes - 45 h tutorial classes – 5 h student's own work – 25 h	
B. The realization of activities in-class learning		Total: 75 h - 3 ECTS	
C. Number of hours 45 h (15 h lecture, 30 h auditorium classes)			
The academic cycle Second year, winter semester			
Type of course obligatory		Language of instruction Polish	
Teaching methods <ul style="list-style-type: none">• Lecture with multimedia presentation• Seminar: discussion with the teacher, solving of the stereochemistry problems connected to the material discussed during the lectures		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 Lecture – Written exam consisting of open questions Seminar – tests with practical problems to solve based on the acquired knowledge	
		C. The basic criteria for evaluation or exam requirements Lecture: <ul style="list-style-type: none">• Achievement of at least 51 % of the total number of points from the written exam Seminar: <ul style="list-style-type: none">• Achievement of at least 51 % of the total number of points from test.	
Required courses and introductory requirements None			
Aims of education <ul style="list-style-type: none">• 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 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

A. 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

B. 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

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 determine 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.