

<b>Course title</b> Stereochemia związków organicznych / Stereochemistry of organic compounds		<b>ECTS code</b> 13.3.0489	
<b>Name of unit administrating study</b> Faculty of Chemistry			
<b>Studies</b>			
<b>Field of study</b>	<b>Type</b>	<b>Form</b>	
Chemistry	Bachelor	Full-time studies	
<b>Teaching staff</b> Dr Andrzej Nowacki			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b> 3	
<b>A. Forms of classes, in accordance with the UG Rector's regulations</b> lecture, auditorium classes		classes - 45 h tutorial classes – 5 h student's own work – 25 h	
<b>B. The realization of activities</b> in-class learning		Total: 75 h - 3 ECTS	
<b>C. Number of hours</b> 45 h (15 h lecture, 30 h auditorium classes)			
<b>The academic cycle</b> 2020/21 winter semester			
<b>Type of course</b> obligatory		<b>Language of instruction</b> Polish	
<b>Teaching methods</b> <ul style="list-style-type: none"><li>• <b>Lecture</b> with multimedia presentation</li><li>• <b>Seminar:</b> discussion with the teacher, solving of the stereochemistry problems connected to the material discussed during the lectures</li></ul>		<b>Form and method of assessment and basic criteria for evaluation or examination requirements</b>	
		<b>A. Final evaluation, in accordance with the UG study regulations</b> course completion (with a grade)	
		<b>B. Assessment methods</b> <b>Lecture</b> – Written exam consisting of open questions <b>Seminar</b> – tests with practical problems to solve based on the acquired knowledge	
		<b>C. The basic criteria for evaluation or exam requirements</b> <b>Lecture:</b> <ul style="list-style-type: none"><li>• Achievement of at least 51 % of the total number of points from the written exam</li></ul> <b>Seminar:</b> <ul style="list-style-type: none"><li>• Achievement of at least 51 % of the total number of points from test.</li></ul>	
<b>Required courses and introductory requirements</b> None			
<b>Aims of education</b> <ul style="list-style-type: none"><li>• familiarize students with basic and advanced problems concerning the spatial structure of organic compounds</li><li>• familiarize students with obtaining and discrimination of stereoisomers</li><li>• familiarize students with the basic aspects of stereocontrolled organic synthesis</li></ul>			
<b>Course contents</b>  A. <b>Topics of the lecture:</b> 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.