

<b>Course title</b> Chemia organiczna/Organic chemistry		<b>ECTS code</b> 7.2.0475	
<b>Name of unit administrating study</b>			
<b>Faculty of Chemistry</b>			
<b>Studies</b>			
<b>Field of study</b>	<b>Type</b>	<b>Form</b>	
Environmental Protection	Bachelor	Full-time studies	
<b>Teaching staff</b>			
Dr hab. Beata Liberek, prof. UG			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b>	
<b>A. Forms of classes, in accordance with the UG Rector's regulations</b> lecture, audytorium classes, laboratory classes		classes - 75 h Tutorial classes 15 h Student's own work - 60 h TOTAL: 150 h - 6 ECTS	
<b>B. The realization of activities</b> In-class learning			
<b>C. Number of hours</b> lecture 30 h, audytorium classes 15 h, laboratory classes 30 h			
<b>The academic cycle</b> Second year, winter semester			
<b>Type of course</b> obligatory		<b>Language of instruction</b> Polish	
<b>Teaching methods</b>  Lecture with a multimedial presentation Doing experiments in laboratory Case studies		<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), exam	
		<b>B. Assessment methods</b> Two written colloquia for auditorium exercises (part I and part II, respectively). Three written colloquia for laboratory exercises (preliminary, compound 1, compound 2) . Each colloquium may be corrected once. Written exam from the lectures (two dates).	
		<b>The basic criteria for evaluation</b> <u>Lecture:</u> Achievement of at least 51% of the total number of points from the exam. The exam consists of about ten open questions concerning material discussed in the lectures. The percentage result is correlated with the mark in the way indicated in "Study Regulations of University of Gdansk". <u>Auditorium exercises:</u> Achievement of at least 51% of the total number of points from each colloquium, which consist of material discussed during exercises. The percentage result is correlated with the mark in the way indicated in "Study Regulations of University of Gdansk". <u>Laboratory exercises:</u> Student is required to: • Perform TLC analysis	

	<ul style="list-style-type: none"> <li>• Synthesize two organic compounds, one liquid and one solid</li> <li>• Achieve at least 51% of the total number of points from three colloquia (preliminary, compound 1 and compound 2), respectively. The final result is an average of the obtained partial results. Percentage result is correlated with the mark in the way indicated in “Study Regulations of University of Gdansk”.</li> </ul>
<b>Required courses and introductory requirements</b> <b>A. Formal requirements</b> General chemistry <b>B. Prerequisites</b> Basics of general chemistry	
<b>Aims of education</b> Acquiring knowledge of typical groups of organic compounds, their structure, nomenclature, physical properties and characteristic reactions; learning of types of organic reactions and selected mechanisms; acquainting students with the issues of isomerism, particularly stereoisomerism; As a part of laboratory exercises students familiarize themselves with the experimental work by performing of the TLC analysis and synthesis of two organic compound, one liquid and one solid. Exercises are aimed at developing the skills of conducting experiments and solving experimental problems independently.	
<b>Course contents</b> <u>A. Lecture issues:</u> Atomic orbitals; Hybridization; Chemical bonds; Dipole moment; Inductive effect; Formal charge; Lewis structures; Mezomeric effect; Intermolecular forces; Acidity and basicity; Nucleophile and electrophile; Types of organic reactions; Thermodynamic and kinetic of organic reactions; Alkanes: structure, nomenclature, boiling points and solubility, isomerism, occurrence, conformations, synthesis; Alkanes acidity, carboanions, organometallic compounds, protic and aprotic solvents; Alkanes burning; Alkanes halogenation: mechanism, reactivity, carbon radicals; Cycloalkanes: nomenclature, <i>cis-trans</i> isomerism, stability, cyclohexane conformations; Alkenes: nomenclature, structure, stereoisomerism, stability, physical properties, synthesis; Hydrogenation of alkenes; Electrophilic additions: Markovnikov’s rule, carbocation; Radical addition of HBr; Alkenes polymerization; Alkynes: nomenclature, structure, physical properties, synthesis; acidity; addition reactions; Aromatic compounds: benzene, conditions of aromaticity, other aromatic compounds; Electrophilic substitution, substituent’s effect; Optical isomerism: chiral atom, configuration determination, Fischer projection, relative configuration, other types of chirality, biological significance; Halogenoalkanes: characteristic, nomenclature, physical properties, synthesis; Mechanism of nucleophilic substitution and eliminations; Alcohols: structure, nomenclature, physical properties, synthesis, acidity, typical reactions; Phenols: nomenclature, acidity, typical reactions; Ethers: nomenclature, physical properties, synthesis, cyclic ethers; Aldehydes and ketones: nomenclature, physical properties, synthesis; Nucleophilic addition: mechanism and reactions; Aldehyde oxidation; Alpha hydrogen acidity: tautomerization, aldol condensation; Carboxylic acids: structure, nomenclature, physical properties, synthesis, acidity; Carboxylic acid salts; Derivatives of carboxylic acids; structures, nomenclature, synthesis, acyl nucleophilic substitution; Esterification; Triglycerides; Amines: structures, nomenclature, physical properties, synthesis, basicity, typical reactions; Ammonium salts; Introduction to multifunctional compounds: amino acids and carbohydrates. <u>B. Problems of auditorium exercises:</u> Solving problems regarding: determining the relationship between structure and properties, including reactivity, of the compounds belonging to the subsequent groups of organic compounds, discussed during the lectures; isomerism of organic compounds with particular emphasis on stereoisomerism; basic mechanism of the organic reactions. <u>C. Problems of laboratory exercises:</u> Work safety in chemical laboratory; Basics of laboratory work; Conducting of TLC analysis; Synthesis of two organic compound: one solid and one liquid.	

**Bibliography of literature**

**A. Literature required to pass the course**

J. McMurry *Chemia organiczna*,

R. T. Morrison, R. N. Boyd *Chemia organiczna*

P. Mastalerz *Chemia organiczna*

G. Kupryszewski *Wstęp do chemii organicznej*

J. Wade *Organic Chemistry*

P. Y. Bruice *Organic Chemistry*

G. Kupryszewski, M. Sobocińska, R. Walczyna *Podstawy preparatyki organicznych związków chemicznych*

A. Vogel *Preparatyka organiczna*

J. Wróbel *Preparatyka i elementy syntezy organicznej*

**B. Extracurricular readings**