

**KARTA PRZEDMIOTU****I. Dane podstawowe**

Nazwa przedmiotu	Chemia organiczna – kurs rozszerzony
Nazwa przedmiotu w języku angielskim	Organic chemistry – extended course
Kierunek studiów	Biotechnologia
Poziom studiów (I, II, jednolite magisterskie)	I
Forma studiów (stacjonarne, niestacjonarne)	stacjonarne
Dyscyplina	
Język wykładowy	Grupy w języku polskim – język polski Grupy w języku angielskim – język angielski

Koordinator przedmiotu/osoba odpowiedzialna	dr Artur Banach
---	-----------------

Forma zajęć ( <i>katalog zamknięty ze słownika</i> )	Liczba godzin	semestr	Punkty ECTS
wykład	30	II	9
konwersatorium	-	-	
ćwiczenia	60	II	
laboratorium	-	-	
warsztaty	-	-	
seminarium	-	-	
proseminarium	-	-	
lektorat	-	-	
praktyki	-	-	
zajęcia terenowe	-	-	
pracownia dyplomowa	-	-	
translatorium	-	-	
wizyta studyjna	-	-	

Wymagania wstępne	General Chemistry, Inorganic Chemistry, Physico-chemistry of Biological Systems
-------------------	---

**II. Cele kształcenia dla przedmiotu**

Acquire skills of the naming, writing formulas and classification main organic compounds, important for biotechnology, basing on their functional groups
Acquire knowledge about preparation and properties of organic compounds
Acquire skills of the assigning of biosphere components to suitable organic groups
Acquire practical skills of carrying out chemical reactions by students
Learning of the analytical methods and basics of synthesis of organics
Learning the basics of multistep synthesis of organic compounds

## III. Efekty uczenia się dla przedmiotu wraz z odniesieniem do efektów kierunkowych

Symbol	Opis efektu przedmiotowego	Odniesienie do efektu kierunkowego
<b>WIEDZA</b>		
W_01	Student describes issues in the field of organic chemistry required to understand and interpret basic natural phenomena and processes	K_W02
W_02	Student presents the principles of health, safety work and ergonomics, indicates the psychophysical possibilities of a human in the work environment in laboratory of organic chemistry	K_W09
<b>UMIEJĘTNOŚCI</b>		
U_01	Student applies techniques and research tools in the field of organic chemistry for biotechnology students	K_U01
U_02	Student carries out observations and performs chemical measurements	K_U02
U_03	Student describes, explains and interprets chemical and physicochemical phenomena at an advanced level	K_U08
U_04	Student performs qualitative and quantitative analyzes of organic compounds by using classical and instrumental method	K_U10
U_05	Student prepares a written study on issues related to organic chemistry in English language using the scientific language	K_U13
U_06	Student designs and performs research tasks or expertise in the field of organic chemistry.	K_U15
U_07	Student learns independently in a targeted manner in the field of organic chemistry, updates his knowledge and skills, applies new research techniques and plans his professional development	K_U17
<b>KOMPETENCJE SPOŁECZNE</b>		
K_01	Student possesses appropriate habits required to the work in scientific laboratories especially in organic chemistry, proceeds according to work safety regulations, knows how to react in states of danger.	K_K04

## IV. Opis przedmiotu/ treści programowe

**Lecture:** The structure and properties of organic compounds – chemical bonds, electron configuration, polarity, intermolecular forces. Isomerism. The nomenclature of organic compounds. Saturated-, unsaturated hydrocarbons, aromatic hydrocarbons, alcohols, ethers, carboxylic acids, aldehydes, ketones, esters, amines, phenols, fats, carbohydrates – preparation, physical and chemical properties, mechanisms of reactions. Polymers, their structure and properties. Detergents and their properties. Amino acids and their properties. Peptides. Basic elements of organic preparation: synthesis, distillation, crystallization.

**Classes:** Safety principles for work in the Organic Chemistry Laboratory. General laboratory glassware and accessories used in the synthesis of organic compounds. Qualitative analysis of organic compounds containing nitrogen, sulphur and halogens. Chemical properties of alkanes, alkenes, alkynes and arenes. Distillation of ethanol and determination properties of alcohols. Analysis of aldehydes, ketones and carboxylic acids. Synthesis of sulphanilic acid. Purification of sulphanilic acid by means of crystallization. Preparation and studies on esters basing on ethyl

acetate. Examination the efficiency of acylation of sulphanilic acid by means of Thin Layer Chromatography. Physical and chemical properties of lipids. Isolation of plant oil by means of extraction. Detergents and polymers – study their properties. Preparation of cellulose fibre. Identification of carbohydrates basing on their properties. Amino acids and proteins – characteristic reactions. Synthesis of methyl orange - diazotization reaction. Purification of synthesized methyl orange.

#### V. Metody realizacji i weryfikacji efektów uczenia się

Symbol efektu	Metody dydaktyczne (lista wyboru)	Metody weryfikacji (lista wyboru)	Sposoby dokumentacji (lista wyboru)
<b>WIEDZA</b>			
W_01	Conventional lecture Laboratory analysis	Written exam Test	Written exam Completed and evaluated test
W_02	Laboratory analysis	Observation	Rating card / Report from observation
<b>UMIEJĘTNOŚCI</b>			
U_01	Laboratory classes	Report	Protocol / Print / Report file
U_02	Laboratory classes	Report	Protocol / Print / Report file
U_03	Laboratory analysis	Test	Completed and evaluated test
U_04	Laboratory classes	Report	Protocol / Print / Report file
U_05	Laboratory classes	Report	Protocol / Print / Report file
U_06	Laboratory classes	Report	Protocol / Print / Report file
U_07	Laboratory analysis	Test	Completed and evaluated test
<b>KOMPETENCJE SPOŁECZNE</b>			
K_01	Laboratory classes	Observation	Rating card / Report from observation

#### VI. Kryteria oceny, wagi...

**Lecture:** Written exam in the form of test - 90%, participation in the lectures - 10%

**Classes:** 3 tests – 90%, active participation in the classes - 5%, preparation of report – 5%

Mark	Evaluation criteria	
<b>verygood (5)</b>	the student realizes the assumed learning outcomes at a very good level	the student demonstrates knowledge of the education content at the level of 91-100%
<b>overgood (4.5)</b>	the student accomplishes the assumed learning outcomes an over good	the student demonstrates knowledge of the education content at the level of 86-90 %

	level	
<b>good(4)</b>	the student accomplishes the assumed learning outcomes at a good level	the student demonstrates knowledge of the education content at the level of 71-85%
<b>quitegood(3.5)</b>	the student accomplishes the assumed learning outcomes at a quite good level	the student demonstrates knowledge of the education content at the level of 66-70%
<b>sufficient (3)</b>	the student accomplishes the assumed learning outcomes at a sufficient level	the student demonstrates knowledge of the education content at the level of 51-65%
<b>insufficient (2)</b>	the student accomplishes the assumed learning outcomes at an insufficient level	the student demonstrates knowledge of the education content below the level of 51%

#### VII. Obciążenie pracą studenta

Forma aktywności studenta	Liczba godzin
Liczba godzin kontaktowych z nauczycielem	<b>90</b>
Liczba godzin indywidualnej pracy studenta	<b>135</b>

#### VIII. Literatura

Literatura podstawowa
Morrison R.T. , Boyd R.N. Organic Chemistry, Prentice Hall; 6th edition, 1992. Bruice P.Y. Organic Chemistry, 6th Edition, Prentice Hall, Pearson Education, Inc. 2011. Clayden J., Greeves N., Warren N., Wothers P.: Organic chemistry, Oxford University Press, Oxford 2012. Clayden J., Warren S.: Solutions Manual to accompany Organic Chemistry, 2nd edition, Oxford University Press, Oxford 2013. Loudon G.M.: Organic Chemistry, 4th edition, Oxford University Press, Oxford 2002. Solomons G., Fryhle C., Snyder S., Organic Chemistry, 11e, John Wiley & Sons, Inc. 2014.
Literatura uzupełniająca
Bruckner R.: Organic mechanisms, Reactions, Stereochemistry and Synthesis, Springer-Verlag, Berlin 2010. Putz M.V.: Carbon Bonding and Structures, Advances in Physics and Chemistry, Springer Science+Business Media B.V. 2011. Seager S.L., Slabaugh M.R. Organic and Biochemistry for Today, 6th Edition, Brooks/Cole, a division of Thomson Learning, Inc. 2008. Parsons A.F. Keynotes in Organic Chemistry, Blackwell Science Ltd. 2003.