

Course Syllabus

I. General Information

Course name	Organic chemistry – extended course
Programme	Biotechnology
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	BSc
Form of studies (full-time, part-time)	part-time
Discipline	Biological sciences
Language of instruction	English

Course coordinator/person responsible	dr Artur Banach
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Type of class (<i>use only the types mentioned below</i>)	Number of teaching hours	Semester	ECTS Points
lecture	30	II	9
tutorial			
classes	60	II	
laboratory classes			
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	General chemistry, Inorganic chemistry, Physico-chemistry of biological systems
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II. Course Objectives

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. Course learning outcomes with reference to programme learning outcomes

Symbol	Description of course learning outcome	Reference to programme learning outcome
KNOWLEDGE		
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
SKILLS		
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
SOCIAL COMPETENCIES		
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. Course Content

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

V. Didactic methods used and forms of assessment of learning outcomes

Symbol	Didactic methods (choose from the list)	Forms of assessment (choose from the list)	Documentation type (choose from the list)
KNOWLEDGE			
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
SKILLS			
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
SOCIAL COMPETENCIES			
K_01	Laboratory classes	Observation	Rating card / Report from observation

VI. Grading criteria, weighting factors.....

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	
verygood (5)	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%
overgood (4.5)	the student accomplishes the assumed learning outcomes an over good level	the student demonstrates knowledge of the education content at the level of 86-90 %
good(4)	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%

quitegood(3.5)	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%
sufficient (3)	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%
insufficient (2)	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. Student workload

Form of activity	Number of hours
Number of contact hours (with the teacher)	90
Number of hours of individual student work	135

VIII. Literature

Basic literature
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.
Additional literature
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.