

Course title: ORGANIC CHEMISTRY AND BIOCHEMISTRY

ECTS credit allocation (and other scores): 6

Semester: spring

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Natural sciences

Language: English

Number of hours per semester: 75

Course coordinator/ Department and e-mail: Angelika Król-Grzymała / Biochemistry, angelika.krol@uwm.edu.pl

Type of classes: classes and lectures

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#### Substantive content

CLASSES: Organic chemistry calculation practice. Basic laboratory techniques (crystallization, distillation, sublimation, extraction, chromatography). Computer-aided learning of organic chemistry. Determination of amino acids, proteins, glucose and cholesterol in biological material. Isolation and analysis of nucleic acids. Thin-layer chromatography of polar lipids. Determination of Michaelis' constant. Diagnostic enzymes.

LECTURES: Structure and properties of organic chemistry. Optical isomerism. Conformational analysis. Saturated, unsaturated hydrocarbons. Free radicals. SN1 and SN2 substitution reactions. E1 and E2 elimination reactions. Aromatic hydrocarbons. SEAr reactions. Alcohols, phenols, ethers and their sulfur analogues. Aldehydes and ketones. Carboxylic acids and their derivatives. Fats and soaps. Lipids. Amines. Diazonium salts and azo compounds. Amino acids, peptides. Heterocyclic compounds. Carbohydrate, fat, nitrogen metabolism. Energetics - Krebs cycle, respiratory chain. Nucleic acids.

Learning purpose: familiarize with particular classes of organic compounds, principles of green chemistry

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On completion of the study programme the graduate will gain:

Knowledge: characterize the different classes of organic compounds, mechanisms of the functioning of cells and organisms

Skills: perform organic synthesis and biochemical analysis, interpret results

Social Competencies: discusses with other sciences, well work in a team, focus on raising awareness

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Basic literature: 1) McMurry J., Fundamentals of Organic Chemistry, wyd. Wadsworth Publishing Company, 2006 ; 2) Murry R., Bender D.A., Botham K., Rodwell V.W., Weil P.A., Harpers Illustrated Biochemistry, 2017.

Supplementary literature: 1) Morrison R. T., Boyd R. N., Bhattacharjee S. K., Organic chemistry, wyd. Pearson Education Singapore Pte Ltd., 2011 ; 2) Harvey R., Ferrier D., Lippicots, Illustrated Reviews – Biochemistry, Wolter Kluwer, 2011.

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The allocated number of ECTS points consists of: 6

Contact hours with an academic teacher: 12.00-14.00 monday

Student's independent work: during the course, the students are familiarised with particular classes of organic compounds. They are taught to understand the effect of the structure of molecule on the physical, chemical and biological properties of the given compound. Additionally, the emphasis is on the proecological thinking by students - uses of principles of green chemistry in organic chemistry.