# DESCRIPTION OF THE COURSE OF STUDY

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| **Course code** | **0917LEK-B2.3-C** | |
| **Name of the course in** | Polish | **Chemia** |
| | English | **Chemistry** |

## 1. LOCATION OF THE COURSE OF STUDY WITHIN THE SYSTEM OF STUDIES

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| **1.1. Field of study** | medicine |
| **1.2. Mode of study** | Full-time |
| **1.3. Level of study** | Uniform Master's study |
| **1.4. Profile of study*** | General academic |
| **1.5. Specialization*** | lack |
| **1.6. Unit running the course of study** | Faculty of Exact and Natural Sciences |
| **1.7. Person/s preparing the course description** | dr Dariusz Wideł |
| **1.8. Person responsible for the course of study** | dr Dariusz Wideł |
| **1.9. Contact** | dariusz.widel@ujk.edu.pl |

## 2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

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| **2.1. Affiliation with the module** | Scientific basis of medicine |
| **2.2. Language of instruction** | English |
| **2.3. Semesters in which the course of study is offered** | 1st |
| **2.4. Prerequisites*** | Knowledge of general chemistry, inorganic and organic at the advanced level of secondary school. |

## 3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

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| **3.1. Form of classes** | | lecture– 15 hours; e-learning 5 hours; laboratory classes– 20 hours |
| **3.2. Place of classes** | | Courses in the teaching rooms of the UJK<br>Faculty of Exact and Natural Sciences, The Institute of Chemistry |
| **3.3. Form of assessment** | | Laboratory-credit with grade, lecture - written exam, e-learning - credit |
| **3.4. Teaching methods** | | Informative lecture, explaining and problem-based, practical laboratory classes |
| **3.5. Bibliography** | **Required reading** | An Introduction to General, Organic, and Biological Chemistry, Global Edition Autor: Timberlake Karen, ed. by Pearson Higher Education , 2018 |
| | **Further reading** | John E. McMurry - Organic Chemistry - 8th edition in pdf |

## 4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED TEACHING OUTCOMES

**4.1. Course objectives**

C1- Mastering the basic knowledge in the field of general, analytical and organic chemistry.
C2 - Understanding the properties of inorganic and organic compounds important in biochemistry.
C3 - Conducting chemical calculations and interpretation of the results of conducted experiments.
C4 - Mastering the basics of work in a chemical laboratory and elements quantitative analysis of organic and inorganic compounds.
C5- Development of proper ethical attitudes and abilities to properly communicate.

***4.2.*** **Detailed syllabus**

Lecture

The water in the human body. The structure and chemical properties of water. The influence of dissolved substances on the properties of the solutions. Diffusion and osmosis. The osmolarity and tonicity. The Donnan equilibrium. Acid-base balance. The concentration of hydrogen ions, the pH concept. Buffer solutions and function. Henderson-Hasselbalch equation. Buffer capacity. Elements of classical quantitative analysis. Functional groups of organic compunds and nomenclature. Tautomerism. The importance of stereochemistry relates to properties of organic compounds. Chiral molecules. Aromatic hydrocarbons and some their derivatives of biological importance. Amino acids and proteins: structure and classification, physicochemical properties, isoelectric point, peptide bond. Carbohydrates: classification, the chemical properties of monosaccharides, types of isomerism. Some sugar derivatives of biological importance. Lipids: fatty acids – structure and terminology, Triacylglycerols. The heteroaromatic compounds of five and six membered rings with one and two and heteroatoms. The nitrogenous bases: structure and importance in biochemistry.

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| E-learning<br>Modern analytical techniques and their application in medicine – presentation and scientific articles<br>Laboratory<br>Practical classes related to selected methods of quantitative analysis, simple chemical measurements, and experiments in chemistry laboratory. Qualitative analysis of biological important cations and anions. Acid-base titration. Spectrophotometric determination of protein. Properties of buffer mixtures. |

**4.3.Education outcomes in the discipline**

| Code | A student, who passed the course | Relation to teaching outcomes |
|---|---|---|
| within the scope of **KNOWLEDGE:** | | |
| W01 | knows basic reactions of organic and non-organic compounds in water solutions | B.W4. |
| W02 | knows the structure of simple organic compounds in living organisms | B.W10. |
| W03 | describes the structure and properties of aminoacids and carbohydrates | B.W11. |
| W04 | describes stereochemistry of organic compounds and their importance in biochemistry | B.W12. |
| within the scope of **ABILITIES:** | | |
| U01 | determines molar and percentage concentration of compounds and the concentration of substances in isoosmotic solutions, both mono- and multi-component | B.U3. |
| U02 | determines the pH of the solution and the effect of changes in the pH on the inorganic and organic compounds; | B.U5. |
| U03 | use databases, including onlines ones, and search for necessary information using available tools | B.U11 |

**4.4. Methods of assessment of the intended teaching outcomes**

| Teaching outcomes *(code)* | Method of assessment (+/-) | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Exam ~~oral~~/written* | | | Test* | | | Project* | | | Effort in class* | | | Self-study* | | | Group work* | | | Others (lab. reports)* | | |
| | *Form of classes* | | | *Form of classes* | | | *Form of classes* | | | *Form of classes* | | | *Form of classes* | | | *Form of classes* | | | *Form of classes* | | |
| | *L* | *C* | *e-l* | *L* | *C* | *e-l* | *L* | *C* | *e-l* | *L* | *C* | *e-l* | *L* | *C* | *e-l* | *L* | *C* | *e-l* | *L* | *C* | *e-l* |
| W01 | + | - | - | - | + | - | - | - | - | + | + | - | + | + | + | - | + | - | - | + | - |
| W02 | + | - | - | - | + | - | - | - | - | + | + | - | + | + | + | - | + | - | - | + | - |
| W03 | + | - | - | - | + | - | - | - | - | + | + | - | + | + | + | - | + | - | - | + | - |
| W04 | + | - | - | - | + | - | - | - | - | + | + | - | + | + | + | - | + | - | - | + | - |
| U01 | + | - | - | - | + | - | - | - | - | + | + | - | + | + | + | - | + | - | - | + | - |
| U02 | + | - | - | - | + | - | - | - | - | + | + | - | + | + | + | - | + | - | - | + | - |
| U03 | - | - | - | - | - | - | - | - | + | + | + | + | + | + | + | + | - | + | - | + | - |

**4.5. Criteria of assessment of the intended teaching outcomes**

| Form of classes | Grade | Criterion of assessment |
|---|---|---|
| **lecture (L)** | **3** | Achievement 60 - 67% of the total number of points from written exam. |
| | **3,5** | Achievement 68 - 75% of the total number of points from written exam |
| | **4** | Achievement 76 - 83% of the total number of points from written exam. |
| | **4,5** | Achievement 84 - 91% of the total number of points from written exam. |
| | **5** | Achievement 92 - 100% of the total number of points from written exam. |
| **classes (C)*** | **3** | Accomplishment of laboratory classes and achievement 60-67% of the total number of points from written partition tests. |
| | **3,5** | Accomplishment of laboratory classes and achievement 68-75% of the total number of points from written partition tests. |
| | **4** | Accomplishment of laboratory classes and achievement 76-83% of the total number of points from written partition tests. |

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| | **4,5** | Accomplishment of laboratory classes and achievement 84-91% of the total number of points from written partition tests. |
| | **5** | Accomplishment of laboratory classes and achievement 92-100% of the total number of points from written partition tests. |
| **e-learning (e-l)** | **credit** | Accomplishment of all task on e-learning platform |

## 5. BALANCE OF ECTS CREDITS – STUDENT'S WORK INPUT

| **Category** | **Student's workload** |
|---|---|
| | **Full-time studies** |
| *NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/* | **40** |
| *Participation in lectures** | **15** |
| *Participation in classes, seminars, laboratories** | **20** |
| *Preparation in the exam/ final test** | |
| *Others*(e-learning)* | **5** |
| *INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/* | **35** |
| *Preparation for the lecture** | |
| *Preparation for the classes, seminars, laboratories** | **10** |
| *Preparation for the exam/test** | **25** |
| *Gathering materials for the project/Internet query** | |
| *Preparation of multimedia presentation* | |
| *Others** | |
| *TOTAL NUMBER OF HOURS* | **75** |
| ECTS credits for the course of study | **3** |

***Accepted for execution*** *(date and signatures of the teachers running the course in the given academic year)*

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