COURSE DESCRIPTION CARD - SYLLABUS

Course name
Bioorganic chemistry [S1TOZ1>CB]

Course

Field of study
Circular System Technologies

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)
0

Tutorials
15

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

The student should have basic knowledge of general and inorganic chemistry. He should know the symbols of the elements, the rules for the formation of chemical bonds, the catalytic properties of metals, the formation of complexes. He should also have basic knowledge of organic chemistry (reactivity of amines, carboxylic acids, carbonyl compounds, substitution, addition, elimination, oxidation, reduction reactions), and basic knowledge of the stereochemistry of organic compounds. Moreover, student should have knowledge and practical skills in assembling kits and apparatus used in an organic laboratory classes. He/she should know the names of the equipment and be able to assemble the appropriate sets. He/she should also be aware of the dangers of working with organic compounds.

Course objective

The aim of lecture and exercises is the mastering the basic knowledge of the structural structure, methods of synthesis and reactivity of natural organic compounds such as: amino acids, peptides, proteins, carbohydrates and lipids. The aim of the laboratory classes is to familiarize students with the basic techniques of determining selected physicochemical properties and the reactivity of amino acids, peptides, proteins, carbohydrates and lipids. In this scope, the student will also learn the basic techniques used in the synthesis of organic compounds and the methods of their isolation from the post-reaction medium.

Course-related learning outcomes

Knowledge:
k_w02 has knowledge of chemistry to understand the phenomena and changes occurring in technological and environmental processes. p6s_wg
k_w03 has the knowledge of chemistry necessary to describe the concepts, concepts and principles of closed-loop technology and the characteristics of the connections and relationships between its components p6s_wg
k_w04 has a systematized, theoretically founded knowledge of inorganic, organic, physical and analytical chemistry. p6s_wg

Skills:
k_u01 is able to obtain information from literature, databases and other sources related to closed-loop technologies, also in a foreign language, integrate them, interpret them, draw conclusions and formulate opinions. p6s_uw
k_u03 plans, selects equipment and scientific apparatus, carries out research and analyzes the results and formulates conclusions on this basis p6s_uw
k_u04 has the ability to self-study, is able to use source information in polish and a foreign language in accordance with the principles of ethics, reads with understanding, conducts analyzes, syntheses, summaries, critical assessments and correct conclusions p6s_uu
k_u05 correctly uses in the discussion and properly uses the nomenclature and terminology in the field of closed-loop economy, chemistry, technology and chemical engineering, environmental protection and related disciplines p6s_uw p6s_uk

Social competences:
k_k05 objectively assesses the level of their knowledge and skills, understands the importance of improving professional and personal competences adequately to the changing social conditions and the progress of learning p6s_kk
k_k06 thinks and works in an entrepreneurial way p6s_ko
k_k08 participates in discussions and is able to conduct discussions, is open to different opinions and ready to assertively express feelings and critical comments p6s_kk p6s_ko p6s_kr

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture: the knowledge acquired during the lecture is verified in the form of control works with open-ended and test questions. Completion requires obtaining> 50% of points in total.
Exercises: control works based on the knowledge presented in the lectures and extended with additional examples during the seminar exercises. Completion requires obtaining> 50% of points in total.
laboratory classes: short tests of theoretical knowledge necessary to safely perform the laboratory exercise. Performing planned experiments with a description of observations and correct preparation of preparative calculations (synthesis). Credit on the basis of the average of the marks in tests of theoretical knowledge, and marks on the implementation of planned experiments.
In the case of on-line classes, the verification of knowledge will be carried out in the same form on the eMeeting platform.

Programme content

Lecture and Exercises- the course covers the following issues:
1. Amino acids: classification, structure, synthesis, application in synthesis
2. Peptides: peptide bond characterization, synthesis
3. Proteins: order, structure of selected proteins
4. Monosaccharides: structure, stereochemistry, formation and conformation, basic reactions, oxidation and reduction of monosaccharides, glycosides, di- and polysaccharides
5. Lipids: fats, fatty acids, detergents, soaps, prostangladins, terpenes, steroids, phospholipids, sphingolipids (structure, reactivity).
Laboratory classes- as part of the course, the student performs a series of characteristic reactions for amino acids, proteins, monosaccharides and lipids. The student will also carry out a reaction in which, among others, the selected amino acid will undergo an acylation, esterification reaction.

Teaching methods

Lecture with multimedia presentation, discussion with students. Seminar exercises - discussing selected chemical reactions in thematic blocks with the active participation of students. Laboratory classes- verification of the student"s knowledge and discussion of the processes and reaction mechanisms taking place. The student performs exercises independently, records the observations of changes. The student performs reaction calculations and summarizes all the work carried out with appropriate conclusions.

Bibliography

Basic
1. McMurry J., Chemia Organiczna, Wydawnictwo Naukowe PWN 2009 (t. IV i V)
2. Robert Morrison, Robert Boyd, Chemia organiczna, Wydawnictwo Naukowe PWN
Additional
1. Kołodziejczyk A., Naturalne związki organiczne, Wydawnictwo Naukowe PWN 2012 (wyd. II)

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	75	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00