



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Biologically active compounds from natural sources

Course

Field of study

Bioinformatics

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

4/7

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Prerequisites

Student will gain well-ordered and theoretically grounded knowledge of key issues of organic chemistry.

Student is able to solve elementary problems of organic chemistry on the basis of possessed knowledge, the ability to acquire information from indicated sources in Polish and foreign language.

Student understands the need of further education, the necessity of broadening his/her competence, readiness to cooperate within a team.

Course objective

The course presents basic knowledge of organic compounds of natural origin, characterized by biological activity. The course aims to familiarize students with the structure, properties, occurrence and biological



significance of selected compounds of animal origin, which are used in pharmacology, medicine, food and cosmetics.

Course-related learning outcomes

Knowledge

1. Student knows basic issues of organic and bioorganic chemistry related to bioactive substances [K_K04].
2. Student knows selected groups of bioactive compounds and their properties, including possible influence on cells and living organisms. He knows the set of raw materials of natural origin, their source, key biological activity and importance for cosmetic, pharmaceutical, medical and food preparations [K_W08].

Skills

1. Student is able to use basic laboratory techniques in synthesis, isolation and purification of chemical compounds, including biologically active compounds [K_U03].
2. Student is able to use basic laboratory techniques and tools to solve problems in organic and bioorganic chemistry, evaluate their usefulness [K_U05].

Social competences

1. Student is ready to lifelong learning and improving his competences [K_K01].
2. Student is ready to cooperate and work in a group, taking various roles in it [K_K02].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - written pass; evaluation criteria: 3 - 50.1-70.0%; 4 - 70.1-90.0%; 5 - from 90.1%.

Laboratory - reports from laboratory classes, colloquium, oral/written answer, presentation of theoretical and experimental material, solving of posed scientific problems, evaluation of student activity during classes, evaluation of the implementation and solving of posed tasks, evaluation of teamwork and self-presentation skills, evaluation criteria: 3 - basic theoretical and practical preparation, ability to prepare reports on laboratory exercises, basic participation in theoretical and practical classes without additional involvement; 4 - practical preparation supported by theoretical knowledge, ability to formulate appropriate conclusions from the data obtained during the laboratory, active participation in classes supported by the desire to acquire additional practical and theoretical knowledge; 5 - complete preparation for classes, the ability to formulate conclusions at an advanced level and defend the theses, precise performance of assigned tasks, independent search for additional theoretical knowledge, coordination of work in a research team, ambitious approach to the subject.

Programme content

Lecture:



1. Definition and classification of biologically active substances (biologically active substances) from natural sources.
2. Biologically active substances of animal origin: hormones, pheromones (fragrances), lipids, proteins (collagen and elastin) and others (royal jelly), their physicochemical properties and biological action.
3. Application of bioactive compounds obtained from animals in cosmetics, pharmacy, medicine and food industry (bioactive components of food products, uniqueness of aromatic substances, bee products in medicine and cosmetology, natural emulsifiers).
4. Selected components of animal origin in cosmetics: chitosan, elastin, keratin, collagen, lanolin, beeswax, sodium salt of animal fat (soaps).
5. Bioactive substances found in foods: L-carnitine, taurine, carnosine, anserine, creatine, coenzyme Q10, glutathione, conjugated linoleic acid (CLA), bioactive peptides, ovoalbumin, conalbumin, ovomucin, cystatin.
6. Honey as a rich source of biologically active substances (vitamins, minerals, monosaccharides and their derivatives, e.g. methylglyoxal)
7. Dyes of animal origin, e.g. cochineal, shellac, sepia.
8. Animal fats and polysaccharides with special medicinal uses.
9. Amino sugars - antibiotics of natural origin.
10. Introduction to the synthesis and analysis of properties of biologically active compounds based on natural raw materials. Features affecting the difficulty of synthesis of biologically active compounds. Synthetic approach in formation of biologically active compounds.

Laboratory:

Problems of laboratory classes: students will use the knowledge gained at the lecture to master the practical skills related to the laboratory techniques used in the process of synthesis, modification, analysis and study of the activity of selected representatives of biologically active compounds of animal origin.

Teaching methods

Lecture - multimedia presentation, discussion.

Laboratory exercises - practical classes.

Bibliography

Basic

1. A. Kołodziejczyk, Naturalne związki organiczne, PWN, Warszawa, 2013.



2. Z.E. Sikorski (red.), Chemia żywności, WNT, Warszawa, 2012.
3. Z.E. Sikorski, H. Staroszczyk, Chemia żywności, PWN, Warszawa, 2017.
4. R.B. Silverman, Chemia organiczna w projektowaniu leków, WNT, Warszawa, 2004.
5. P. Kafarski, B. Lejczak, Chemia bioorganiczna, PWN, Warszawa, 1994.
6. G.L. Patrick, Chemia medyczna, PWN, Warszawa, 2019

Additional

1. M. Molski, Nowoczesna kosmetologia, PWN, Warszawa, 2014.
2. K. Kacprzak, K. Gawronska, Chemia kosmetyczna, Wydawnictwo Naukowe UAM, Poznań, 2010.
3. Syguda A., Wojcieszak M., Materna K., Woźniak-Karczewska M., Parus A., Ławniczak Ł., Chrzanowski Ł. (2020) Double-Action Herbicidal Ionic Liquids Based on Dicamba Esterquats with 4-CPA, 2, 4-D, MCPA, MCPP, and Clopyralid Anions, ACS Sustain. Chem. Eng., 14584.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	60	2,5
Student's own work (literature studies, preparation for laboratory classes, preparation for tests/pass) ¹	40	1,5

¹ delete or add other activities as appropriate