



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Chemistry of natural compounds - Structure and biological significance of selected biomolecules

Course

Field of study

Pharmaceutical Engineering

Area of study (specialization)

Year/Semester

2/3

Profile of study

Level of study

First-cycle studies

Form of study

full-time

Course offered in

Polish

Requirements

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

15

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

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Faculty of Chemical Technology

Institute of Chemical Technology and

Engineering

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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 covers basic information about 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 plant and animal origin.

Course-related learning outcomes

Knowledge

1. Student has a well-ordered, theoretically grounded general knowledge of organic and bioorganic chemistry connected with bioactive substances [K_W1].
2. Student has knowledge of natural and synthetic raw materials, products and processes used in pharmaceutical industry [K_W13].

Skills

1. Student is able to prepare and present an oral presentation on detailed issues of pharmaceutical engineering [K_U6].
2. Student has the ability of self-education [K_U24].

Social competences

1. Student is ready to critically evaluate his/her knowledge, understands the need for further education, complementing the field knowledge and improving his/her professional, personal and social competences, understands the importance of knowledge in problem solving and is ready to consult experts. [K_K1].
2. Student is ready to critically evaluate own and team actions, and is able to cooperate and work in a group [K_K2].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Current control during class, evaluation of prepared multimedia presentations and participation in class discussions;

assessment criteria: 3 - basic theoretical preparation and moderate participation in discussion; 4 - preparation for classes supported by theoretical knowledge, ability to formulate conclusions and active participation in discussion during classes; 5 - very good preparation for classes, ability to formulate own opinions and conclusions during discussion, independent search for additional theoretical knowledge concerning discussed issues.

Programme content

1. Definition and subdivision of biologically active substances (bioactive substances) of natural origin.



2. Chirality of biologically active compounds. The effect of changes in the structure of the molecule on its biological activity (isomerism, stereoisomerism, enantiomers).
3. Alkaloids. Classification. Occurrence. Therapeutic and toxic effects.
4. Polyphenols. Structure, classification, biological properties and application.
5. Phytoncides as natural antibiotics.
6. Terpenes and terpenoids.
7. Other biologically active substances of plant origin: flavonoids, anthocyanins, karetenoids, organic hydroxy acids, essential oils, saponins, isothiocyanates, glucosinolates, phytosterols, their properties and biological activity.
8. Animal fats and polysaccharides.
9. Amino sugars - antibiotics of natural origin.

Teaching methods

Overview of the issues with the use of multimedia presentations, discussion.

Bibliography

Basic

1. Z.E. Sikorski (red.), *Chemia żywności*, WNT, Warszawa, 2012.
2. Z.E. Sikorski, H. Staroszczyk, *Chemia żywności*, PWN, Warszawa, 2017.
3. A. Kołodziejczyk, *Naturalne związki organiczne*, PWN, Warszawa, 2013.
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	25	1,0
Classes requiring direct contact with the teacher	15	0,5
Student's own work (literature studies, preparation for tutorials classes) ¹	10	0,5

¹ delete or add other activities as appropriate