



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Chemistry of Natural Compounds - Application of Selected Biomolecules in Industry

Course

Field of study

Pharmaceutical Engineering

Area of study (specialization)

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Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

elective

Number of hours

Lecture

0

Laboratory classes

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

dr hab. n. farm. Barbara Bednarczyk-Cwynar

Responsible for the course/lecturer:

Prerequisites

Knowledge of organic chemistry in high school.

Course objective

Extending knowledge about compounds of natural origin that have important biological significance and are used in industry.



Understanding the specific characteristics of the chemical structure and understanding of genetic and structural interrelationships between individual classes of natural compounds and also within these classes.

wFacilitate further, effective study of subjects related to drug science.

Course-related learning outcomes

Knowledge

K_W1. Has ordered general knowledge in the field of pharmacy, cosmetology, technology and chemical engineering as related fields directly related to pharmaceutical engineering;

K_W4. Has ordered, theoretically founded general knowledge in the field of inorganic, organic, physical and analytical chemistry enabling understanding, description and investigation of chemical phenomena and processes related to pharmaceutical engineering;

K_W7. Has knowledge of the basic techniques, methods for characterizing and identifying pharmaceutical products and research tools used in pharmaceutical engineering, knows the classical and instrumental methods used in assessing the quality of substances for pharmaceutical purposes and in quantitative analysis in medicinal products, knows the physicochemical properties of substances for pharmaceutical use on the biological activity of drugs, knows the classification of analytical techniques together with criteria for the selection of methods and method validation;

K_W13. Has knowledge of natural and synthetic raw materials, products and processes used in the pharmaceutical industry;

K_W15. Has a solid knowledge of the processes of separation and purification of raw materials and products found in the pharmaceutical, cosmetic and chemical industries;

K_W16. Knows the rules for the construction and selection of reactors and apparatus used in the pharmaceutical, cosmetic and chemical industries;

K_W24. Has basic knowledge in the field of methods of searching for new medicinal substances, plant and synthetic medicine as well as their biochemical and molecular gripping points, pharmacopoeial standards and norms related to pharmaceutical engineering; knows the methods and techniques of chemical, pharmaceutical and toxicological testing of medicinal products;

K_W25. Has detailed knowledge of substances for pharmaceutical and cosmetic use, dietary supplements, plant raw materials, their production, analysis and quality control, technology and general about the metabolism and effects of drugs and the proper use of medicinal products, knows the principles of creating the characteristics of a medicinal product and information leaflet for the patient, knows and understands the principles of marketing medicinal products, medical devices, cosmetics and dietary supplements, knows the pharmacopoeial requirements for assessing the quality of substances and medicinal products;

K_W27. Knows the basic principles of occupational health and safety.



Skills

- K_U1. Understands literature in the field of pharmaceutical engineering in Polish; reads uncomplicated scientific and technical texts in a foreign language with understanding, is able to obtain information from literature, databases and other sources related to pharmaceutical engineering, also in a foreign language, integrate them, interpret them and draw conclusions and formulate opinions;
- K_U2. Based on general knowledge, explains the basic phenomena associated with significant processes, distinguishes between types of chemical reactions and has the ability to select them for chemical processes, can characterize various states of matter, the structure of chemical compounds, including medicinal substances, using theories used to describe them, methods and experimental techniques; uses correct chemical and pharmaceutical terminology and nomenclature of chemical compounds, also in a foreign language;
- K_U9. Is able to use the basic equipment and apparatus used in pharmaceutical engineering, receives pharmaceutically active substances by synthetic and biotechnological methods, isolates active bodies from plant materials based on knowledge of basic physical and chemical operations as well as biochemical and molecular processes, develops the form of the drug, performs research in within the scope of assessing the quality of drug forms, interprets and documents the results of product quality tests;
- K_U10. Has the ability to conduct chemical, pharmaceutical and toxicological tests of pharmaceutically active substances and medicinal products;
- K_U11. Selects and applies analytical methods and techniques in qualitative and quantitative analysis as well as to control processes and assess the quality of raw materials and products;
- K_U17. Is able to design and implement the basic apparatus of the pharmaceutical industry and design and implement unitary operations of pharmaceutical engineering

Social competences

K_K1. Is ready to critically assess his knowledge, understands the need for further education, supplementing specialized knowledge and raising his professional, personal and social competences, understands the importance of knowledge in solving problems and is ready to consult experts; is ready to make independent decisions and lead a team, critically assess his own actions and those of the team, take responsibility for the effects of these activities and is able to cooperate and work in a group, inspire and integrate the professional environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Verifying criteria: The knowledge acquired during the course of the course is verified on the basis of the oral answer of the student, his activity in class, as well as four written partial tests. Each test consists of five short open questions.

Assessment criteria: Student's preparedness for discussion during classes is assessed. In addition, each test question is rated on a scale of 2.0 - 5.0, with no score of 2.5. Passing threshold: giving a positive



grade to three out of five questions and at the same time an average grade of five questions equal to or higher than 3.00.

Programme content

- Acquaintance with the nomenclature, chemical structure, reactivity, chemical transformation possibilities and practical significance in pharmacy and pharmaceutical engineering of selected biomolecules belonging to the basic groups, ie: alkaloids, carbohydrates, steroids, terpenoids, peptides and proteins, nucleic acids, fatty acids, lipids and prostanoids and porphyrins.
- Acquainting with biological properties, occurrence in the surrounding world, possible application in the industry and pharmaceutical engineering, with elements of their synthesis and biosynthesis.

Teaching methods

Students present in the form of a multimedia presentation the practical importance (use in industry) of selected biomolecules belonging to particular groups of compounds. In addition, discussion, case study, problem solving are used.

Bibliography

Basic

1. Kafarski P., Lejczak B. Chemia bioorganiczna , Wydawnictwo Naukowe PWN, 1994.
2. Kołodziejczyk A. Naturalne związki organiczne , Wydawnictwo Naukowe PWN, 2012.
3. Wrzeciono U., Zaprutko L. Chemia związków naturalnych. Zagadnienia wybrane. , Wydawnictwa Uczelniane AM, 2001.

Additional

1. Patrick G. Chemia medyczna , Wydawnictwo Naukowo-Techniczne, 2003.
2. Stryer L. Biochemia , Wydawnictwo Naukowe PWN, 2005.

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,0
Classes requiring direct contact with the teacher	20	0,6
Student's own work (literature studies, preparation for tutorials, preparation for tests) ¹	10	0,4

¹ delete or add other activities as appropriate