COURSE DESCRIPTION CARD - SYLLABUS

Course name
Organic Chemistry

Course

Field of study
Pharmaceutical Engineering
Year/Semester
2/3
Area of study (specialization)
-
Profile of study
general academic
Level of study
First-cycle studies
Course offered in
polish
Form of study
full-time
Requirements
compulsory

Number of hours

Lecture
15
Laboratory classes
30
Other (e.g. online)
0
Tutorials
0
Projects/seminars
0

Number of credit points

4

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

Acquiring and extending the already existing knowledge of the leading groups of organic compounds: ways of naming them, obtaining, reactivity and practical significance. Acquaintance with basic laboratory activities, separation techniques, purification of organic compounds and determination of their purity. Acquiring habits of safe work in a chemical laboratory.

Course-related learning outcomes

Knowledge

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_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 researching medicinal products in chemical, pharmaceutical and toxicological terms

K_W26. Has knowledge of the risks associated with the implementation of chemical processes and risk assessment principles, knows international regulations and EU directives in the field of technical safety, and knows the principles of the organization of the chemical products market (REACH);

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;

K_U3. Uses correct chemical and pharmaceutical terminology and nomenclature of chemical compounds, also in a foreign language;

K_U8. Uses basic techniques, research equipment and apparatus useful in biotechnology, synthesis and analysis of pharmaceutically active substances, drug form technology and toxicology, appropriate for pharmaceutical engineering, uses pharmacopoeial methods, prepares documentation;

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_U12. Han plan and carry out simple experiments in the field of pharmaceutical engineering, both experimental and simulation, as well as interpret their results and draw conclusions;

K_U22. Complies with health and safety rules related to the work performed and is able to assess the hazards arising from unit operations of pharmaceutical engineering;

K_U25. In a professional and research environment is able to plan and organize individual and team work as well as work both individually and as a team.

Social competences

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 evaluate own and team activities, take responsibility for the effects of these activities and is able to cooperate and work in a group, inspire and integrate the professional environment;

is able to properly set priorities for the implementation of the task specified by himself or others, has a habit of supporting assistance and remedial actions, is responsible for the safety of own and other work, knows how to act in an emergency.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Verification methods: Active discussion solving problems. Observation of the student's work, his skills for independent work and teamwork. Assessment of the exercise protocol. Also:

Knowledge acquired during laboratory exercises is verified by six short written tests. Each test consists of five short open questions.

Knowledge acquired during lectures is verified at the end of semester III in the form of a written exam. It consists of 20 short closed questions.

Assessment Criteria:

Laboratory exercises: theory: Each question is rated on a scale of 2.0 - 5.0, with no grade 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.

Classes laboratory: practice: assessment of independence and diligence of the exercise, evaluation of the protocol on the exercise.

Lecture: Each question is rated on a scale of 2.0 - 5.0, with no score of 2.5. Assessment threshold: a positive mark for at least 11 out of 20 questions and at the same time an average of twenty questions equal to or higher than 3.00.

Programme content

Laboratory exercises: Practical classes covering such issues as:

• introduction to the principles of safe work in a chemical laboratory and first aid

• methods for the purification of solid organic compounds (crystallization, sublimation, liquid extraction in a Soxhlet apparatus)

• liquid purification methods (distillation)

• methods for separating mixtures of solids (column chromatography)

• separation methods for liquid mixtures (distillation, continuous extraction)

• preparation of selected groups of organic compounds

• determining the purity of organic compounds (thin layer chromatography, melting point, boiling point)
Each class includes passing the theoretical material and practical performance of the exercise.

Lectures: Discussion of the following issues:

• basic types of chemical reactions

• the ability to control the response by selecting appropriate external conditions

• division of organic compounds due to the presence of a functional group

• methods of preparation, reactivity of individual groups of organic compounds, their practical importance and use in industry.

Teaching methods

Laboratory exercises: practical classes of 30 hours, during which students carry out simple chemical experiments.

Lectures: 30h / semester are lectures using multimedia techniques.

Bibliography

Basic

1. Mc Murry J. Chemia Organiczna , PWN, 2005.

2. Morrison R.T., Boyd R.N., Chemia organiczna, t. 1 i 2, Wyd. Naukowe PWN, 2006.

3. Materiały do ćwiczeń opracowane przez Wykładowcę, 2019.

4. Vogel A.I., Preparatyka organiczna, Wyd. Naukowe PWN, 2018.

Additional

1. Briuce P.Y. Organic chemistry. Global Edition. , Pearson, 2007.

2. Clayden J. Greeves N., Warren S. Organic chemistry. Second Ed. , Oxford University Press, 2012.

3. Mąkosza M., Fedoryński M. Podstawy chemii organicznej , Oficyna Wydawnicza Politechniki Warszawskiej, 2006.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	60	2,4
Student's own work (literature studies, preparation for laboratory classes, preparation for tests/exam) [1]	40	1,6

[1] delete or add other activities as appropriate