COURSE DESCRIPTION CARD - SYLLABUS

Course name
Organic chemistry

Course

Field of study
Circular system technologies

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
30

Laboratory classes
30

Other (e.g. online)
0

Tutorials
30

Projects/seminars
0

Number of credit points

7

Lecturers

Responsible for the course/lecturer:
dr eng. Łukasz Ławniczak

Responsible for the course/lecturer:

Prerequisites

At the beginning of the course, the student should possess basic knowledge regarding general chemistry (e.g. atomic structure, symbols and properties of elements, formulas of chemical compounds, formation of chemical bonds, chemical reactions) and physics (e.g. the phenomenon of state change). In addition, the student should be able to obtain information using the indicated sources and be aware of the need to develop their competences.

Course objective

The aim is to ensure that students acquire basic theoretical and practical knowledge in the field of organic chemistry. The specific objectives include gaining proficiency in: issues related to nomenclature, structure, synthesis methods and properties of hydrocarbons (alkanes, alkenes, alkynes and aromatic compounds) and other groups of organic compounds (e.g. alcohols, aldehydes and ketones, carboxylic acids and their derivatives as well as amines).

Course-related learning outcomes

Knowledge

K_W02 - has knowledge of physics and chemistry which allows to understand the phenomena and changes occurring in technological and environmental processes (P6S_WG).

K_W04 - has a systematized, theoretical knowledge regarding inorganic, organic, physical and analytical chemistry (P6S_WG).

K_W10 - has knowledge regarding raw materials, products and processes used in closed-loop technologies (P6S_WG).

Skills

K_U01 - can obtain information using literature reports, 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, analyzes the results and formulates conclusions on this basis (P6S_UW).

K_U05 - correctly uses nomenclature and terminology in the field of closed-loop economy, chemistry, technology and chemical engineering, environmental protection and related disciplines, and properly applies it in discussions, also in a foreign language (P6S_UW, P6S_UK).

Social competences

K_K04 - cares about his own safety and the safety of and others during work, applies appropriate procedures and rules in emergency situations (P6S_KR, P6S_KK)

K_K05 - objectively assesses the level of knowledge and skills, understands the importance of improving professional and personal competences adequately to the changing social conditions and the progress of science (P6S_KK).

K_K10 - is aware of the negative impact of human activity on the state of the environment and actively counteracts its degradation (P6S_KK).

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

After the end of the lecture series, the knowledge of students will be verified based on the results of the final examination.

Evaluation in stationary mode:

Written test with 10 open questions regarding theoretical and practical issues.

Evaluation in on-line mode:

Test with 10 open questions regarding theoretical and practical issues carried out with the use of the eKursy platfrom.

A passing grade is obtained when the number of points is greater than 50% of the accepted maximum.

Tutorials:

During the series of tutorials, the knowledge of students will be verified based on 2 tests with 5 questions regarding practical synthetic problems. Additionally, the progress will be controlled using short tests carried out during the following classes.

Evaluation in stationary mode:

Written tests.

Evaluation in on-line mode:

Tests carried out with the use of the eKursy platfrom.

A passing grade is obtained when the number of points is greater than 50% of the accepted maximum.

Laboratories:

During the series of laboratory classes, the knowledge of students will be verified based on short tests regarding theoretical knowledge in the scope of the exercise. In addition, the knowledge regarding the course of the exercise and practical knowledge necessary to safely conduct the experiment will be verified by the teacher.

Evaluation in stationary mode:

Written tests.

Evaluation in on-line mode:

Tests carried out with the use of the eKursy platfrom.

A passing grade is based on correctly conducting the planned experiments as well as passing the tests and questions.

Programme content

The course will cover the following theoretical issues: nomenclature and structure of organic compounds, reactivity and properties of individual compound groups, isomerism, reaction mechanisms and properties of hydrocarbons (alkanes, alkenes, alkynes), aromaticity and resonance, electrophilic substitution reactions, nucleophilic substitution and elimination reactions, synthesis and mechanisms of reactions characteristic for other organic compounds (halogen derivatives, ethers, alcohols and phenols, aldehydes and ketones, carboxylic acids and their derivatives as well as amines), planning of multi-stage reactions.

In addition, laboratory classes will be carried out to obtain practical knowledge in the field of basic methods of purification of organic compounds (distillation, crystallization and extraction), the synthesis

of simple and advanced organic compounds and the analysis of products in terms of purity and reaction efficiency.

Teaching methods

The lecture includes a multimedia presentation of the discussed content and involving students in scientific discussions.

Tutorials include the use of knowledge obtained during lectures to record mechanisms and plan syntheses depending on the reaction conditions and reactivity of the discussed compounds.

Laboratories include training in occupational health and safety, the use of basic laboratory equipment, basic methods of analysis and purification of organic compounds as well as practical implementation of syntheses along with keeping a laboratory journal.

Bibliography

Basic

1. John McMurry, Organic Chemistry, Polish Scientific Publishers PWN.

2. Robert Morrison, Robert Boyd, Organic Chemistry, Polish Scientific Publishers PWN.

Additional

1. Arthur Vogel, Organic Preparation, Polish Scientific Publishers PWN.

2. Susan McMurry, Organic Chemistry, Polish Scientific Publishers PWN.

3. Jerry March, Organic Chemistry. Reactions, mechanisms, construction. Scientific and Technical Publishers.

4. Daniela Buza, Aleksandra Ćwil, Organic chemistry exercises with solutions. PW Publishing House.

5. Polish Chemical Society, Nomenclature of Organic Compounds.

Breakdown of average student's workload

	Hours	ECTS
Total workload	175	7,0
Classes requiring direct contact with the teacher	100	4,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam) [1]	75	3,0

[1] delete or add other activities as appropriate