



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Organic chemistry

Course

Field of study

Environmental Protection Technologies

Area of study (specialization)

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

compulsory

Number of hours

Lecture

45

Laboratory classes

Tutorials

Projects/seminars

Other (e.g. online)

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Katarzyna Bielicka-Daszkiewicz

Responsible for the course/lecturer:

Prerequisites

The student has a basic knowledge of general and organic chemistry at the level of general education school. The student is able to solve the simple problem tasks of organic chemistry based on his knowledge. The student is aware of the need to broaden his knowledge.

Course objective

1. Provide students with basic knowledge of organic chemistry, to the extent specified by the content of the curriculum of the chemical and process engineering field of study.
2. Develop students' ability to solve basic problems in the synthesis of simple organic compounds and the problems related to the reactivity of compounds containing various functional groups.
3. Develop students' awareness of the responsibility for their future decisions relevant to the chemical engineer work.

Course-related learning outcomes

Knowledge

1. The student has ordered, theoretically founded general knowledge in the field of organic chemistry;



the student knows the issues related to the theory of orbitals and resonance, and characteristic reactions (including mechanisms) of major groups of organic compounds- [K_W03]

2. The student is able to plan the method of synthesis of simple organic compounds with different functional groups which may be used in chemical industry; The student is able to characterize the substrates needed and he is able to analyze the resulting products- [K_W09]

Skills

1. The student is able to obtain information from the literature, electronic databases and other sources properly selected, he is able to interpret and draw conclusions, also practical- [K_U01]

2. The student has the ability to self-education- [K_U05]

Social competences

1. The student understands the need to improve his professional qualifications - [K_K01]

2. The student is aware of the importance of the decisions on the future of engineering activities, their comprehensive impact on the environment - [K_K02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures - Assessment of knowledge and skills on the basis of written or oral credit.

Programme content

Introduction: the nomenclature and stereochemistry of organic compounds (IUPAC rules), the theory of orbitals, hybridization, chemical bonding, resonance, polarity of bonds and molecules.

The concept of acidity and basicity. Types of chemical reactions and mechanisms. Transition states, the formation of intermediate products. Kinetically and thermodynamically controlled reactions. Rearrangements. Tautomerism.

Methods of synthesis and reactivity of the major classes of organic compounds: alkanes, alkenes, alkynes, aromatic compounds, alkyl halides, organometallic compounds, alcohols and phenols, aldehydes and ketones, carboxylic acids and their derivatives, amines and nitro compounds.

Teaching methods

Lecture: multimedia presentation supplemented with extensive commentary and examples

Bibliography

Basic

1. J. McMurry, Chemia organiczna, PWN, Warszawa 2017.

2. R.T. Morrison, R.N. Boyd, Chemia organiczna, PWN, Warszawa 1998.

3. A. Vogel, Preparatyka organiczna, WNT, Warszawa 2006.



5. D. Buza, A. Ćwil, Zadania z chemii organicznej z rozwiązaniami, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2003.

Additional

1. Przewodnik do nomenklatury związków organicznych, Polskie Towarzystwo Chemiczne, Warszawa 1994.

2. M. Mąkosza, M. Fedoryński, Podstawy syntezy organicznej. Reakcje jonowe i rodnikowe, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2006.

3. W. Majewski, Mechanizmy reakcji organicznych, Wydawnictwo Uniwersytetu Marii Curie-Skłodowskiej, Lublin 2012.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	50	2,0
Student's own work (literature studies, preparation for tests/exam) ¹	25	1,0

¹ delete or add other activities as appropriate