# DESCRIPTION OF THE COURSE OF STUDY

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| **Course code** | **0531-2CHEM-C03-COII** | |
| **Name of the course in** | Polish | Chemia Organiczna II |
| | English | Organic Chemistry II |

## 1. LOCATION OF THE COURSE OF STUDY WITHIN THE SYSTEM OF STUDIES

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| **1.1. Field of study** | Chemistry |
| **1.2. Mode of study** | Full-time studies |
| **1.3. Level of study** | Second-cycle studies |
| **1.4. Profile of study*** | General academic |
| **1.5. Person/s preparing the course description** | Alicja Wzorek |
| **1.6. Contact** | awzorek@ujk.edu.pl |

## 2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

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|---|---|
| **2.1. Language of instruction** | English |
| **2.2. Prerequisites*** | Organic Chemistry I |

## 3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

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| **3.1. Form of classes** | | Lectures 15, laboratory 45, seminar 15 |
| **3.2. Place of classes** | | Classes in the teaching room of the UJK |
| **3.3. Form of assessment** | | Lecture - exam, laboratory exercises, seminar - credit with grade |
| **3.4. Teaching methods** | | Lecture, discussion, demonstration, independent experiments, |
| **3.5. Bibliography** | **Required reading** | 1. J. Clayden, N. Greeves, S. Warren, P. Wothers, Organic Chemistry 2nd Edition, Oxford University Press, 2012.<br>2. Pierre Vogel, Kendall N. Houk, Organic Chemistry: Theory, Reactivity and Mechanisms in Modern Synthesis, Wiley-VCH, 2019. |
| | **Further reading** | 1. J. March, Advanced Organic Chemistry, Wiley, 1992,<br>2. T. W. Solomons, Organic Chemistry, Wiley 1997,<br>3. Praca zbiorowa pod red. J. Wróbla, Preparatyka i elementy syntezy organicznej, PWN, Warszawa 1983. |

## 4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

**4.1. Course objectives** ***(including form of classes)***

C1- Presentation of extended knowledge in the field of chemistry of organic compounds
C2- The content of the lecture also includes stereochemistry and reaction mechanisms as well as modern methods of synthesis of chiral compounds
C3 - Exercises in writing reaction mechanisms, chemoselectivity and stereochemistry are included in the seminar
C4- Reminding and consolidating the rules of safe work in the laboratory

**4.2. Detailed syllabus** ***(including form of classes)***

**Lecture**

The lecture covers the following topics:
1. Chirality: the importance of chirality in nature, chiral compounds containing chiral centers other than the carbon atom: nitrogen, phosphorus, sulfur, silicon, arsenic, tin; Asymmetric synthesis.
2. Application of biocatalysis in organic synthesis;
3. Diastereoselective reactions: stereospecific reactions, stereoselective reactions, prochirality,
4. Pericyclic reactions: definition, division; Diels-Alder cycloaddition reactions;
5. Characteristics of selected C-C bond formation reactions: Heck reaction, Suzuki reaction, metathesis reactions;
6. Chemistry of selected organometallic compounds: nomenclature of organometallic compounds, synthesis of organometallic compounds, application of organometallic compounds in organic synthesis;
7. Chemistry of organophosphorus compounds: synthesis of organophosphorus compounds, application of organophosphorus compounds in organic synthesis;
8. Organic synthesis reactions using microwave radiation and ultrasounds.

**Seminar:** Consolidating and expanding the content of lectures by solving problems in small groups.

**Laboratory**

In the laboratory, students perform planned syntheses aimed at improving students' manual skills.
Students are required to pass the test and the knowledge required by the instructor to complete the preparation.

**4.3 Intended learning outcomes**

| Code | A student, who passed the course | Relation to learning outcomes |
|---|---|---|
| within the scope of **KNOWLEDGE:** | | |
| W01 | Knows the basic concepts of modern organic chemistry | CHEM2A _W03 |
| W02 | Gives examples of the use of organometallic and organophosphorus compounds in synthesis | CHEM2A _W03 |
| W03 | Knows modern methods of organic synthesis | CHEM2A _W03<br>CHEM2A _W9<br>CHEM2A _W06 |
| within the scope of **ABILITIES:** | | |
| | | |
| U01 | Can analyse organic synthesis procedures | CHEM2A _U02 |
| U02 | Can safely conduct the synthesis of organic compounds | CHEM2A _U08<br>CHEM2A _U09 |
| within the scope of **SOCIAL COMPETENCE:** | | |
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| | | |

**4.4. Methods of assessment of the intended learning outcomes**

| Teaching outcomes *(code)* | Method of assessment (+/-) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Exam oral /written* | | | Test* | | | Project* | | | Group work* | | | Others* e.g. standardized test used in e-learning | | |
| | *Form of classes* | | | *Form of classes* | | | *Form of classes* | | | *Form of classes* | | | *Form of classes* | | |
| | *L* | *C* | *Lab* | *L* | *C* | *Lab* | *L* | *C* | *Lab* | *L* | *C* | *Lab* | *L* | *C* | *Lab* |
| W01 | + | | | + | + | + | | | | | + | | | | |
| W02 | + | | | + | + | + | | | | | + | | | | |
| W03 | + | | | | | + | | | | | | | | | |
| U01 | | | | | | + | | | | | | | | | + |

***delete as appropriate***

**4.5. Criteria of assessment of the intended learning outcomes**

| Form of classes | Grade | Criterion of assessment |
|---|---|---|
| **Lecture (L)** * (including e-learning) | **3** | Exam : the student must earn at least 60% of the total points. |
| | **3,5** | Exam : the student must earn 70% of the total points. |
| | **4** | Exam : the student must earn 80% of the total points. |
| | **4,5** | Exam : the student must earn 90% of the total points. |
| | **5** | Exam : Student gain more than 95% of total points. |
| **Classes (C)** * (including e-learning) | **3** | Tests : the student must earn at least 60% of the total points. |
| | **3,5** | Tests : the student must earn 70% of the total points. |
| | **4** | Tests : the student must earn 80% of the total points. |
| | **4,5** | Tests : the student must *earn* 90% of the total points. |
| | **5** | Tests : Student gain more than 95% of total points. |
| **Other (…)** * (including e-learning) | **3** | Student performed all practical tasks; wrote reports with corrections; earned 60% of correct answers. |
| | **3,5** | Student performed all practical tasks; wrote reports with corrections; earned 70% of correct answers. |
| | **4** | Student performed all practical tasks; wrote reports without corrections; earned 80% of correct answers. |
| | **4,5** | Student performed all practical tasks; wrote reports without corrections; earned 90% of correct answers. |
| | **5** | Student performed all practical tasks; wrote reports without corrections; earned >95% of correct answers. |

**5. BALANCE OF ECTS CREDITS – STUDENT'S WORK INPUT**

| Category | Student's workload | |
|---|---|---|
| | Full-time studies | Extramural studies |
| *NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/* | *74* | |
| *Participation in lectures** | 15 | |

| | | |
|---|---|---|
| *Participation in classes, seminars, laboratories** | 55 | |
| *Preparation in the exam/final test** | 4 | |
| *Others** | | |
| *INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/* | ***51*** | |
| *Preparation for the lecture** | | |
| *Preparation for the classes, seminars, laboratories** | 30 | |
| *Preparation for the exam/test** | 21 | |
| *Gathering materials for the project/Internet query** | | |
| *Preparation of multimedia presentation* | | |
| *Others** | | |
| *TOTAL NUMBER OF HOURS* | ***125*** | |
| ECTS credits for the course of study | **5** | |

***delete as appropriate***

***Accepted for execution*** *(date and legible signatures of the teachers running the course in the given academic year)*

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