

FACULTY of CHEMISTRY

SUBJECT CARD

Name of subject in Polish ...Wieloletnia synteza organiczna

Name of subject in EnglishMultistep organic synthesis....

Main field of study (if applicable): ...BIOSCIENCES....

Specialization (if applicable): ...Medicinal chemistry

Profile: academic

Level and form of studies: 2nd level,

Kind of subject: obligatory

Subject code ... W03BSS-SM2024L

Group of courses YES/ NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)			60		
Number of hours of total student workload (CNPS)			75		
Form of crediting (Examination / crediting with grade)			crediting with grade)		
For group of courses mark (X) final course					
Number of ECTS points			3		
including number of ECTS points for practical classes (P)			3		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			2,8		

*delete as not necessary

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge and skills at the level of completing the "Fundamentals of organic chemistry - laboratory" course or equivalent
2. Basic knowledge of English at a communicative level

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SUBJECT OBJECTIVES

- C1 Acquires students' proficiency in laboratory work using advanced experimental techniques of organic synthesis.
- C2 Ability to practically use various transformation methods in multi-stage synthesis - creating new C-C bonds, transformations on functional groups
- C3 Ability to perform a complex synthetic sequence based on literature data.

SUBJECT EDUCATIONAL EFFECTS

relating to skills:

PEU_U01 – is able to carry out a multi-stage synthesis of an organic compound,

PEU_U02 – knows how to use scientific literature and chemical databases

PEU_U03 – is able to select the conditions for various transformations and plan methods of isolating and purifying products,

PEU_U04 – is able to independently interpret the results, measure basic physicochemical constants, interpret spectroscopic spectra of organic compounds

relating to social competences:

PEU_K01— knows English at a communicative level, is able to keep a laboratory journal in English

PROGRAMME CONTENT

Lecture		Number of hours
Lec 1		
Lec 2		
Lec 3		
Lec 4		
Lec 5		
....		
	Total hours	
Classes		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	
Laboratory		Number of hours
Lab 1	Information on how to conduct and pass exercises and keep a laboratory journal. Basic equipment (glass and metal) and laboratory operations. Work safety in the laboratory: harmful, flammable substances, etc. Synthesis planning - using literature and databases.	4
Lab 2	Carrying out one-step syntheses requiring selective reduction of the C=O and C=C bonds - procedures to be selected by the lecturer (from a prepared script)	4
Lab 3		4
Lab 4		4
Lab 5		4
Lab 6	Carrying out a one-step synthesis requiring selective oxidation - procedure to be selected by the instructor (from a prepared script)	4
Lab 7		4
Lab 8	Conducting a 3- and 4-step synthesis of a compound with known biological	4

Lab 9	activity, including both the formation of new C-C bonds and transformations on various functional groups. Purification, identification and characterization of products - measurement of physico-chemical constants. Calculations of the yield at individual stages and total yield. Interpretation of the results.	4
Lab 10		4
Lab 11		4
Lab 12		4
Lab 13		4
Lab 14		4
Lab15	Settlement of laboratory equipment and laboratory notes.	4
	Total hours	

Project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
...		
	Total hours	

Seminar		Number of hours
Semin 1		
Semin 2		
Semin 3		
...		
	Total hours	

TEACHING TOOLS USED	
N1. Discussion of the experiment: planning the equipment, techniques used and subsequent stages of synthesis	
N2. Carrying out experiments independently	
N3. Preparing a report in a laboratory journal (in English)	

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
P	PEU_U01- PEU_U04 PEU_K01	Independent synthesis of given products, measurement of physical and chemical constants for product characterization, preparing a report in the laboratory book in English.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] R. Siedlecka, Multistep organic synthesis. Laboratory course for students of medicinal chemistry, Wrocław, 2020;
- [2] A. Mucha, R. Siedlecka, Multistep organic synthesis. Practical course, Wrocław, 2010;
- [3] A. I. Vogel, Preparatyka organiczna, WNT, Warszawa, 2006;
- [4] Bazy danych: Beilstein, Chemical Abstracts, Current Contents.

SECONDARY LITERATURE:

- [1] J. Gawroński, K. Gawrońska, K. Kacprzak, M. Kwit, Współczesna synteza organiczna, PWN, Warszawa, 2004
- [2] L.-T. Ho, *Tactics of Organic Synthesis*, J. Wiley, New York, 1994

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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