DESCRIPTION OF THE COURSE OF STUDY

Course code	0531.6.CHEM1.B/C.ZRiZC	
Name of the course in	Polish	**Zrównoważony rozwój i zielona chemia**
	English	**Sustainable development and green chemistry**

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

1.1. Field of study	chemistry
1.2. Mode of study	full-time studies/extramural studies
1.3. Level of study	undergraduate course
1.4. Profile of study*	general academic
1.5. Person/s preparing the course description	Agnieszka Gałuszka
1.6. Contact	Agnieszka.Galuszka@ujk.edu.pl, tel. 41-349-70-26

2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

2.1. Language of instruction	English/Polish
2.2. Prerequisites*	basics of chemistry

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes		e.g. lectures, classes (including e-learning)
3.2. Place of classes		lecture classes
3.3. Form of assessment		teaching rooms at Jan Kochanowski University
3.4. Teaching methods		lecture: oral exam classes: tests
3.5. Bibliography	**Required reading**	Lancaster, M. (2020). *Green chemistry: an introductory text*. Royal Society of Chemistry. Winterton, N. (2021). *Chemistry for Sustainable Technologies 2nd Edition*. Royal Society of Chemistry.
	Further reading	Manahan, S. E. (2022). Environmental chemistry. CRC Press.

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

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

Lecture:

C1 Acquisition by students of the following skills: applying the principles of sustainable development in everyday life; rational and safe use of chemicals and materials; rational use of natural and man-made goods, understanding and proper interpretation of legal acts related to the management of chemicals.

Classes:

C1. The main goal of the course is to consolidate the knowledge gained during the lecture and to familiarize students with the methods of assessing compliance with the principles of green chemistry of organic syntheses and analytical methods.

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

Lecture

1. **Concept of sustainable development**. A history and main concepts of sustainable development. Sustainable development laws and principles. Consequences of the implementation of sustainable development for contemporary societies.
2. **Sustainable development and environmental protection**. Pollution, protection of air, water and soil. Sustainable waste management.
3. **Green chemistry**. Assumptions, principles and requirements of green chemistry. Management of chemicals in the light of legal regulations.

Classes

1. **Ways and possibilities of implementing the principles of sustainable development.**

Ways of implementing green chemistry in laboratory practice. Renewable raw materials in organic synthesis. New reactions and alternative reagents. "Green" ways of conducting chemical reactions. "Green" reactionary media. Green Analytical Chemistry.

4.3 Intended learning outcomes

Code	A student, who passed the course	Relation to learning outcomes
within the scope of **KNOWLEDGE:**		
W01	characterizes the laws and principles of sustainable development	CHEM1A_W08
W02	explains the assumptions, principles and requirements of green chemistry	CHEM1A_W08
within the scope of **ABILITIES:**		
U01	knows the laws and principles of sustainable development	CHEM1A_U09
U02	assesses the relationship between sustainable development and environmental protection	CHEM1A_U09
U03	compares the ways of implementing green chemistry in chemical synthesis and analysis	CHEM1A_U09
within the scope of **SOCIAL COMPETENCE:**		
K01	is aware of the necessity of implementing green chemistry to minimize the impact of pollution on the environment	CHEM1A_K02

4.4. Methods of assessment of the intended learning outcomes

Teaching outcomes *(code)*	Method of assessment (+/-)			
	Exam (written)		Test*	
	Form of classes		*Form of classes*	
	L	*C*	*L*	*C*
W01	+	–	–	+
W02	+	–	–	+
U01	+	–	–	+
U02	+	–	–	+
U03	+	–	–	+
K01	+	–	–	+

**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**	obtaining 50-60% of the total number of points from the answers on the exam
	3,5	obtaining 61-70% of the total number of points from the answers on the exam
	4	obtaining 71-80% of the total number of points from the answers on the exam
	4,5	obtaining 81-90% of the total number of points from the exam answers
	5	obtaining 91-100% of the total number of points from the answers on the exam
Classes (C) * (including e-learning)	**3**	obtaining 50-60% of the total number of points in written tests
	3,5	obtaining 61-70% of the total number of points in written tests
	4	obtaining 71-80% of the total number of points in written tests
	4,5	obtaining 81-90% of the total number of points in written tests
	5	obtaining 91-100% of the total number of points in written tests

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/	***30***	***30***
*Participation in lectures**	15	15
*Participation in classes, seminars, laboratories**	15	15
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	***20***	***20***
*Preparation for the classes, seminars, laboratories**	10	10
*Preparation for the exam/test**	10	10
TOTAL NUMBER OF HOURS	***50***	***50***
ECTS credits for the course of study	**2**	**2**

****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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