Course Syllabus

Course from study programme for the cycle: 2025/2026

I. General Information

Course name	Green Chemistry
Programme	Biotechnology
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	MSc
Form of studies (full-time, part-time)	full-time
Discipline	Biological sciences
Language of instruction	English

Course coordinator	Dr hab. inż. Andrea Baier, prof. KUL

Type of class *(use only the types mentioned below)*	Number of teaching hours	Semester	ECTS Points
lecture	15	II	1
tutorial			
classes			
laboratory classes			
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	Knowledge of chemistry, enzymology and molecular biology

II. Course Objectives

Introducing students to green chemistry and its applications in biotechnology
Familiarising students with strategies and methods used in green chemistry

III. Course learning outcomes with reference to programme learning outcomes

Symbol	Description of course learning outcome	Reference to programme learning outcome
KNOWLEDGE		
W_01	characterises the principles of green chemistry and explains their significance in the design and implementation of	K_W02

	sustainable biotechnological processes	
W_02	identifies and characterises biotechnological methods consistent with the principles of green chemistry, used in the prevention of environmental pollution, taking into account their application in various industrial sectors	K_W03
SKILLS		
U_01	identifies sectors of the economy that can benefit from green chemistry solutions	K_U11
U_02	assesses potential environmental risks arising from the technologies used, taking into account the principles of green chemistry and sustainable development in order to minimise negative impacts on the environment	K_U12
U_03	assesses the risks arising from the research techniques used in accordance with the principles of sustainable development	K_U15
SOCIAL COMPETENCIES		
K_01	analyses the impact of biotechnology development on natural resource management, taking into account the meaning, values and need for sustainable use of the environment	K_K01

IV. Course Content

- The essence of green chemistry and sustainable development. The goals and principles of green chemistry. Alternative reaction media (2 hours, W_01, U_02)
- Unconventional methods of conducting chemical reactions (electrochemical, photochemical, sonochemical synthesis, using microwave radiation) (2 hours, W_02)
- Methods and techniques in directed evolution: generating a library of mutants, screening and selection methods (6 hours, W_01, W_02)
- Examples of the application of green chemistry principles in industry and agriculture (4 hours, U_01, U_03, K_01)
- Assessment (1 hour)

V. Didactic methods used and forms of assessment of learning outcomes

Symbol	Didactic methods *(choose from the list)*	Forms of assessment *(choose from the list)*	Documentation type *(choose from the list)*
KNOWLEDGE			
K_W01	Conversational lecture	Written test	Evaluated written test
K_W02	Conversational lecture	Written test	Evaluated written test
SKILLS			
K_U01	Conversational lecture	Written test	Evaluated written test
K_U02	Conversational lecture	Written test	Evaluated written test
K_U03	Conversational lecture	Written test	Evaluated written test
SOCIAL COMPETENCIES			
K_K01	Conversational lecture	Written test	Evaluated written test

VI. Grading criteria, weighting factors.....

Four hours of unexcused absence from lectures are permitted. The method of making up for absences is indicated by the lecturer. Students may use electronic equipment during lectures.

Written assessment:

very good (5)	above 95%
good plus (4.5)	86%-95%
good (4)	76%-85%
satisfactory plus (3.5)	68%-75%
satisfactory (3)	51%-67%

VII. Student workload

Form of activity	
Number of contact hours (with the teacher)	15
Number of hours of individual student work	10

VIII. Literature

Basic literature
Selected scientific publications