University of Gdańsk

Subject card

Subject name and code	Biotechnology in environmental protection, PG_00117758		
Field of study	Chemistry		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	postgraduate studies	Subject group	Obligatory subject group in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	academic	Assessment form	
Conducting unit	Pracownia Bionanotechnologii -> Katedra Biotechnologii Molekularnej -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Joanna Jeżewska-Frąckowiak	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	30.0	0.0	0.0	30

E-learning hours included: 0.0

Additional information:
laboratory work

problem task, work in pairs

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	30	5.0	15.0	50

Subject objectives

Familiarization with the issues of classical biotechnology in environmental protection and presentation of modern issues and prospects for the use of molecular biotechnology methods. Obtaining laboratory skills - classical and molecular diagnostics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.	The student knows the methodology for obtaining GMO varieties and understands the purposefulness of using genetically modified organisms in environmental protection.	[SW4] test/exam - oral or written [SW5] implementation of a problem task
[CHEMMU2_W10] Uses knowledge of the principles of operation of the basic scientific and research apparatus used in chemistry.	The student knows the basic processes and unit operations related to biotechnology in environmental protection.	[SW2] presentation/project/paper/ report [SW5] implementation of a problem task
[CHEMMU2_W03] Demonstrates extended knowledge in the field of modern measuring techniques used in chemical analysis.	The student knows and characterizes biotechnological methods of environmental analysis.	[SW4] test/exam - oral or written
[CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.	The student independently plans and performs assigned laboratory tasks, manages time and available infrastructure.	[SK2] presentation/project/paper/ report [SK5] implementation of a problem task [SK8] observation of student's independent or team work
[CHEMMU2_U04] Applies acquired knowledge of chemistry and related scientific disciplines.	Solve problem tasks independently and in pairs, record, prepare and interpret laboratory test results.	[SU3] text preparation/written work [SU5] implementation of a problem task [SU6] demonstration of practical skills

Subject contents

1. Basic legal regulations applicable in Poland regarding GMOs.

2. Biotechnological aspects of environmental protection.

3. Diagnostic methods used to detect the presence of GM plant varieties.

4. Popular breeding varieties of GMO plants and modifications occurring in them.

5. Morphological and microscopic determination of biodiversity of environmental samples of water and soil.

6. Determination of the number of microorganisms using the surface inoculation method and the titer method.

7. Principle of DNA purification from plant samples.

8. The principle of identifying genetic modification of plant DNA used in the exercise.

9. Processes occurring during each stage of subsequent PCR amplification cycles

10. Principle of electrophoretic separation and interpretation of the results of the separation of PCR reaction products.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
laboratory notebook with reports	51.0%	40.0%
work card - problem task	0.0%	10.0%
test	51.0%	50.0%

Recommended reading

Basic literature	1. Glick B.R., Pasternak J.J., Patten Ch. L. Molecular biotechnology 4th Ed. , ASM PRESS 2010 2. Libudzisz Z., Kowal K. Żakowska Z. Mikrobiologia techniczna T 2 , PWN 2008 3. Klimiuk E., Łebkowska M. Biotechnologia w ochronie środowiska, PWN 2005 4. Querci M., Maretti M., Mazzara M. Badanie próbek żywności na obecność Genetycznie Zmodyfikowanych Organizmów. European Comission Joint Research Centre, World Health Organization, Regional Office for Europe
Supplementary literature	5. indicated on-line resources 6. Klimiuk E., Łebkowska M.: Biotechnologia w ochronie środowiska, PWN, 20057. Glick, B.R., Pasternak, J.J., Patten, C.L.: Molecular biotechnology: Principles and applications of recombinant DNA. ASM PRESS, 20098. Libudzisz Z., Kowal K., Żakowska Z.: Mikrobiologia techniczna, tom 2, PWN 20089. Olańczuk-Neyman K.: Laboratorium z biologii środowiska, Wyd. PG, 1998
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

working with a DNA demonstration sequence

test questions

Work placement

Not applicable

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