Course title:				
Environmental biotechnology and bioreactors				
Biotechnologia srodowiska i bioreaktory				
Field of study:				
Type of study:	The level of education:	Education profile:		
Wybierz element.	Wybierz element.			
Type of subject:	Semester:	Course language:		
optional	Wybierz element.	English		
Course type:	Number of hours:	ECTS Credit points:		
lecture, laboratory	15L, 45Lab	7		

SYLLABUS

COURSE OBJECTIVES

C.1. Kliknij lub naciśnij tutaj, aby wprowadzić tekst.

PRELIMINARY COURSE REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Kliknij lub naciśnij tutaj, aby wprowadzić tekst.

SUBJECT EDUCATIONAL EFFECTS

EU 1 - Kliknij lub naciśnij tutaj, aby wprowadzić tekst.

COURSE CONTENT

Form of classes - lectures		
Introduction to environmental biotechnology		
Fermentation in environmental biotechnology – microbial growth kinetics and yield constants; Monod kinetics; types of fermentation		
Bioreactors - types, designs, and functional characteristics		
Biomining		
Agricultural biotechnology		
Bioremediation of groundwater and contaminated soil	2	
Biotechnology for waste and wastewater treatment		
Biorefineries	2	
Applications of biotechnology in environmental monitoring – bioindicators, biomarkers, biosensors		
Test	1	
Form of classes – laboratory	Hours	
Wastewater treatment	10	
Evaluation of the degree of compost maturity on the basis of the germination index		
Energy recovery from waste		
Effect of lead and cadmium on morphological and physiological features of plants		

Bioremediation of contaminated soil	12
Defense of studies	3

COURSE STUDY METHODS

1. blackboard	
2. multimedia presentation	
3. laboratory setup	
4. the literature and instructions for laboratory classes	

METHODS OF ASSESMENT (F - formative; S - summative)

F1. - activity in classes	
F2. - evaluation of work during laboratory exercises	
S1. – test	
S2. - evaluation of the laboratory reports	

STUDENT WORKLOAD

Form of activity	Workload (hours)
Participation in lectures	15 h
Participation in classes	-
Laboratory	45 h
Participation in project classes	-
Participation in seminar	-
Preparation course on e-learning	-
Test	5 h
Entrance test for laboratory classes	15 h
Project's defence	3 h
Exam	-
Consultation hours	15 h
DIRECT TEACHING, hours/ ECTS	98 h / 5,36 ECTS
Preparation for tutorials	-
Preparation for laboratories	20 h
Preparation for projects	-
Preparation for seminars	-
Preparation for e-learning classes	-
Participation in e-learning classes	-
Working on project	-
Preparation for tests	10 h
Preparation for exam	-
SELF-STUDY, hours/ ECTS	30 h / 1,64 ECTS
TOTAL (hours)	128 ∑
TOTAL ECTS	7 ECTS

PRIMARY AND SUPPLEMENTARY TEXTBOOKS

Scragg, A. H. (2005). Environmental biotechnology. New York: OXFORD university press.

Khan, F. A. (2020). Biotechnology fundamentals. CRC Press.

Vallero, D., Environmental Biotechnology: A Biosystems Approach (2010),

Sibi, G., (2023). Environmental Biotechnology Fundamentals to Modern Techniques, CRC Press

Bhat, R.A., (2022). Environmental Biotechnology, Apple Academic Press Inc.

Fulekar M. H., (2010). Environmental Biotechnology, CRC Press

Jördening, H-J., Winter J., (eds), (2005). Environmental Biotechnology: Concepts and Applications, Wiley-Blackwell

SUBJECT COORDINATOR (NAME, SURNAME, E-MAIL ADDRESS)

1. Anna Grosser, anna.grosser@pcz.pl

NAME OF LECTURER (s) (NAME, SURNAME, E-MAIL ADDRESS)

1. Anna Grosser, anna.grosser@pcz.pl

OTHER USEFUL INFORMATION

- 1. All the information on the class schedule is posted on the student information board and online at: https://is.pcz.pl/.
- 2. The information about the consultation hours is provided to students on the first class meeting and posted online at https://is.pcz.pl/.
- 3. The information on course completion and grade is provided to students on the first class meeting.