DESCRIPTION OF THE COURSE OF STUDY

Course code	**0512.6.BIOT1.B/C.MŚ**	
Name of the course in	Polish	***Mikrobiologia środowiskowa***
	English	***Environmental Microbiology***

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

1.1. Field of study	BIOTECHNOLOGY
1.2. Mode of study	STATIONARY
1.3. Level of study	First-cycle master's studies
1.4. Profile of study*	General academic
1.5. Person/s preparing the course description	Dr Paulina Żarnowiec
1.6. Contact	Paulina.zarnowiec@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

2.1. Language of instruction	Polish, English
2.2. Prerequisites*	Basics of general microbiology. Possessing the ability to inoculate bacteria and cultivate microorganisms

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes		Lecture: 30 h Laboratory exercises: 30h
3.2. Place of classes		D4
3.3. Form of assessment		Lecture - final exam with grade Laboratory exercises - colloquium, practical examination
3.4. Teaching methods		In: exposing (show, film, experience), presenting (informative), problem-atic L: laboratory exercises
3.5. Bibliography	**Required reading**	Libudzisz Z. Kowal K., Żakowska Z., Mikrobiologia techniczna Tom I PWN, 2007 i 2010.
	Further reading	KUNICKI-GOLDFINGER W.: Życie bakterii – Wydawnictwo Nau-kowe PWN, Warszawa 2005

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

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

Lectures:

C1. Familiarizing the student with the microbial diversity of the environment. Understanding the role of microorgan-isms in soil, water, and air. Discussion on the importance of extremophilic bacteria.

Laboratory

Laboratories:

C1 Familiarizing students with methods of identifying and characterizing microorganisms from various environments.

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

Lectures:

1. Fundamentals of microbial ecology.
2. Soil microbiology: Characteristics of soil microorganisms.
3. Microbiological processes of matter transformation. Cycles of carbon, nitrogen, and sulfur.
4. Water microbiology. Microbiological indicators for water quality assessment.
5. Air microbiology. Microbiological indicators for air quality assessment.
6. Occurrence and significance of extremophilic bacteria in biotechnology.
7. Environmental bioremediation and the use of bacterial enzymes in biotechnology.

Laboratories:

1. Isolation of microorganisms from soil.
2. Testing the functional properties of isolated strains (biodegradation of proteins, lipids, gelatin, cellulose, urea).
3. Identification of isolated strains.
4. Comparison of the effectiveness of different strains in the biotechnological process.

4.3 Intended learning outcomes

Code	A student, who passed the course	Relation to learning outcomes
within the scope of **KNOWLEDGE:**		
W01	Knows and understands at an advanced level the cellular processes occurring in micro-organisms at the genetic, biochemical, and physiological levels.	BIO1A_W02
W02	Has advanced knowledge in the physiology and biochemistry of environmental micro-organisms of practical significance.	BIO1A_W04
W03	Knows and understands the most important threats to the natural environment at the population, biocenosis, and ecosystem levels related to its pollution.	BIO1A_W06
within the scope of **ABILITIES:**		
U01	Applies analytical techniques, cultivation methods, and molecular tools used in environmental biotechnology.	BIO1A_U01
U02	Is capable of synthesizing data from the field of environmental biotechnology and the exact and natural sciences, critically evaluates their sources, and draws conclusions.	BIO1A_U07
within the scope of **SOCIAL COMPETENCE:**		
K01	Is ready to initiate actions for the benefit of the natural environment.	BIO1A_K02
K02	Is prepared to initiate actions in the public interest related to promoting achievements in biotechnology in the context of environmental protection..	BIO1A_K05

4.4. Methods of assessment of the intended learning outcomes

Teaching outcomes *(code)*	Method of assessment (+/-)														
	Exam oral /written*			Test*			Project*			Group work*			Others* e.g. standardized test used in e-learning		
	Form of classes			*Form of classes*			*Form of classes*			*Form of classes*			*Form of classes*		
	L	*C*	*...*	*L*	*C*	*...*	*L*	*C*	*...*	*L*	*C*	*...*	*L*	*C*	*...*
W01	+														
W02	+														
W03	+														
U01					+										
U02					+										
K01								+			+				
K02								+			+				

4.5. Criteria of assessment of the intended learning outcomes

Form of classes	Grade	Criterion of assessment
Lecture (L) * (including e-learning)	**3**	51-60% of the maximum number of points from the exam.
	3,5	61-70% of the maximum number of points from the exam.
	4	71-80% of the maximum number of points from the exam.
	4,5	81-90% of the maximum number of points from the exam.
	5	91-100% of the maximum number of points from the exam.
Classes (C)* (including e-learning)	**3**	51-60% of the maximum number of points from the exam.
	3,5	61-70% of the maximum number of points from the exam.
	4	71-80% of the maximum number of points from the exam.
	4,5	81-90% of the maximum number of points from the exam.
	5	91-100% of the maximum number of points from the exam.

5.

6. 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/	***60***	
*Participation in lectures**	***30***	
*Participation in classes, seminars, laboratories**	***30***	
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	***30***	
*Preparation for the lecture**	***10***	
*Preparation for the classes, seminars, laboratories**	***20***	
TOTAL NUMBER OF HOURS	***90***	
ECTS credits for the course of study	***3***	

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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