

Course code:

Plan position:

A. INFORMATION ABOUT THE COURSE

B. Basic information

Name of course	Microbiology
Field of studies	Biotechnology
Level of studies	First cycle
Profile of studies	Academic
Form of studies	Full time
Specialty	Applied biotechnology. Biotechnology in food production.
Unit responsible for the field of studies	Department of Microbiology and Food Technology
Name and academic degree of teacher(s)	Justyna Bauza-Kaszewska, PhD
Introductory courses	-
Introductory requirements	-

C. Semester/week schedule of classes

Semester	Lectures (W)	Auditorium classes (Ć)	Laboratory classes (L)	Project classes (P)	Seminar (S)	Field classes (T)	Number of ECTS points
V/VI			35				7

2. LEARNING OUTCOME

No.	Learning outcomes description	The reference to the learning outcomes of specific field of study	The reference to the learning outcomes for the area
KNOWLEDGE			
W1	A student has a basic knowledge of microbiology application in selected areas of biotechnology; understands the relationships between different natural disciplines	K_W07	P6S_WG
W2	A student has a knowledge concerning ecologic aspects of microbiology and their engagement between biological processes in the nature	K_W08	P6S_WG
W3	A student has a knowledge concerning basic techniques research and instruments using in the area of microbiology at the cellular level	K_W09	P6S_WG
SKILLS			
U1	A student makes observations using a microscope and describes the objects observed.	K_U13	P6S_UW
U2	A student demonstrates the ability to obtain and characterise biological material.	K_U17	P6S_UW

SOCIAL COMPETENCES			
K1	A student is able to cooperate within a group and play different roles in it.	K_K02	P6S_KR
K2	A student is responsible for their own safety and for other group members.	K_K07	P6S_KR

3. TEACHING METHODS

A. Traditional methods used ***

Laboratories

B. Distance learning methods used ***

Synchronous method remote discussion in the form of videoconference, remote presentation of the experiments
Asynchronous method online multimedia presentations (as a complementary method)

4. METHODS OF EXAMINATION

Final test exam, presentation

5. SCOPE

Laboratories	<p>Safety rules in microbiological laboratory. Basic information about the microbial structure and systematics. Sterylization and pasteurization techniques. Methods of isolation and cultivation of microorganisms (pour plate, spread plate methods, colony morphology, pure cultures). Determination of morphological and physiological properties of bacteria and actinobacteria and fungi (molds, yeast). Microscopy observation (simple and complex staining). Determination of biochemical and serological properties of microorganisms. Hydrolysis of carbohydrates. Anaerobic digestions: ethanol, lactic acid, butyric, propionic fermentation. Chemism, products, microorganisms. Oxygen fermentations (citric and acetic - chemistry, product, microorganisms). Application in biotechnology processes. The contribution of bacteria in the transformation of organic and mineral nitrogen compounds (proteolysis, ammonification, nitrification, denitrification - substrates, products, microorganisms). N₂ fixing by free-living and symbiotic bacteria. Ecological and economic importance of microorganisms – food production, antibiotic production, virulence. Assessment of the impact of chemical and physical agents (pesticides, detergents and heavy metals and preservatives) on microorganisms. Assessment of microbiological quality of food products (milk, raw products, and water: coli titer, total number of bacteria, molds and yeast, determination and characterisation of indicator bacteria: <i>Escherichia coli</i>, <i>Streptococcus faecalis</i>, <i>Salmonella</i> spp.</p>
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6. METHODS OF VERIFICATION OF LEARNING OUTCOMES

LEARNING OUTCOME	Form of assessment					
	Oral examination	Written exam	Colloquium	Project	Presentation
W1		x			x	
W2		x				
W3		x				

U1		x				
U2		x				
K1		x			x	
K2		x				

7. LITERATURE

Basic literature	Hogg, S. (2005) Essential Microbiology. Wiley-Blackwell (available on-line) Archunan, G. (2004). Microbiology. Indie: Sarup Book Publishers Pvt. Limited (available on-line)
Supplementary literature	Scientific journals recommended by the teacher.

8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity		Student workload– number of hours
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 1B	35
	Supervision hours	15
Student's own work	Preparation for classes	20
	Reading assignments	25
	Other (preparation for exams, tests, carrying out a project etc)	80
Total student workload		175
Number of ECTS points		7