Nazwa zajęć/*Course title*:	**Mikrobiologia ogólna**	**ECTS**	**6**
Nazwa zajęć w j. angielskim/ *Course title in English*:	**General microbiology**		
Zajęcia dla kierunku studiów/ *Degree program name*:	**Biotechnology**		

Język kursu/ *Course language*: English			Poziom studiów/*Study level:* I		
Typ studiów/ *Form of studies*:	x intramural .. extramural	Status zajęć/ *Course status*	podstawowe/ *Basic* x kierunkowe/ *major*	X obowiązkowe/ *mandatory* do wyboru/ *elective*	Semestr/*Semester:* 3	x semestr zimowy/ *winter semester* semestr letni/ *summer semester*
Rok akademicki/*Academic year:*			**2022/2023**	Numer katalogowy/ *Catalogue number:*	**BBT_BTa-1S-3Z-23**	

Koordynator zajęć/Course coordinator:	**dr inż. Anna Kot**
Prowadzący zajęcia/ *Teachers responsible for the co*urse:	prof. dr hab. Stanisław Błażejak, dr hab. Elżbieta Hać-Szymańczuk, dr hab. Anna Bzducha-Wróbel, dr hab. Iwona Gientka, dr hab. Marek Kieliszek
Założenia, cele i opis zajęć/ *Aims, objectives and description of the course:*	The importance of microorganisms in shaping the natural environment and the possibility of using their biochemical potential Lecture topics: Microbiology as a science. Place of microorganisms in the world of living organisms. Special features of microorganisms. Taxonomic, morphological and physiological characteristics of prokaryotes and eukaryotes. Microorganisms of extreme environments. Conjugation, transduction and transformation as sources of microbial variability. The influence of external environmental factors (physical, chemical, biological) on the growth of microorganisms and the influence of microorganisms on changes in the environment. Mutual relations between microorganisms. Microorganisms as an indicator of environmental safety. Characteristics of the most important saprophytes and pathogens and the routes of their transmission. Methods of microbial inactivation. Benefits and dangers of the metabolic activity of microorganisms. Exercise topics: Nutrients, inoculation technique and methods of microbial cultivation. Morphological, biochemical and enzymatic characteristics of selected strains of bacteria, yeasts and filamentous fungi. The use of staining methods in the diagnosis of microorganisms. Direct, breeding and indicator methods of counting microorganisms. The use of indicator and breeding methods of counting microorganisms in the assessment of the sanitary and hygienic condition of the environment. The influence of chemical factors on the growth of bacteria, yeasts and molds in food. Biological methods of antibiotic potency and vitamin concentration determination.
Formy dydaktyczne, liczba godzin/ *Teaching forms, number of hours*:	a) Lecture number of hours ... 30 b) Laboratory classes number of hours 30
Metody dydaktyczne/*Teaching methods:*	Lecture, experience, discussion, individual work and team work during the pandemic of the possibility of using distance learning
Wymagania formalne i założenia wstępne/ *Formal requirements and prerequisites*	Biochemistry Basic knowledge of the transformation of proteins, fats and carbohydrates and the participation of enzymes in these processes

Efekty uczenia się/*Learning outcomes:*		treść efektu przypisanego do zajęć/*the content of the effect assigned to the course:*	Odniesienie do efektu kierunkowego /*Relation to the course outcomes*	Siła dla ef. kier* /*Impact on the course outcomes* *
Wiedza (absolwent zna i rozumie) /*Knowledge*: *(the graduate knows and understands)*	W1	knows the taxonomic, morphological and physiological criteria of prokaryotes and eukaryotes diagnostics	K_W06 K_W09 K_W10	2 3 3
	W2	understands the specificity of the growth of microorganisms and the impact of external environmental factors on their development	K_W03 K_W07 K_W08 K_W09	2 2 3 3
	W3	understands the relationship between microorganisms	K_W08	3
Umiejętności (absolwent potrafi) /*Skills*: *(the graduate is able to)*	U1	is able to identify the basic groups of microorganisms	K_U01 K_U04 K_U05 K_U06	2 2 2 2

	U2	is able to quantitatively characterize the microbiological quality of the environment	K_U01 K_U04 K_U05 K_U06	2 2 2 2
Kompetencje (absolwent jest gotów do) /Competences: (The graduate is ready to)	K1	is ready to consciously distinguish between the benefits and risks of the presence of microorganisms in the environment	K_K01 K_K02 K_K03	3 3 2

Treści programowe zapewniające uzyskanie efektów uczenia się: */Program contents ensuring the achievement of the learning outcomes:*	The importance of microorganisms in shaping the natural environment and the possibility of using their biochemical potential. Issues such as: Microbiology as a science. Place of microorganisms in the world of living organisms. Special features of microorganisms. Taxonomic, morphological and physiological characteristics of prokaryotes and eukaryotes. Microorganisms of extreme environments. Conjugation, transduction and transformation as sources of microbial variability. The influence of external environmental factors (physical, chemical, biological) on the growth of microorganisms and the influence of microorganisms on changes in the environment. Mutual relations between microorganisms. Microorganisms as an indicator of environmental safety. Characteristics of the most important saprophytes and pathogens and the routes of their transmission. Methods of microbial inactivation. Benefits and dangers of the metabolic activity of microorganisms.
Sposób weryfikacji efektów uczenia się/ *Methods of the verification of the learning outcomes:*	colloquia, written final exam,
Szczegóły dotyczące sposobów weryfikacji i form dokumentacji osiąganych efektów uczenia się /Details on the verification methods and of the ways of documenting the learning outcomes:	Name lists of partial grades from tests together with these tests, the content of examination questions or a written exam along with grades, the possibility of using distance learning when necessary
Elementy i wagi mające wpływ na ocenę końcową/*Elements and weights influencing the final grade:*	Colloquiums during laboratory classes - 25% Practical identification of the most important bacteria and fungi - 25% Exam grade - 50%
Miejsce realizacji zajęć/ *Teaching place:*	Laboratory of the Department of Chemistry; Lecture halls of the Warsaw University of Life Sciences - SGGW, if necessary, online classes (Teams)

Literatura/Literature:

1. . Schlegel H., 2002. Mikrobiologia ogólna, PWN
2. Duszkiewicz-Reinhard W., GrzybowiskiR., SobczakE., 2003. Teoria i ćwiczenia z mikrobiologii ogólnej i technicznej, Wyd. SGGW. 3. Błażejak St., Gientka I., 2010. Wybrane zagadnienia z mikrobiologii żywności, Wyd. SGGW.
4. Singleton P.,2000. Bakterie w biologii, biotechnologii i medycynie, PWN.
5. Bednarski W., Reps A., 2000. Biotechnologia żywności, WNT.

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UWAGI/*ANNOTATIONS*

*) 3 – zaawansowany i szczegółowy, 2 – znaczący, 1 – podstawowy/ *3 – significant and detailed, 2 – considerable, 1 – basic,*

Wskaźniki ilościowe charakteryzujące moduł/przedmiot/*Quantitative summary of the course:*

Szacunkowa sumaryczna liczba godzin pracy studenta (kontaktowych i pracy własnej) niezbędna dla osiągnięcia zakładanych dla zajęć efektów uczenia się - na tej podstawie należy wypełnić pole ECTS /*Estimated number of work hours per student (contact and self-study) essential to achieve the presumed learning outcomes - basis for the calculation of ECTS credits:*	111h
Łączna liczba punktów ECTS, którą student uzyskuje na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich lub innych osób prowadzących zajęcia/ *Total number of ECTS credits accumulated by the student during contact learning:*	2.4 ECTS