GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modern Methods and Apparatus in Microbiology and Biotechnology, PG_00036745		
Field of study	Biotechnology		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Microbiology -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Rafał Piątek	
	Teachers	dr hab. inż. Rafał Piątek dr hab. inż. Marta Wanarska dr hab. inż. Anna Stanisławska-Sachadyn	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						

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	2.0	18.0	50

Subject objectives	The aim of the subject is theoretical and practical familiarization of the student with modern methods used in microbiology.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_K02	The student is aware of the limitations resulting from incomplete knowledge in the field of modern biotechnology. The student is aware of the need to update his knowledge in the field of techniques used in biotechnology.	[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills [SK3] Assessment of ability to organize work
	K6_U04	The student has the ability to use basic microbiological techniques and methods, eg ELISA technique, PCR technique, immunofluorescence microscopy.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information
	K6_W09	The student has theoretical knowledge of the basic analytical and chromatographic techniques used in biotechnology and microbiology. The student knows what practical applications have modern analytical and chromatographic methods in biotechnology and microbiology.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	K6_U06	The student is able to use the basic methods of molecular biology, eg PCR technique, ELISA technique, gel chromatography technique, fluorescence techniques, electrophoretic techniques.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information
	K6_W08	The student understands the limitations of methods and techniques used in modern biotechnology. The student knows the methods and techniques used in medical, industrial and plant biotechnology.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents	Lectures: Physical methods: 1. Analysis of equilibrium processes in biotechnology, microbiology and chemistry of biomacromolecules. 2. DSC microcalorimetry in biotechnology and identification of microorganisms. 3. Fluometric methods in biotechnology and microbiology. 4. Surface plasmon resonance. Methods and techniques based on the use of processes taking place in cells. 5. Fusion proteins, chimeric proteins, fusion peptide domains. 6. Gene silencing methods based on the phenomenon of RNA interference. 7. Gene silencing methods based on the CRISPR technique. 8. DNA sequencing - classical methods. 9. DNA sequencing - NGS methods. Laboratories: 1. GFP protein as a fluorescent marker of cells. 2. Analytical gel chromatography of proteins. 3. PCR technique - DNA amplification. 4. Application of qPCR in the identification of fungi. 5. Basics of using TaqMan probes. 6. Basics of ELISA technique.
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory evaluation.	60.0%	100.0%

Recommended reading	Basic literature	Materials are provided by the teacher.
	Supplementary literature	No need.
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	PCR technique. QPCR technique. Gel chromatography.. Fluorescent cell labeling. ELISA technique. TaqMan technique.
Work placement	Not applicable