



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 2022	Academic year of realisation of subject			2023/2024		
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	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	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. Lucyna Holec-Gąsior dr inż. Paweł Wityk					
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_U06	The student is able to use basic techniques of molecular biology and immunology, e.g. PCR technique, ELISA technique, fluorescence microscopy, molecular filtration.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	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
	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_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_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

Subject contents	<p>Lectures:</p> <p>Physical methods:</p> <ol style="list-style-type: none"> 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. <p>Methods and techniques based on the use of processes taking place in cells.</p> <ol style="list-style-type: none"> 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. <p>Laboratories:</p> <ol style="list-style-type: none"> 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	<table border="1"> <thead> <tr> <th data-bbox="456 1559 794 1585">Subject passing criteria</th> <th data-bbox="799 1559 1137 1585">Passing threshold</th> <th data-bbox="1142 1559 1469 1585">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1592 794 1619">Lecture grade</td> <td data-bbox="799 1592 1137 1619">60.0%</td> <td data-bbox="1142 1592 1469 1619">40.0%</td> </tr> <tr> <td data-bbox="456 1626 794 1653">Laboratory evaluation.</td> <td data-bbox="799 1626 1137 1653">60.0%</td> <td data-bbox="1142 1626 1469 1653">60.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lecture grade	60.0%	40.0%	Laboratory evaluation.	60.0%	60.0%
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Example issues/ example questions/ tasks being completed	PCR technique. QPCR technique. Gel chromatography.. Fluorescent cell labeling. ELISA technique. TaqMan technique.
Work placement	Not applicable

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