



## 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 2024	Academic year of realisation of subject			2025/2026		
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 -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Rafał Piątek				
	Teachers		dr hab. inż. Rafał Piątek				
Lesson types	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						
	eNauczanie source addresses: Moodle ID: 5866 Nowoczesne Metody i Aparatura w Mikrobiologii i Biotechnologii <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5866">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5866</a> Moodle ID: 5866 Nowoczesne Metody i Aparatura w Mikrobiologii i Biotechnologii <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5866">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5866</a>						
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.	[SK1] Assessment of group work skills [SK2] Assessment of progress of work [SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice
	K6_U04	The student has the ability to use basic microbiological techniques and methods, eg ELISA technique, PCR technique, immunofluorescence microscopy.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
	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.	[SW1] Assessment of factual knowledge
	K6_W08	The student knows modern methods used in contemporary industrial, medical and plant biotechnology, e.g. PCR technique and its variants, SPR method, calorimetry, recombinant proteins, CRISPR, siRNA.	[SW1] Assessment of factual knowledge
	K6_U06	The student is able to use basic techniques in the field of molecular biology, electrophoretic techniques, e.g. agarose electrophoresis, fluorescence microscopy, FPLC chromatography, quantitative PCR, cell counting methods.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task

Subject contents	Course content – lecture Lectures:		
	Physical methods: <ol style="list-style-type: none"> <li>1. Analysis of equilibrium processes in biotechnology, microbiology and chemistry of biomacromolecules.</li> <li>2. DSC microcalorimetry in biotechnology and identification of microorganisms.</li> <li>3. Fluometric methods in biotechnology and microbiology.</li> <li>4. Surface plasmon resonance.</li> </ol> Methods and techniques based on the use of processes taking place in cells. <ol style="list-style-type: none"> <li>5. Fusion proteins, chimeric proteins, fusion peptide domains.</li> <li>6. Gene silencing methods based on the phenomenon of RNA interference.</li> <li>7. Gene silencing methods based on the CRISPR technique.</li> <li>8. DNA sequencing - classical methods. 9. DNA sequencing - NGS methods.</li> </ol>		
Prerequisites and co-requisites	Course content – laboratory Laboratories: <ol style="list-style-type: none"> <li>1. GFP protein as a fluorescent marker of cells.</li> <li>2. Analytical gel chromatography of proteins.</li> <li>3. PCR technique - DNA amplification.</li> <li>4. Application of qPCR in the identification of fungi.</li> <li>5. Basics of using TaqMan probes.</li> <li>6. Cell counting methods.</li> </ol>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory evaluation.	60.0%	50.0%
	Lecture evaluation	60.0%	50.0%
Recommended reading	Basic literature	Materials are provided by the teacher.	
	Supplementary literature	No need.	
	eResources addresses		

Example issues/ example questions/ tasks being completed	PCR technique.  QPCR technique.  Gel chromatography..  Fluorescent cell labeling.  ELISA technique.  TaqMan technique.
Practical activities within the subject	Not applicable

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