

**Subject card**

<b>Subject name and code</b>	Food Biotechnology, PG_00081887						
<b>Field of study</b>	Chemistry						
<b>Date of commencement of studies</b>	October 2024	<b>Academic year of realisation of subject</b>			2026/2027		
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>			Obligatory subject group in the field of study		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	3	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	6	<b>ECTS credits</b>			2.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			exam		
<b>Conducting unit</b>	Laboratory of Bionanotechnology -> Department of Molecular Biotechnology -> Faculty of Chemistry -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Joanna Jeżewska-Frańkowiak				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
	Additional information: multimedia presentation, speeches, discussions						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	15		2.0		33.0	50
<b>Subject objectives</b>	familiarizing students with all issues mentioned in the lecture program content; familiarizing students with microorganisms and the basic processes used in food biotechnology familiarizing students with modern methods used in food biotechnology, including the detection of genetically modified food using the PCR method						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.	Documents the results of laboratory tests, prepares them and comments.	[SU2] presentation/project/paper/report [SU5] implementation of a problem task [SU8] observation of student's independent or team work
	[CHEML3_W05] Has basic knowledge of the chemical specialisation studied.	Knows the processes and operations used in food biotechnology.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report
	[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	Plans experiments and properly operates assigned laboratory equipment.	[SU2] presentation/project/paper/report [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
	[CHEML3_K02] Works individually demonstrating initiative and independence of activity and cooperates in a team fulfilling various roles in it.	Takes part in the discussion and prepares a presentation on a selected topic.	[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report
	[CHEML3_W10] Enumerates and describes the basic aspects of the construction, operation and use of measuring apparatus and equipment used in experimental works in the field of chemistry and related sciences.	Knows the principles of techniques for designing, fermenting, isolating, purifying and analyzing products in food biotechnology.	[SW4] test/exam - oral or written [SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report
	[CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.	Operates the equipment independently, selects experimental conditions and verifies their correctness.	[SU1] oral statement/conversation/discussion [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
	[CHEML3_K05] Observes established procedures in laboratory work and is responsible for the safety of her/his and others' work.	Works in accordance with the principles of safety procedures in a biotechnology laboratory.	[SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[CHEML3_K03] Establishes priorities in the right way for the implementation of tasks specified by herself/himself and/or by others.	Prepares reports and studies in a timely manner.	[SK3] text preparation/written work [SK5] implementation of a problem task	
Subject contents	Food biotechnology - classical and molecular, history of biotechnological food products, biotechnological processes and operations, strategy for designing and obtaining a biotechnological product, basic stages of biomass processing, microorganisms in food biotechnology, model microorganisms, microbiological vaccine technologies in food biotechnology, biotechnological products in the food industry and agriculture, dairy industry and milk processing, lactic acid bacteria, homo-hetero lactic fermentation, probiotics as food additives and foodstuffs for special purposes, fermentation of milk and plant and animal raw materials, lactic acid in various fields of industry, the use of microorganisms in the context of ensuring continuity and quality of the food production process, the use of bacteriophages, diagnostics in food biotechnology, transgenic plants and animals, biodiversity protection, seed banking, legal regulations. Selected issues from the list of topics to be developed by students.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	presentation on a selected topic (abstrakt)	0.0%	24.0%
	activity in the discussion	0.0%	16.0%
	written exam	51.0%	60.0%
Recommended reading	<p>Basic literature</p> <p>Bednarski W., Rejs A. (red.) (2001) Biotechnologia żywności, WNT, Warszawa.</p> <p>Gniewosz M., Lipińska E. (red.) (2013) Zastosowanie wybranych drobnoustrojów w biotechnologii żywności. SGGW, Warszawa</p> <p>Querci M., Maretti M., Mazzara M. Badanie próbek żywności na obecność Genetycznie Zmodyfikowanych Organizmów. European Commission Joint Research Centre, World Health Organization, Regional Office for Europe</p> <p>Tengel C., Schüßler P., Setzke E., Balles J., Sprenger-Haußels M. (2001) PCR-Based Detection of Genetically Modified Soybean and Maize in Raw and Highly Processed Foodstuffs, BioTechniques 31:426-429.</p>		

	Supplementary literature	Libudzisz, Z., Kowal, K., Żakowska, Z. Mikrobiologia techniczna., Wydawnictwo naukowe PWN, 2008 Holt J.G., Krieg N.R., Sneath P.H.A., Staley J.T., Williams S.T. (2000) Bergeys Manual of Determinative Bacteriology, 9th ed., Lippincott Williams &Wilkins Glick, R.B., Pasternak, J.J., Patten, Ch.L., Molecular Biotechnology. Principles and applications of Recombinant DNA. 4th edition, ASM Press 2010 Joshi, V.K., Singh, R.S., Food biotechnology. Principles and Practices. 2012, IK International Publishing House Ltd., New Delhi
	eResources addresses	
Example issues/ example questions/ tasks being completed	test and problem questions, diagrams (molecular cloning, obtaining GMO varieties, obtaining a biotechnological product)  student presentations:  biotechnology and genetic engineering raw materials and materials in biotechnology basic operations and processes in biotechnology food biotechnology food ingredient biotechnology fermentation technologies enzymatic modification of food ingredients biotechnological processing of agri-food industry by-products biotechnological methods of food analysis use of selected microorganisms in food biotechnology	
Work placement	Not applicable	

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