



## Subject card

Subject name and code	Food Microbiology, PG_00058617						
Field of study	Biotechnology						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2022/2023		
Education level	second-cycle studies	Subject group			Optional subject group 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	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Chemistry, Technology and Biochemistry of Food -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Edyta Malinowska-Pańczyk					
	Teachers	dr hab. inż. Edyta Malinowska-Pańczyk  Patryk Lichocki  dr inż. Agata Sommer					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	45.0	0.0	0.0	60
	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	60		8.0		32.0	100
Subject objectives	The aim of the lecture is familiarizing of students with food poisoning and spoilage microorganisms, the ways of microbial food contamination and factors preventing the growth of microorganisms as well as with the role of hygiene in food industry.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W07] knows issues related to plant and animal raw materials, their quality, impact on human health, processing technology and chemical and biological hazards resulting from process treatment and storage	The student identifies the microbiota of food raw materials and characterizes its properties. It describes the sources of microbiological contamination of food and indicates the impact of these contaminations on the quality and health safety of products. It presents ways to eliminate microbiological hazards and the role of hygiene in the food industry. Selects methods of microbiological control of production processes and manufactured products.	[SW3] Assessment of knowledge contained in written work and projects
	[K7_U05] is able to apply instrumental methods of quantitative and qualitative analysis and studies on activity of biomolecules, select and apply diagnostic and analytical methods in the field of his/her specialty with particular emphasis on genetic, molecular and microbiological diagnostics and diagnostics based on antigen-antibody reaction	The student is able to determine the number of microorganisms in various food products, identify pathogens present in food and skillfully uses modern tools to determine the hygienic state of a food production plant.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools
	[K7_K01] has a sense of the importance of attitudes such as responsibility, goal-directedness and conscientiousness in one's work	The student understands that a reliable microbiological analysis of food products is an essential element of the work of a biotechnologist.	[SK2] Assessment of progress of work [SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice
Subject contents	<p>LECTURE: Food as an ecological environment for microorganisms. Microbiological degradation of food components. Food poisoning and other food-borne hazards characteristic, pathogenic bacteria and their toxins, mycotoxins produced by some fungi, viruses transmitted via food. Occurrence of pathogenic microorganisms and ways of contamination of food, growth conditions, prevention. Indicator microorganisms characteristics and applications. Microflora of some raw materials and food products. Effect of preservation factors on viability of microorganisms: freezing, chilling, pasteurisation, smoking, high pressure, radiation, acidity, decreased water activity, oxidation-reduction potential, antimicrobial compounds. The basis of predictive microbiology kinds of prognostic models, methods of their construction and possibility of applying. Methods of hygiene estimation in food factories. Probiotics and their meaning for human health.</p> <p>LABORATORY: Microflora of some food products - preparing media and samples for microbiological testing of food, estimation of microbial quality of food. Quick tests used for estimation of freshness of raw milk. Identification of salmonellas and Staphylococcus aureus in food products according to standards. Microbial analysis of water and sewage. Effect of physical and chemical factors on microbial state of water. Detection of antibiotics in food. Applying of bioluminescence method of ATP determination for estimation of hygiene in food factories. Determination of microbiological purity of air. Effect of commercial disinfectants on microorganisms. Isolation of milk fermentative bacteria from dairy products and their characteristics.</p>		
Prerequisites and co-requisites	General biological knowledge. Knowledge from the course of General Microbiology and Industrial Microbiology.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory activity	60.0%	40.0%
	Written exam	60.0%	60.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Malinowska-Pańczyk E., Kołodziejska I. Mikrobiologia żywności. Wydawnictwo PG, Gdańsk, 2011</li> <li>2. Doyle M. P, Beuchat L.R. Food Microbiology. ASM Press, Washington, 2007.</li> <li>3. Żakowska Z., Stobińska H. Mikrobiologia i Higiena w Przemysle Spożywczym. Politechnika Łódzka, Łódź, 2000.</li> <li>4. Zaleski S. Mikrobiologia Żywności Pochodzenia Zwierzęcego. WNT, Warszawa, 1986.</li> </ol>	

	Supplementary literature	1. Libudzisz Z., Kowal K. Mikrobiologia Techniczna. Politechnika Łódzka, Łódź, 2000. 2. Hayes P.R. Food Microbiology and Hygiene. Elsevier Applied Science, London, 1992.
	eResources addresses	Adresy na platformie eNauczenie: Mikrobiologia żywności - Moodle ID: 29226 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29226">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29226</a>
Example issues/ example questions/ tasks being completed	Potential microbial contamination of food. Mycotoxins - factors affecting their generation. Food intoxication and infection.	
Work placement	Not applicable	