GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	FOOD MICROBIOLOGY, PG_00065644		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	Optional subject group Specialty 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	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Chemistry Technology and Biotechnology of Food -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Edyta Malinowska-Pańczyk	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	30.0	0.0	0.0	45

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	45	5.0	40.0	90

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_K01] understands the need to constantly update knowledge based on the state of the art in accordance with the latest scientific literature, improve professional skills and the importance of teamwork	The student understands that food microbiology is a field subject to constant change and innovation, which requires regular follow-up of the latest research and scientific publications. The student is able to cooperate with other professionals within research and project teams, appreciating the importance of the exchange of knowledge and experience in achieving common goals. The student is aware of his/her strengths and weaknesses in the field of food microbiology and strives for continuous improvement through self-education and seeking constructive feedback.	[SK2] Assessment of progress of work [SK1] Assessment of group work skills
[K7_U04] predicts the interaction of biomolecules and biologically active compounds on living organisms and the course of processes involving them based on knowledge in biology, biotechnology and related fields and computer methods of data analysis, modeling and simulation	Student is able to predict how biologically active compounds present in food interact with microorganisms, affecting their growth and metabolism.	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_W05] identifies crucial developments in research, apparatus and technology in biotechnology and related fields	The student is up to date with the latest findings on food microbiology and its impact on human health to identify future research directions in this field. The student is able to indicate and describe modern equipment and analytical methods used in food microbiology.	[SW3] Assessment of knowledge contained in written work and projects
[K7_U05] proposes solutions to technological and scientific problems in biotechnology and related fields using experimental methods and bioinformatics, statistics and specialized databases	The student is able to independently plan and perform experiments to identify and characterise microorganisms in food, taking into account relevant culture and analytical methods. The student is able to identify potential microbiological hazards in food production processes and propose appropriate methods for their monitoring and elimination, using modern analytical and control techniques.	[SU1] Assessment of task fulfilment

Subject contents

Course content – lecture
LECTURE: Food as an ecological environment for microrganisms. 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 microrganisms and ways of contamination of food, growth conditions, prevention. Indicator microrganisms characteristics and applications. Microflora of some raw materials and food products. Effect of preservation factors on viability of microrganisms: 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.

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.

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
Written exam	60.0%	60.0%
Laboratory activity	60.0%	40.0%

Recommended reading	Basic literature	1. Malinowska-Pańczyk E., Kołodziejska I. Mikrobiologia żywności. Wydawnictwo PG, Gdańsk, 2011 2. Doyle M. P, Beuchat L.R. Food Microbiology. ASM Press, Washington, 2007. 3. Żakowska Z., Stobińska H. Mikrobiologia i Higiena w Przemyśle Spożywczym. Politechnika Łódzka, Łódź, 2000. 4. Zaleski S. Mikrobiologia Żywności Pochodzenia Zwierzęcego. WNT, Warszawa, 1986.
	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	
Example issues/ example questions/ tasks being completed	Potential microbial contamination of food. Mycotoxins - factors affecting their generation. Food intoxication and infection.	
Practical activites within the subject	Not applicable	

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