GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	FUNCTIONAL PROPERTIES OF FOOD INGREDIENTS, PG_00065645		
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	blended-learning
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
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. Hanna Staroszczyk	
	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: 15.0

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	10.0	30.0	85

Subject objectives

To familiarize students with the knowledge of the impact of the interaction of major components on the properties and quality of foods and the role of these components in human nutrition, as well as of contamination and food safety.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	The student is able to determine the impact of biomolecules and biologically active compounds on the human body and knows the course of processes involving them based on knowledge of biology, biotechnology and related fields.	[SU2] Assessment of ability to analyse information
[K7_U05] proposes solutions to technological and scientific problems in biotechnology and related fields using experimental methods and bioinformatics, statistics and specialized databases	Student isolates and identifies the basic food ingredients from raw materials of plant and animal origin.	[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
[K7_K02] is aware of the potential risks and opportunities associated with the development of science and technology for the natural environment and society	Student is able to justify the importance of the development of science and technology for the development of food economy.	[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice
[K7_W02] explains the structure and function of biomolecules and the methods and instruments for determining their quantity and activity	The student knows about the effect of enzymes present in food raw materials on the properties and quality of the resulting products. He is able to determine them.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Lecture. Physical, biochemical and chemical interactions of proteins, polysaccharides, lipids and metal ions in terms of storage and processing of food and their effects on the properties and quality of the products. The role of nutrients in human nutrition. Contamination and food safety.

Laboratory. Caramelization of saccharides. Comparison of the lactose content in dairy products. Fractionation of muscle proteins. Proteolytic activity of muscle proteins. Functional properties of proteins. The influence of different technological factors on the ability of gelation of gelatine. Interaction of proteins and polysaccharides in aqueous solutions. Colorants. Study of the kinetics of the oxidation of fats. Analysis of compounds forming in fats during high temperature processing. Qualitative

composition of phospholipids present in plant and animal products. Comparison of the composition of the

fatty acids present in plant and animal phospholipids.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of organic chemistry, general knowledge of the composition and chemical and functional properties of food components.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Laboratory tests</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Midterm colloquium</td><td>60.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>• Red. Sikorski Z.E., Staroszczyk H. Chemia zwynosci. Tom 1. Główne składniki żywności; Tom 2. Biologiczne właściwości składników żywności. PWN. Warszawa 2017.
• Red. Gawecki J. Zywienie człowieka. Podstawy nauki o żywieniu. PWN. Warszawa 2012.</td></tr>
<tr><td>Supplementary literature</td><td>• Eds. Witczak A., Sikorski Z.E. Toxins and other harmful compounds in food. CRC Press. Boca Raton. London. New York. 2017.
• Eds. Sikorski Z.E. Chemical and functional properties of food components. CRC Press. Boca Raton FL 2002.
• Eds. Damodoran S., Parkin K.L. Fennema's Food Chemistry. CRC Press. Boca Raton. London. New York 2017.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>• Methods for assessing the quality and safety of health food.
• Chemical, physical and nutritional properties of lactose.
• Class karmeli and their application.
• The effect of hydration on its gelling properties gelatine way.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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