GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	NUTRITIONAL SCIENCE AND FOOD TOXICOLOGY, PG_00065562		
Field of study	NAUKA O ŻYWIENIU I TOKSYKOLOGIA ŻYWNOŚCI		
Date of commencement of studies	October 2025	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	2	Language of instruction	Polish
Semester of study	3	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	prof. dr hab. inż. Agnieszka Bartoszek-Pączkowska	
	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 lectures aim at familiarizing students with the most recent knowledge in the field of nutrition, including food toxicology. The contents of lectures is based on scientific publications and, if available, textbooks and monographs accessible on the market. The purpose of laboratory exercises is to make students acquaint with analytical procedures and biochemical methods used in the assessment of activity of food components.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 can design the composition of food products and meals serving the specific nutritional purposes with the use of norms and/or dedicated software.	[SK5] Ocena umiejętności rozwiązywania problemów występujących w praktyce [SK4] Ocena umiejętności komunikacji, w tym poprawności językowej
[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 capable of competent and critical qualitative evaluation of food items, including their health impact.	[SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu
[K7_U08] prepares documentation of experiments and technological processes using professional terminology in biotechnology and related fields	Student knows how to perform quantitative determinations and to measure parameters based on which is able to reason about the impact of consumed food items on consumer’s organism. Student understands how to make use of dietary recommendations to design meals with the use of dedicated software (e.g. program DIETA6) and dietary norms (e.g. PZH publications).	[SU4] Ocena umiejętności korzystania z metod i narzędzi [SU2] Ocena umiejętności analizy informacji [SU1] Ocena realizacji zadania
[K7_W06] recognizes the technological and scientific, as well as organizational and economic opportunities and limitations in biotechnology and related fields	Student learns about the evolutionary conditions deciding about nutritional requirements and the role of genome in food absorption and food impact on microbiota and epigenome. Student understands the mechanisms behind digestion and absorption of dietary ingredients and the deregulation of this processes by toxic compounds.	[SW1] Ocena wiedzy faktograficznej

Subject contents	Course content – lecture The importance of food in the evolutionary context Food vs. human genome; nutrigenetics and nutrigenomics. examples of mechanisms Nutrients and the function of human genome: the impact of food components on epigenetic regulation of gene expression, exemplary mechanisms Digestion and absorption of food: interactions between parts of dietary tract and individual food components, the role of microbiome Food toxicology: basic mechanisms of detoxification of xenobiotics, the examples of substances triggering detoxification systems, key mechanisms, interactions between food components and medicines The organisms requirements for nutrients; basic definitions, energetic balance, obesity epidemics The significance of food components: water and proteins, physiological functions, requirements and health risks The significance of food components: carbohydrates, dietary functions, requirements The significance of food components: lipids, absorption and distribution in human organism, the fate of cholesterol, health risks, fat tissue as a regulator of metabolism The significance of food components: lipids, types of lipids, physiological functions, requirements, nutrigenomic role of antioxidant vitamins and vitamin D, dietary supplements The significance of food components: vitamins, physiological functions, requirements Carcinogenic and anticarcinogenic food components Food as an element of medicinal therapies
Prerequisites and co-requisites	Accomplished courses of Organic chemistry and Biochemistry

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lectures	50.0%	60.0%
Laboratories	100.0%	40.0%

Recommended reading Basic literature	"Żywienie człowieka" Tom 1. Podstawy Nauki o Żywieniu, pod redakcją Jana Gawędzkiego, PWN 2022. "Norma Żywienia dla Populacji Polski i ich zastosowanie" pod redakcją Mirosława Jarosza, Ewy Rychlik, Katarzyny Stoś, i Jadwigi Charzewskiej, Narodowego Instytutu Zdrowia Publicznego Państwowego Zakładu Higieny (NIZP-PZH), 2020
Supplementary literature	Deep Nutrition, C. Shanahan, L.Shanahan, 2018 Burn, H. Pontzer, W, 2021 Spoon-Fed, T. Spector, 2021 Food as Medicine online access from Center of Food as Medicine, 2023
eResources addresses	

Example issues/ example questions/ tasks being completed	1. What embraces the term nutrigenetics and nutrigenomics? Give the example of food components which according to current research influences expression of numerous genes and thus has a great nutrigenomic impact. 2. What nutritional and non-nutritional roles plays dietary tract? Which mechanisms of communication between alimentary tract and nervous system regulates our nutritional needs? 3. What is the definition of food and what kind of its components can be listed? What processes are called digestion and which describe further stages of food absorption and what the latter provide organism with?
Practical activites within the subject	Not applicable

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