GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Nutritional Science and Food Toxicology, PG_00058620
Field of study	Biotechnology

Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
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	2	Language of instruction	Polish Polish
Semester of study	3	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Department of Chemistry, Technology and Biochemistry of Food -> Faculty of Chemistry

Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Agnieszka Bartoszek-Pączkowska
	Teachers	prof. dr hab. inż. Agnieszka Bartoszek-Pączkowska dr hab. inż. Dorota Martysiak-Żurowska dr inż. Izabela Koss-Mikołajczyk

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	15.0	75
	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	75	8.0	42.0	125

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. Seminars are meant to complement lectures and are based on most recent scientific publications recommended by the lecturer. 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 limitations and the necessity of continuous development of knowledge and technology; understands the need for education and constant training	Student is aware of changes in dietary recommendations as a result of the scientific progress.	[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice
	[K7_W05] knows the basis of civilization diseases, including cancer, and chemical structures and properties of various groups of active substances, including anticancer drugs	Student is capable of competent and critical qualitative evaluation of food items, including their health impact. Student can design the composition of food products and meals serving the specific nutritional purposes with the use of norms and/or dedicated software	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
	[K7_U04] is able to predict potential properties of biomolecules and biologically active compounds on the basis of knowledge of their chemical structure and apply methods of molecular modelling of biomolecules	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.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	[K7_U09] is able to design experiments and analyze experimental results, is able to prepare and present papers, reports, documentation of experiments, technological processes using correct scientific and specialist terminology, and to prepare a correct bibliography	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).	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	[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	Student understands the impact of processing on the nutritional value of food products. Student is aware the health risks associated with the improper food processing technologies.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge

Subject contents	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	The knowledge acquired during courses in organic, physical and analytical chemistry as well as in biochemistry and biotechnology.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tests, reports, exam	50.0%	100.0%

Recommended reading	Basic literature	"Żywienie człowieka" Tom 1. Podstawy Nauki o Żywieniu, edited by Jana Gawędzkiego, PWN 2022.
		"Norma Żywienia dla Populacji Polski i ich zastosowanie" edited by Mirosława Jarosza, Ewy Rychlik, Katarzyny Stoś, i Jadwigi Charzewskiej, Narodowego Instytutu Zdrowia Publicznego Państwowego Zakładu Higieny (NIZP-PZH), 2020
	Supplementary literature	DNA Żywienia, C. Shanahan, L.Shanahan, Publisher Galaktyka, 2019
		Spalaj Się. Jak Naprawdę Spalamy Kalorie, H. Pontzer, Publisher Zysk i ska, 2022
		Podano do stołu, T. Spector, Publisher Marginesy, 2022
		Food as Medicine accesible from portal Center of Food as Medicine, 2023
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. Czym zajmuje się nutrigenetyka, a czym nutrigenomika? Podaj i **omów** przykład substancji obecnej w żywności, która w świetle obecnych badań naukowych ma wpływ na ekspresję tak wielu genów, że można ją uznać za wykazującą wysoki potencjał nutrigenomiczny? 2. Jakie istotne żywieniowe i pozażywieniowe role pełni układ pokarmowy? Jakie mechanizmy komunikacji pomiędzy układem pokarmowym a układem nerwowym regulują to co i w jakich ilościach jemy? 3. Jak definiowany jest pokarm i jakie jego składniki można wyróżnić? Jakie procesy określane są mianem tra-wienia, a jakie dalszego metabolizmu substancji odżywczych i czego mają one dostarczać organizmowi.
Work placement	Not applicable