GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Analytics in food industry, PG_00060778		
Field of study	Chemical Technology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
Education level	first-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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Dorota Martysiak-Żurowska	
	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	25.0	75

Subject objectives

The aim of the course is to introduce students to modern analytical methods used in the food industry for assessing food quality, safety and authenticity. The lectures cover instrumental techniques applied to the determination of nutrients, food additives, chemical and biological contaminants, as well as the migration of substances from packaging materials. Additional topics include green chemistry, product stability and relevant regulatory requirements. The course is supplemented with practical examples and case studies from the food industry.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W03] Has knowledge in the field of chemical technology and environmental protection, including sustainable development, green chemistry, modern energy sources and the principles of minimizing the impact of industrial processes on the environment and work safety	understands the principles of green chemistry and methods for reducing the environmental impact of analytical and technological processes used in the food industry. The student recognizes the importance of sustainable development and workplace safety in food quality control laboratories.	[SW1] Assessment of factual knowledge
[K6_U07] Is able to select and justify a chemical and technological production concept, assess the quality of products and analyse and evaluate existing technical solutions.	can select appropriate analytical methods for assessing the quality and safety of food products and justify the choice of measurement techniques depending on the type of sample.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
[K6_U06] Recognizes the relationships between technological issues and their impact on the environment, taking into account the principles of sustainable development, systemic and non-technical aspects, and occupational health and safety principles	understands the environmental impact of analytical and technological processes used in the food industry and can identify solutions consistent with sustainable development principles and workplace safety.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>Course content – lecture
The lectures cover key analytical methods used in the food industry, including the characteristics of food raw materials and components, instrumental techniques applied in assessing food quality, safety and authenticity, and the fundamentals of method validation. Additional topics include the detection of chemical and biological contaminants, evaluation of product stability, migration of substances from packaging materials, and the role of green chemistry in food analysis. Selected issues may be complemented with practical examples from food quality control laboratories and industrial practice.

Course content – laboratory
The laboratory classes focus on the practical application of analytical techniques used in food quality control. Students prepare samples, perform instrumental measurements, analyse the composition of food products and learn the basics of method validation. The exercises may include the determination of nutrients, food additives and selected contaminants, as well as the evaluation of substance migration from packaging materials. An integral part of the classes is the processing of analytical data and preparation of laboratory reports.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>The student should have basic knowledge of analytical, organic and physical chemistry, including qualitative and quantitative analytical methods and safe laboratory practices.</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 grade (tests and reports)</td><td>60.0%</td><td>60.0%</td></tr>
<tr><td>Exam</td><td>60.0%</td><td>40.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Zdzisław E. Sikorski, Szkodliwe substancje w żywności. Pochodzenie, działanie, zagrożenia zdrowotne, Wydawnictwo Naukowe PWN

Bogusław Buszewski, Irena Staneczko-Baranowska, Bioanalityka Tom 1-2, Wydawnictwo Naukowe PWN

Walenty Szczepaniak, Metody instrumentalne w analizie chemicznej, Wydawnictwo Naukowe PWN</td></tr>
<tr><td>Supplementary literature</td><td>Valdés A, Álvarez-Rivera G, Socas-Rodríguez B, Herrero M, Ibáñez E, Cifuentes A. Foodomics: Analytical Opportunities and Challenges. Anal Chem. 2022 Jan 11;94(1):366-381. doi: 10.1021/acs.analchem.1c04678.

Arunkumar Elumalai, Venkatachalapathy Natarajan, Advancements in analytical technologies for ensuring food quality and authentication: A comprehensive review, Journal of Food Composition and Analysis, Volume 139, 2025, 107075,https://doi.org/10.1016/j.jfca.2024.107075.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Examples of analytical techniques used to assess the quality and safety of food products.
Discussion of challenges related to the analysis of nutrients, food additives and contaminants.
Consideration of instrumental methods applied in food authenticity testing and detection of food adulteration.
Case studies involving substance migration from packaging and evaluation of food product stability.
Tasks focused on interpreting analytical data and assessing method performance parameters in relation to regulatory requirements.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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