University of Gdańsk

Subject card

Subject name and code	Advanced chemical analysis in food safety, PG_00165805		
Field of study	Chemistry		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2027/2028
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study 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	5	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit	Department of Environmental Analysis -> Faculty of Chemistry -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Łukasz Haliński	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	45.0	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	1.0	14.0	60

Subject objectives

1. To familiarize students with the basic techniques of advanced food analytics.
2. To present the capabilities and limitations of the various techniques.
3. To introduce students to the basics of assessing the reliability of analytical measurements.
4. To introduce students to the methodology of developing and optimizing the extraction process.
5. To develop the ability to develop analytical procedures independently.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEML3_U04] Plans and performs simple chemical experiments and analyses the results obtained.	The student develops and performs an experiment on the basis of data on the properties of the substances to be determined.	[SU4] test/exam - oral or written
[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	The student is able to propose a methodology for the determination of a substance on the basis of its physical and chemical properties.	[SU4] test/exam - oral or written [SU6] demonstration of practical skills
[CHEML3_W03] Explains the relationship between the structure of matter and its observed properties.	The student is able to propose a methodology for the determination of a substance on the basis of its physical and chemical properties.	[SW4] test/exam - oral or written
[CHEML3_K05] Observes established procedures in laboratory work and is responsible for the safety of her/his and others' work.	The student can describe the application of a specific analytical procedure.	[SK4] test/exam - oral or written
[CHEML3_W04] Characterises the basic methods of chemical compound analysis.	The student describes and characterizes various analytical methods used in food analysis.	[SW4] test/exam - oral or written
[CHEML3_W11] Defines the basic principles of occupational health and safety and ergonomics necessary for the proper organization of learning.	The student knows and describes the principles of safe work with measuring apparatus.	[SW4] test/exam - oral or written
[CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.	The student can propose a specific analytical procedure for compounds present in food.	[SU4] test/exam - oral or written
[CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.	The student prepares a report on the chemical analyses performed.	[SU2] presentation/project/paper/ report
[CHEML3_K02] Works individually demonstrating initiative and independence of activity and cooperates in a team fulfilling various roles in it.	The student demonstrates the ability to work analytically independently and in a team.	[SK6] demonstration of practical skills

Subject contents

Fundamentals of food analytics. Limitations of analytical techniques and methods. Development and optimization of extraction methods. Quality assessment of analytical results. Chromatographic, spectroscopic and hyphenated techniques. Rapid and targeted techniques. Mass spectrometry as a basic tool for the identification of organic compounds. Validation of analytical methods. Examples of application of analytical techniques and methods in advanced food analytics.

Prerequisites and co-requisites

Completed courses: general biology, general chemistry, organic chemistry, analytical chemistry.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Witten exam (120 min)	51.0%	100.0%

Recommended reading

Basic literature	Witkiewicz Z. Podstawy chromatografii, Wydawnictwa Naukowo-Techniczne, Warszawa, 2005. Namieśnik i in. Przygotowanie próbek środowiskowych do analizy, WNT, W-wa, 2000. Kiemle DJ., Silverstein RM., Webster FX. pektroskopowe metody identyfikacji związków organicznych. PWN, Warszawa, 2007.
Supplementary literature	Stepnowski P., Synak E., Szafranek B., Kaczyński Z. Techniki separacyjne. Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, 2010.
eResources addresses	

Example issues/ example questions/ tasks being completed

Work placement

Not applicable