GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Analytical Chemistry, PG_00054878		
Field of study	Biotechnology		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Żaneta Polkowska	
	Teachers	prof. dr hab. inż. Żaneta Polkowska dr inż. Tomasz Dymerski dr hab. inż. Mariusz Marć dr inż. Natalia Jatkowska dr inż. Małgorzata Rutkowska dr inż. Bartłomiej Cieślik dr inż. Weronika Hewelt-Belka Paweł Hać prof. dr hab. inż. Piotr Konieczka	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	60.0	0.0	0.0	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	15.0	60.0	150

Subject objectives

Acquire the necessary knowledge in the field of analytical chemistry, including basic steps of the analytical process, the principles of sampling and preparation of samples for analysis and the theoretical analysis of selected methods of classical and instrumental.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W02	Has an ordered knowledge of analytical chemistry	[SW1] Assessment of factual knowledge
K6_U09	He can use analytical techniques	[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
K6_W09	He can use basic concepts in the field of analytical techniques	[SW1] Assessment of factual knowledge

Subject contents	Program content: Subject of analytical chemistry. Types of analytical information, criteria for division and selection of methods. Basic stages of the analytical process. Collection and preparation of a representative analytical sample. Rules for correct weighing. Principles of organization and safe work in an analytical laboratory. Theoretical and methodological foundations of classical quantitative analysis. Alkacymetry, redoxometry, complexometry, precipitation titration, gravimetric analysis. Assessment of the validity of the results. Types of errors, uncertainty of the result, correct recording of the result. Liquid chromatography - HPLC basics, Ion chromatography (IC) in water analysis, SAE absorption and emission spectroscopy - basics, Gas chromatography (GC) - basics, GC-D Detectors in gas chromatography, PTR-MS technique: analysis of acetone and acetonitrile content in exhaled air.
Prerequisites and co-requisites	Knowledge of some reactions and physicochemical phenomena

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterm colloquium	60.0%	10.0%
Practical exercise	100.0%	50.0%
Written exam	60.0%	30.0%
Oral exam	60.0%	10.0%

Recommended reading

Basic literature	Wykaz literatury podstawowej: 1. J. Minczewski, Z. Marczenko, Chemia analityczna, PWN, Warszawa 1985 2. A. Hulanicki, Reakcje kwasów i zasad w chemii analitycznej, PWN, Warszawa 1992 wyd. 3 zm. 3. B. Bobrański, Analiza ilościowa związków organicznych. PWN, Warszawa 1979. 4. K. Eckschlager, Błędy w analizie chemicznej, PWN, Warszawa 1974. 5. Z. Galus, Ćwiczenia rachunkowe z chemii analitycznej, PWN, Warszawa 1972. 6. A. Cygański, Chemiczne metody analizy ilościowej, WNT, Warszawa 1992. 7. K. Danzer, E. Than, D. Moloch, Analityka, WNT, Warszawa 1980. 8. J. Czermiński i współautorzy, Metody statystyczne dla chemików, PWN, Warszawa 1986.
Supplementary literature	Wykaz literatury uzupełniającej: 1. Podstawy analityki [red. J. Łukasiak], Akademia Medyczna w Gdańsku, Gdańsk 1990. 2. G.W. Ewing, Metody instrumentalne w analizie chemicznej, PWN, Warszawa 1980. 3. T.H. Gouw, Nowoczesne metody instrumentalne analizy, WNT, Warszawa 1976. 4. J. Kryściak, Chemiczna analiza instrumentalna, PZWL, Warszawa 1989. 5. Metody instrumentalne w kontroli zanieczyszczeń środowiska [red. J. Namieśnik], Wyd. Pol.Gdańskiej, Gdańsk 1992 6. H.W. Willard, L.L. Merritt, J.A. Dean, F.A. Settle, Instrumental Methods of Analysis, Wadsworth,. Belmont 1981. 7. Fizykochemiczne metody kontroli zanieczyszczeń środowiska, [red] J. Namieśnik i Z. Jamrógiewicz, WN-T, Warszawa 1998. 8. M. Jarosz, E. Malinowska, Pracownia chemiczna analizy instrumentalnej, Wydawn. Szkolne i Pedagogiczne, Warszawa 1994 17. D.A. Skoog, D.M. West, F.J. Holler, S.R. Crouch, Podstawy chemii analitycznej, PWN, Warszawa 2006
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Analysis of weight: Factors affecting the solubility and purity of the deposits, the optimal conditions for the precipitation of sludge, sludge separation. Sources of error and methods of avoiding them. Precipitation from a homogeneous solution. Characteristics and range of applications of weight. Acid-base titration: Distribution methods. General equation of titration curves alkacymetrycznego, case titration of a strong acid. Titration in non-aqueous environments. Visual indicators endpoint. Redoxometry: Distribution of methods, analytical reactions, equations of the titration curves, the indicators, the impact of various factors on the reaction. Titration of precipitation: Equations of the titration curve. Adsorption ratios endpoint. Complexometry: Equations titration curves. Indicators. Kompleksony and kompleksonometria.
Work placement	Not applicable