GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Instrumental Analysis, PG_00053082		
Field of study	Chemistry		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2024/2025
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	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Piotr Konieczka	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	30

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	30	2.0	18.0	50

Subject objectives

The analytical process, instrumental analytical methods (primary and absolute methods, indirect methods); theoretical basis and description of selected instrumental analytical techniques (spectroscopic techniques; chromatographic techniques and related, hyphenated techniques).

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U07	can make accurate and precise measurement in the analytical laboratory	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
K6_W03	has a basic knowledge of trends in the area of theoretical chemistry and is familiar with a number of engineering disciplines related to theoretical chemistry	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_U08] is capable to design and carry out the experiment which is necessary to confirm a given hypothesis and sees wider context, often beyond-technical, of the analysed phenomena	can design and conduct an experiment	[SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>Chromatographic techniques:

-quantitative analysis in GC

-chromatographic detectors - the principle of operation and the area of use

- liquid chromatography

-mass spectrometry in chromatography

Hyphenated techniques -use in analytics

Extraction techniques as a step of sample preaparation</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of analytical chemistry on the theory of instrumental methods of analysis.</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>test</td><td>60.0%</td><td>50.0%</td></tr><tr><td>participation in the lectures</td><td>0.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>1.A. Cygański, Metody spektroskopowe w chemii analitycznej, WNT, Warszawa, 2002.

2. Z. Witkiewicz, J. Hepter, Chromatografia gazowa, WNT, Warszawa, 2009.

3. W. Szczepaniak, Metody instrumentalne w analizie chemicznej, PWN, Warszawa 2008.</td></tr><tr><td>Supplementary literature</td><td>1. K. Kuklińska, A.Melnyk, B. Zabiegała, Spektrometr mas jako detektor chromatograficzny, połączenie GC-MS, Wydawnictwo PG, Gdańsk 2014</td></tr><tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1 Give a definition of BTV. Explain how this parameter can be used in describing the sorption strength of a solid sorbent?

2. define the parameters that characterise the sorption media used for sampling analytes from the gas phase.

3. explain the principle of two-stage thermal desorption.

4. how (theoretically) using the gas chromatography technique can the BTV breakthrough volume be determined for the system: selected compound and adsorbent

5 Describe the principle of operation of a Split/Splitless dispenser operating in the splitless mode.

6. describe the phenomenon of discrimination. How it affects the quality of the chromatographic determination results obtained.

7) What is a typical CV-AAS instrument made up of?

8) State the basic parameters (descriptively) characterising the CV-AAS technique.

9) What are the physical and chemical properties of mercury used in the CV-AAS technique?

10. list the advantages of the CV-AAS technique.

Translated with www.DeepL.com/Translator (free version)</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
</table>