



Subject card

Subject name and code	Instrumental Analysis, PG_00054880						
Field of study	Biotechnology						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2022/2023		
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. 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	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	Analytical process, instrumental analytical methods (primary and absolute methods, indirect methods); theoretical basis and description of selected instrumental analytical techniques (spectroscopic techniques; chromatographic and related techniques, combined techniques).						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_U09	can take accurate and precise measurements in the analytical laboratory			[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information		
	K6_W09	has knowledge of the relevant spectroscopic and chromatographic techniques, has knowledge in which areas the different techniques can be applied			[SW1] Assessment of factual knowledge		
	K6_W02	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			[SW1] Assessment of factual knowledge		
Subject contents	Chromatographic techniques: - quantitative analysis in GC - chromatographic detectors - principle of operation and area of application - liquid chromatography - mass spectrometry in chromatography Combined techniques - application in analysis Extraction techniques as a step in the preparation of samples for analysis						
Prerequisites and co-requisites	Basic knowledge in analytical chemistry of the theory of instrumental analytical methods.						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	presence at classess	0.0%			50.0%		
	test	60.0%			50.0%		

Recommended reading	Basic literature	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.
	Supplementary literature	K. Kuklińska, A. Melnyk, B. Zabiegała, Spektrometr mas jako detektor chromatograficzny, połączenie GC-MS, Wydawnictwo PG, Gdańsk 2014
	eResources addresses	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 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 a system: selected compound and adsorbent 5. Describe the principle of operation of a Split/Splitless dispenser operating in a splitless mode. 6. Describe the phenomenon of discrimination. How it affects the quality of the chromatographic determination results obtained. 7. What components does a typical CV-AAS instrument consist 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. 	
Work placement	Not applicable	