

Subject card

Subject name and code	Practical Mass Spectroscopy, PG_00188329						
Field of study	Praktyczna spektrometria mas (Ćw.laboratoryjne)						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2028/2029		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study 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. Monika Paszkiewicz				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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		5.0		15.0	50
Subject objectives	The aim of the course is to familiarise students with: the structure and principles of operation of modern mass spectrometers, with particular emphasis on the possibilities and limitations of their use in forensic analysis; combined techniques, including liquid and gas chromatography coupled with mass spectrometry, used to identify selected compounds; the basic principles of interpreting mass spectra of selected classes of organic compounds using various ionisation techniques, the practical application of mass spectrometry and combined techniques in forensic analysis, including the preparation of reports and interpretation of data.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[AKRL3_W02] The graduate knows and understands, at an advanced level, the analytical methods used in forensic laboratories, in particular spectroscopic, chromatographic and electroanalytical methods.	1. The student knows the structure of modern mass spectrometers. 2. The student knows and understands the principles of operation of modern mass spectrometers, ionisation techniques, and methods of data collection and interpretation used in forensic laboratories. 3. The student knows the theory of the fragmentation process.	[SW4] test/egzamin - ustny lub pisemny
	[AKRL3_K06] The graduate is ready to follow occupational health and safety regulations in the laboratory and care for the safety of themselves and others.	1. The student is able to apply health and safety rules in the laboratory and ensure their own safety and that of others. 2. The student is able to recognise the hazards associated with working with mass spectrometers and chemicals and minimise the risks.	[SK8] obserwacja samodzielnej lub zespołowej pracy studenta
	[AKRL3_U03] The graduate is able to perform analyses using instrumental methods (spectroscopy, chromatography, microbiological tests) and interpret research results.	1. The student is able to perform analyses using combined techniques in accordance with laboratory procedures. 2. The student is able to interpret research results and formulate analytical conclusions.	[SU2] prezentacja/projekt/referat/ raport [SU8] obserwacja samodzielnej lub zespołowej pracy studenta
	[AKRL3_U02] The graduate can plan and organize individual and team work and collaborate with others in team projects (including interdisciplinary teams).	1. The student is able to plan and organise work in a team. 2. The student is able to work individually and cooperate with other team members during the implementation of interdisciplinary tasks.	[SU2] prezentacja/projekt/referat/ raport
	[AKRL3_K04] The graduate is ready to cooperate with representatives of other fields—law, medicine, biology—within forensic expertise.	1. The student is able to cooperate with representatives of law, medicine and biology in the context of forensic expertise. 2. The student is able to interpret the results of analyses in the context of the requirements of various fields of science.	[SK2] prezentacja/projekt/referat/ raport
Subject contents	Practical familiarisation with the construction and operation of a mass spectrometer and the principles of good laboratory practice. Performing analyses using various ionisation methods and selecting the appropriate method depending on the structure and chemical properties of the compound. Practical application of coupled techniques (GC-MS and LC-MS) in forensic analysis, including sample preparation, qualitative and quantitative analysis, and interpretation of results. Use of specialised software for visualisation, analysis and comparison of mass spectra with databases, and identification of compounds in real samples.		
Prerequisites and co-requisites	General chemistry, organic chemistry, inorganic chemistry, analytical chemistry. Knowledge of the fundamentals of general chemistry, organic chemistry and instrumental analysis methods.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Report	51.0%	30.0%
	Partial tests covering topics discussed during laboratory classes	51.0%	70.0%
Recommended reading	Basic literature	R. A. W. Johnstone, M. E. Rose, Mass spectrometry, PWN, Warsaw 2001. R. M. Silverstein, F. X. Webster, D. J. Kiemle, Spectroscopic methods for the identification of organic compounds, PWN, Warsaw 2007 W. Zieliński, A. Rajca (eds.), Spectroscopic methods and their application to identification of organic compounds, WNT, Warsaw 1995	
	Supplementary literature	eds. by P. Suder and J. Silberring, Mass Spectrometry, WUJ, Krakow 2006	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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