

Subject card

Subject name and code	Practical Mass Spectroscopy, PG_00188327						
Field of study	Praktyczna spektrometria mas (Ćw.audytoryjne)						
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		1.0		
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	15.0	0.0	0.0	0.0	15
	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	15		2.0		8.0	25
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_U01] The graduate is able to identify, analyse and solve complex research problems in chemistry and forensic science by selecting appropriate methods and information sources.	1. The student is able to solve complex research problems concerning the identification of chemical compounds using mass spectrometry techniques. 2. The student is able to independently select the appropriate analytical technique to solve a research problem.	[SU4] test/egzamin - ustny lub pisemny
	[AKRL3_K05] The graduate is ready to promote science and raise social awareness in the field of forensic analytics.	1. The student is able to present issues related to the application of mass spectrometry in forensics in a reliable and communicative manner. 2. The student demonstrates a willingness to promote the importance of modern analytical methods for the development of forensic research and social education.	[SK8] obserwacja samodzielnej lub zespołowej pracy studenta
	[AKRL3_W03] The graduate knows and understands the structure and chemical properties of compounds relevant in forensic examinations.	1. The student knows the structure and chemical properties of compounds relevant to forensic analysis. 2. The student distinguishes and characterises the types of ions found in mass spectrometry. 3. The student understands the principles of selecting the appropriate analytical technique based on the structure and chemical properties of compounds relevant to forensic investigations.	[SW4] test/egzamin - ustny lub pisemny
	[AKRL3_U06] The graduate is able to use specialised software and advanced ICT techniques to develop and visualise experimental data.	1. The student is able to use specialised software for advanced processing, visualisation and analysis of spectrometric data. 2. The student uses information and communication techniques to compile results and present data obtained in research conducted using mass spectrometry.	[SU6] demonstracja umiejętności praktycznych
	[AKRL3_W07] The graduate knows and understands the principles of quality assurance in analytical and forensic laboratories.	1. The student knows and understands the principles of quality assurance and control systems in analytical laboratories using mass spectrometry. 2. The student knows the requirements for method validation and uncertainty assessment in forensic practice.	[SW4] test/egzamin - ustny lub pisemny
Subject contents	Theory of the fragmentation process and fragmentation pathways of major classes of compounds. Practical applications of mass spectrometry in forensic analysis, including the identification of drugs, toxic substances, designer drugs, explosives and trace evidence. Interpretation of mass spectra of selected compounds.		
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
	A test covering topics discussed during classes	51.0%	100.0%
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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