

Subject card

Subject name and code	Spectroscopic Methods for Determining Chemical Structures, PG_00188918						
Field of study	Spektroskopowe metody wyznaczania struktur chemicznych (Ćw.audytoryjne)						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Laboratory of Structural Research of Biopolymers -> Department of Organic Chemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Emilia Sikorska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	30.0	0.0	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	Learning to interpret the spectra of organic compounds, taking into account the advantages and limitations of each technique when used individually or in combination. The goal is to equip students with the skills to read and analyze spectroscopic data and to develop the ability to logically integrate information from multiple spectroscopic methods in practical chemical research.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[AKRL3_U02] The graduate can plan and organize individual and team work and collaborate with others in team projects (including interdisciplinary teams).		The student is able to plan both individual and team work, allocate tasks, organize the problem-solving process, and collaborate effectively within a group, particularly when addressing forensic cases that require an interdisciplinary approach.		[SU1] wypowiedź ustna/rozmowa/ dyskusja [SU4] test/egzamin - ustny lub pisemny [SU5] realizacja zadania problemowego [SU8] obserwacja samodzielnej lub zespołowej pracy studenta		
	[AKRL3_W03] The graduate knows and understands the structure and chemical properties of compounds relevant in forensic examinations.		The student understands the structure and chemical properties of compounds relevant to forensic research, such as drugs, explosives, dyes, toxins, and biological traces, and can explain how spectroscopic methods enable their identification and differentiation in evidence.		[SW4] test/egzamin - ustny lub pisemny [SW1] wypowiedź ustna/rozmowa/ dyskusja [SW5] realizacja zadania problemowego		
Subject contents	Methods for interpreting spectroscopic spectra will be discussed, with particular emphasis on practical applications in the structural analysis of molecules with masses up to approximately 300Da. Students will learn to analyze spectra to identify functional groups and structural elements, assess the likelihood of multiple possible structures, and verify the most probable one. The course will also develop the ability to present spectral interpretations clearly, consistently, and in accordance with scientific standards. Particular attention will be given to the advantages and limitations of individual spectroscopic methods and their complementarity. Practical aspects of interpretation will also be addressed, including the identification of isomers and compounds with similar masses, critical evaluation of results, hypothesis testing, and avoidance of common interpretational errors.						

Prerequisites and co-requisites	Completed basic course in organic chemistry		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	100	51.0%	100.0%
Recommended reading	Basic literature	1. Collectively edited W. Zieliński i A. Rajca: Spectroscopic methods and their application in the identification of organic compounds, WNT Warszawa 1995, 2000. 2. R.M. Silverstein, F.X. Webster, D.J. Kiemle: Spectroscopic identification of organic compounds, PWN Warszawa 2007. 3. B. Wojtkowiak, Martial Chabanel: Molecular spectroscopy, PWN Warszawa 1984. 4. Z. Kęcki: Basics of molecular spectroscopy, PWN Warszawa 1998. 5. W. Danikiewicz: Mass Spectrometry: Basics and Applications, PWN Warszawa 2020.	
	Supplementary literature	1. H. Barańska, A. Łabudzińska, J. Terpiński: Laser Raman Spectrometry, Analytical Applications, PWN, Warszawa 1981. 2. A. S. Płaziak: Mass spectrometry of organic compounds, Adam Mickiewicz University Scientific Publishing House Poznań 1997. 3. R.A.W. Johnstone, M.E. Rose: Mass spectrometry, PWN Warszawa 2001 5. S. Paszyc. Basics of photochemistry, PWN Warszawa 1992. 6. I.Z. Siemion: Biostereochemistry, PWN Warszawa 1985. 7. K. Wüthrich: NMR in biological research: peptides and proteins, North-Holland, Amsterdam 1976. 8. Scientific publications. 9. Internet: independent research, verified by the instructor.	
		eResources addresses	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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