University of Gdańsk

Subject card

Subject name and code	Chemical spectroscopy, PG_00057670		
Field of study	Chemical Business		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	undergraduate studies	Subject group	Obligatory subject group 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 no
Semester of study	5	ECTS credits	2.0
Learning profile	academic	Assessment form	
Conducting unit	Faculty of Chemistry -> Rektor		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Sylwia Rodziewicz-Motowidło	
	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 spectra of organic compounds with masses up to ~300 D; Learning to Interpreting the aforementioned spectra toward structure determination (identification, hydrogen bonds, stereochemistry, dynamics, etc.), taking into account the qualities/limitations of the described techniques separately, as well as in an integrated manner

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BCHINŻ_K04] Demonstrates responsibility for the safety of her/ his own and others' work.	Understands the potential hazards of working with chemicals, electromagnetic radiation and other laboratory components.	[SK1] oral statement/conversation/ discussion [SK8] observation of student's independent or team work
[BCHINŻ_U08] Uses the chemical nomenclature and engineering terminology properly.	The student knows and understands the principles of chemical nomenclature used in the interpretation of spectroscopic spectra, including the nomenclature of organic and inorganic compounds. Understands the terminology used in describing spectroscopic techniques (e.g., chemical shift, oscillatory spectra, magnetic resonance).	[SU1] oral statement/conversation/ discussion [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
[BCHINŻ_W07] Describes the construction and operating principles of basic scientific, technological and control-measuring apparatus.	Understands the operation of key apparatus components, e.g., radiation sources, detectors, measuring chambers, and data recording systems.	[SW1] oral statement/ conversation/discussion
[BCHINŻ_K02] Works individually demonstrating initiative and independence in actions, and effectively cooperates in a team, performing various roles in it.	The student knows the principles of effective organization of individual and team work in the context of the implementation of spectroscopic projects. He understands the importance of responsibility for his actions and the impact of cooperation on team effectiveness.	[SK1] oral statement/conversation/ discussion [SK5] implementation of a problem task [SK8] observation of student's independent or team work
[BCHINŻ_W03] Describes the techniques of higher mathematics and IT tools necessary to describe and model chemical phenomena and technological processes.	The student knows and understands the mathematical fundamentals used in the analysis of spectroscopic spectra (e.g., Fourier transform, statistical analysis of data). Describes techniques for analyzing spectroscopic data using computer tools (e.g., spectral analysis software such as OriginLab, MATLAB or specialized NMR, IR applications). Knows the principles of processing and interpretation of data obtained by spectroscopy in the context of describing chemical phenomena.	[SW1] oral statement/ conversation/discussion [SW5] implementation of a problem task
[BCHINŻ_W10] Applies safety and hygiene principles when working on a test and measurement stand or in the field.	Knows the potential hazards of working with electromagnetic radiation and chemicals used in spectroscopic analysis. Understands regulations for working in a chemical laboratory, including emergency procedures.	[SW1] oral statement/ conversation/discussion [SW5] implementation of a problem task
[BCHINŻ_U09] Using the acquired knowledge, skills and various sources of scientific information independently prepares written papers and oral presentations.	Understands the importance and use of various sources of scientific information, including scientific literature and spectroscopic databases.	[SU1] oral statement/conversation/ discussion [SU5] implementation of a problem task

Subject contents

Methods of interpreting molecular spectra; practical use of spectroscopic methods to study the structure and dynamics of molecules with masses up to ~300 D; comparing the probability of several possible solutions and verifying the correct solution of spectra; learning how to correctly create a description of spectra; learning the advantages and disadvantages of different spectroscopic methods, complementarity of methods; elements of structure/conformation analysis of biomolecules.

Prerequisites and co-requisites

Passed basic organic chemistry and physical chemistry courses

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
written tests	51.0%	100.0%

Recommended reading	Basic literature	R.M. Silverstein, F.X. Webster, D.J. Kiemle: Spectroscopic Methods for the Identification of Organic Compounds, PWN W-wa 2007 Internet: independent search, verified by the instructor.
	Supplementary literature	A.S. Płaziak: Mass spectrometry of organic compounds, Wydaw. Naukowe UAM Poznań 1997R.A.W. Johnstone, M.E. Rose: Mass spectrometry, PWN W-wa 2001.Z. Kęcki: Fundamentals of Molecular Spectroscopy, PWN W-wa 1998.I.Z. Siemion: Biostereochemistry, PWN Warsaw 1985.K. Wüthrich: NMR in biological research: peptides and proteins, North-Holland, Amsterdam 1976.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Set of MS, IR, NMR spectra for self-desolving	
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.