



## Subject card

Subject name and code	Principles of Spectroscopic Techniques, PG_00050110						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Zakład Spektroskopii Układów Złożonych -> Instytut Fizyki i Informatyki Stosowanej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marcin Dampc					
	Teachers	dr inż. Marcin Dampc					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	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	2.0		18.0		50
Subject objectives	Presenting basic concepts of optical spectroscopy and physics behind the designated methods. Learning the skill of selecting appropriate technique for a specific physical/chemical/medical problem and learning about the limitations of each experimental technique.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	

Subject contents	Introduction		
	Basics in optical spectroscopy		
	Electromagnetic radiation		
	Quantization of energy		
	Emission and absorption of radiation		
	Optical spectroscopic equipment		
	Optical monochromators and spectrographs		
	Interferometers		
	Detectors		
	Infrared, absorption, Fourier, Raman, laser and microwave spectroscopy		
	Rotational spectra		
	Vibrational spectra		
Raman spectra			
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project	80.0%	50.0%
	lecture	40.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. W. Demtröder, Spektroskopia laserowa, PWN, Warszawa 1993.</li> <li>2. Z. Kęcki, Podstawy spektroskopii molekularnej, Wydawnictwo Naukowe PWN, Warszawa 1992.</li> <li>3. J. M. Hollas, High resolution spectroscopy, J. Wiley &amp; sons, New York 1998.</li> <li>4. H. Barańska, A. Łabudzińska, J. Terpiński, Laserowa spektrometria ramanowska, PWN, Warszawa 1981.</li> <li>5. D. Kunisz, Fizyczne podstawy emisyjnej analizy widmowej, PWN, Warszawa 1973.</li> <li>6. H. Haken, H. C. Wolf, Fizyka molekularna z elementami chemii kwantowej, Wydawnictwo Naukowe PWN, Warszawa 1998.</li> <li>7. C. N. Banwell, Fundamentals of molecular spectroscopy, McGraw-Hill, London 1983</li> </ol>	
	Supplementary literature	-	
	eResources addresses	Adresy na platformie eNauczanie: Podstawy technik spektroskopowych 2023/2024 - Moodle ID: 34402 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=34402">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=34402</a>	
Example issues/ example questions/ tasks being completed	Select appropriate experimental technique to obtain the chemical bond length in CO molecule. Based on available measurement results make calculations.		
Work placement	Not applicable		