GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Optical spectroscopy laboratory , PG_00057510					
Field of study	Nanotechnology					
Date of commencement of studies	February 2023		Academic year of realisation of subject	2022/2023		
Education level	second-cycle studies		Subject group	Optional subject group 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	1		Language of instruction	Polish		
Semester of study	1		ECTS credits	2.0		
Learning profile	general academic profile		Assessment form	assessment		
Conducting unit	Instytut Nanotechnologii i Inżynierii Materiałowej -> Faculty of Applied Physics and Mathematics					
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Leszek Wicikowski				
	Teachers	dr inż. Leszek Wicikowski				

Lesson types and methods of instruction	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	2.0	18.0	50

Subject objectives	The aim of the course is to familiarize students with the basic techniques used in optical spectroscopy.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U05	The student can prepare samples for use in specific spectroscopic techniques. He can work with the help of optical spectroscopy equipment used in the laboratory. Using the available software and his own knowledge, he can interpret the obtained spectra and draw conclusions from them	[SU4] Assessment of ability to use methods and tools
	K7_W04	The student knows the use of electromagnetic radiation in infrared, UV-VIS, materials research and their use in nanotechnology.	[SW1] Assessment of factual knowledge
	K7_K04	The student can plan an experiment based on the presented goals. Complete all stages necessary to obtain results and interpret and present them in an appropriate form	[SK5] Assessment of ability to solve problems that arise in practice
	K7_U02	The student knows the basic techniques of working in the laboratory. Uses laboratory techniques necessary for sample preparation	[SU1] Assessment of task fulfilment

Subject contents	The laboratory aims are to use basic techniques of infrared measurements, the ability to determine functional groups occurring in the tested materials, preparation of samples for transmission and reflection techniques, identification of materials. UV-VIS spectroscopy's goals are to make a calibration curve and determine the concentration of the tested substance, measuring the bandwidth of the energy gap based on the absorption edge in the reflection technique. The quantum dots size determination from luminescence spectra is the last laboratory experiment.
Prerequisites and co-requisites	The student knows the physical basics of the interaction of electromagnetic radiation with matter. Especially in the field of infrared, visible and ultraviolet radiation.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory reports	100.0%	100.0%

Recommended reading	Basic literature	Laboratory instructions and materials prepared by the teacher
	Supplementary literature	Introduction to Spectroscopy by Donald L. Pavia, Gary M. Lampman, George S. Kriz, James R. Vyvyan
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1.FTIR - introductory exercise - spectrum analysis2. FTIR - measurements with the transmission technique3. Measurements of the reflection technique4. Ready spectrum analysis - Antarctica samples, Blatyk microplastics5. UV-VIS calibration curve6. UV-VIS determination of the energy gap using the reflection method7. Luminescence measurements - the spectrum of fluorescsein8. Measurement of the size of quantum dots
Work placement	Not applicable