GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Spectroscopic methods, PG_00069101		
Field of study	Technical Physics		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
Education level	second-cycle 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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marcin Dampc	
	Teachers	dr inż. Marcin Dampc	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	15.0	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 discuss the basic theoretical and practical issues of spectroscopy and presentation of the various types of spectroscopic methods and ways to interpret spectra.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W06] has enhanced knowledge of the experimental methods and techniques applied in physics	Is able to use known spectroscopic techniques to determine specific physical quantities, material properties, and the course of phenomena.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
[K7_W07] has extended knowledge of the methodology of physics laboratory work, based on experience in laboratory work, knows the health and safety rules, sufficient for independent work at the research or measuring position	Can independently perform the indicated measurement.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
[K7_U03] has enhanced laboratory work experience	Can combine known spectroscopic techniques to more fully analyze a material or phenomenon.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K7_K03] can communicate and present results of own work and transfer information in a commonly understandable manner	Student carries out the indicated measurements in a group and then presents the results and their analysis in a written report subject to further discussion.	[SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness

Subject contents

Course content – laboratory
1. Study of a hemispherical electron monochromator;
2. Mass spectrometry using quadrupole mass analyser;
3. Electron impact electronic excitation of nitrogen molecules using electron spectrometry techniques
4. Measurement and analysis of emission and absorption spectra of anthracene

Prerequisites and co-requisites

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Performance of laboratory exercises and laboratory reports preparation</td><td>100.0%</td><td>100.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>[1] J.M.Hollas, Modern Spectroscopy, John Wiley & Sons, Ltd.
[2] J.Sadlej, Molecular Spectroscopy, WNT, Warszawa (in Polish)
[3] D.L.Pavia i in., Introduction to Spectroscopy, Brooks/Cole
[4] Z.Kęcki, "Basics of molecular spectroscopy", PWN, Warszawa (in Polish)</td></tr>
<tr><td>Supplementary literature</td><td>[5] H. Haken, H. Ch. Wolf., "Molecular physics and elements of quantum chemistry", Springer</td></tr>
<tr><td>eResources addresses</td><td>Supplementary
https://enauczanie.pg.edu.pl/2025/course/view.php?id=2305 -</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. Determination of the energy resolution of a hemispherical selector as a function of transmission energy

2. Sample identification based on mass spectra

3. Determination of the spectroscopic constants of anthracene based on excitations in the photoabsorption spectrum.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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