GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Atomic and molecular physics II, PG_00039517		
Field of study	Technical Physics		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
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	2	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Zakład Fizyki Atomowej, Molekularnej i Optycznej -> Instytut Fizyki i Informatyki Stosowanej -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Paweł Możejko	
	Teachers	dr hab. Paweł Możejko	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	0.0	15.0	60

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	60	8.0	32.0	100

Subject objectives

Presentation of selected topics related to the ilight nteraction with atomic systems (lecture, exercises). Presentation of selected computational methods of the atomic and molecuular physics (lecture, exercises). exercises). Presentation of selected topics in atomic and molecular physics (seminars).

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K03] Can cooperate and work in a group, performing different functions. Can make self-assessment, as well as constructively assess the effects of other persons' work.	The student is able to prepare and conduct a seminar presentation. Can take part in a discussion of another person's seminar presentation.	[SK4] Assessment of communication skills, including language correctness [SK1] Assessment of group work skills
[K7_W02] Has enhanced, theoretically-founded, detailed knowledge of selected field of physics, and sufficient knowledge of related fields of science or technology.	A student knows the basics of relativistic quantum mechanics and selected examples of applications in atomic physics.	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Lectures, exercises:

1. Creation and annihilation operators

2. Time dependent perturbation theory

3. Quantization of the electromagnetic field

4. Interaction of atomic systems with light

5. Electronic structure of molecules

6. Oscillatory structure of molecules

7. Rotational structure of molecules

8. Basic methods of quantum chemistry</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of elementary quantum mechanics.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Seminar</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>Writing exam</td><td>50.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>S. Kryszewski "Mechanika kwantowa" Wyd. UG

L. Piela "Idee Chemii Kwantowej" PWN</td></tr>
<tr><td>Supplementary literature</td><td>W. Greiner, Relativistic quantum mechanics, Springer, Berlin, 1994</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:
Fizyka Atomu i Cząsteczki II 2023/2024 - Moodle ID: 33002
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33002</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Problem of two-level atomic system interacting with light</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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