GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physics, PG_00055063		
Field of study	Management and Production Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
Education level	first-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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Małgorzata Śmiałek-Telega	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	15.0	0.0	0.0	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	4.0	61.0	125

Subject objectives

Acquiring knowledge that is the subject of modern physics

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] has the ability of self-learning and expanding knowledge in a specialized field of engineering production	The student has the ability to analyze information and use methods to expand specialist knowledge in the field of production engineering.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
[K6_W01] has knowledge of linear algebra, differential equations, analysis and mathematical statistics useful for modelling and interpreting mechanical systems, manufacturing processes and operating properties of devices, has structured knowledge of physics including classical mechanics, optics, electricity and magnetism, demonstrates knowledge of elements of quantum physics	The student has ordered knowledge of modern physics, optics, electricity and magnetism, demonstrates the knowledge of the elements of quantum physics	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
[K6_K03] is aware of the social role of a graduate of a technical university, understands the importance of non-technical aspects and effects of engineering activities including their impact on the environment and responsibility for decisions, sees the need to formulate and provide the public with information and opinions on the achievements of technology, correctly identifies and resolves dilemmas associated with thejob of an engineer	student understands the importance of non-technical aspects and effects of engineering activities, including its impact on the environment	[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work

Subject contents

1. Mathematical introduction. 2. Electromagnetic waves 3. Wave optics 4. Lasers 5. Lidars 6. Schrödinger equation; examples of solutions to the Schrödinger equation: 7. Models of the atom 8. Stern-Gerlach experiment and electron spin. 9. Multi-electron atoms; Zeeman effect and spin-orbit coupling; 10. Physics of the atomic nucleus 11. Radioactivity 12. Electric conductivity 13. Quantum computers

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Knowledge of classical physics</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Exercises</td><td>50.0%</td><td>35.0%</td></tr>
<tr><td>Lecture</td><td>50.0%</td><td>30.0%</td></tr>
<tr><td>Laboratory</td><td>50.0%</td><td>35.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Fizyka dla Szkół Wyższych Tom 3

https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-3</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, t5, PWN</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">1. Particle-wave nature of light and matter.

2. Heisenberg uncertainty principles. Schrödinger equation and examples of its solutions.

3. Schrödinger equation of hydrogen atom, quantum numbers.

4. Stern-Gerlach experiment, spin of electron.

5. Spin-orbit coupling, total momentum of electron in atom.

6. Zeeman phenomena, Models of nucleus: liquid drop model, Fermi gas model, shell model.

7. Quantun statistics.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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