GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Funamentals of modern physics, PG_00062728		
Field of study	Technologies for Industry 5.0		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Physics of Disordered Systems -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Dziedzic	
	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	5.0	35.0	100

Subject objectives

The aim of the course is to familiarize students with the basic issues of modern physics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K01] is aware of the need to constantly update and enrich knowledge and practical skills, and improve professional, personal and social competences	The student is aware of the progress of science and technology and the resulting need to update and expand their knowledge and competences.	[SK3] Assessment of ability to organize work
[K6_W01] demonstrates knowledge and understanding of mathematics, physics, chemistry and IT tools at the level necessary to formulate and solve typical engineering and technological problems	The student formulates and solves engineering and technological problems based on the achievements of modern physics	[SW1] Assessment of factual knowledge
[K6_U01] applies knowledge of mathematics, physics, chemistry, IT tools and other engineering disciplines to solve theoretical, engineering and technological problems	The student applies the laws of physics to solve theoretical, engineering and technological problems.	[SU3] Assessment of ability to use knowledge gained from the subject

Subject contents	Older quantum theory: Planck's distribution; Einstein's law of photoemission; Bohr's model of the atom. Introduction to quantum physics: Basic assumptions of quantum physics; matter waves; Schrödinger's equation; Heisenberg's uncertainty principle; Elementary particles and their properties; particle statistics - fermions and bosons. Pauli's exclusion principle. Fundamentals of atomic and molecular physics: Atomic structure and the periodic table; Bonds; energetic rotational and vibrational states of molecules; Introduction to lasers: Spontaneous and stimulated emission; optical resonators; the principle of operation of the maser and laser; Basic types of lasers and their structure. Introduction to solid state physics: Bloch's theorem and energy bands in solids; semiconductors; Theses and results of Einstein's special and general theory of relativity.
Prerequisites and co-requisites	Course in Classical Physics and Mathematics
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
excersise test	50.0%	50.0%
test	50.0%	50.0%

Recommended reading	Basic literature	Współczesna fizyka cząstek, M. Thomson, PWN, 2023
	Supplementary literature	given during lectures
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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