GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	PHYSICS II, PG_00049263						
Field of study	Spatial Development						
Date of commencement of studies	October 2022		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	4		Language of instruction	Polish			
Semester of study	7		ECTS credits	4.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Division Of Molecular Photophysics -> Institute Of Physics And Applied Computer Science -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor						
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	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		5.0		65.0	100
Subject objectives	Mastering a specific body of knowledge in the field of general physics and developing the ability to reason in cause-effect categories based on the known laws of physics, in the context of engineering problems related to spatial management.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_U04	Uses knowledge of the basics of physics when preparing an analysis of spatial assumptions on the scale of agglomeration, city and district; using the acquired physical knowledge, demonstrates the ability to correctly interpret and assess the current state on the basis of data from various sources; formulates guidelines for urban and architectural design and develops concepts for transformations of urbanized structures	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
	[K6_W03] has elementary knowledge in the field of mathematics and physics relating to issues related to space management, including the basic mathematical methods used in urban design, as well as analytical and design methods using information technology used in planning processes of settlement structures	Has elementary knowledge of the basics of physics relating to issues related to spatial management, including basic mathematical methods used in urban design, as well as analytical and design methods using IT techniques used in the processes of planning settlement structures.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_K02] comprehending technical and non-technical aspects and effects of its activity, initiates various activities for the public interest, including co-organizing social projects, workshops and public debates on issues related to spatial management, within which it can reliably present a problem on a non-professional forum and explain the methods and solutions used	Understanding the technical and non-technical aspects and effects of his activities, she/he initiates various activities for the public interest, including co-organizing social projects, workshops and public debates on issues related to spatial management, within which she/he is able to reliably present the problem on a non-professional forum and explain the methods and solutions used, using arguments based on the knowledge of the basics of physics.	[SK4] Assessment of communication skills, including language correctness
	[K6_U01] has the ability to abstractly understand technical problems; applies basic mathematical and simulation methods in urban planning and spatial planning	Has the ability to understand technical problems in an abstract way; applies basic mathematical and simulation methods in urban design and spatial planning, using the knowledge of the basics of physics.	[SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task

Subject contents	1.Fluid mechanics: fluids, density, and pressure, measuring pressure, Pascal's principle and hydraulics, Archimedes' principle and buoyancy, fluid dynamics, Bernoulli's equation, viscosity and turbulence. 2. Oscillations: simple harmonic motion, energy in simple harmonic motion, pendulums, damped oscillations, forced oscillations, resonance. 3. Waves: traveling waves, mathematics of waves, energy and power of a wave, interference of waves, standing waves and resonance, sound waves, speed of sound, normal modes of a sound standing wave, sources of musical sounds. 4. The nature of light: propagation of light, law of reflection and refraction, total internal refraction. Huygens's principle, polarization. 5. Geometric optics and image formation: plane mirrors, spherical mirrors, images formed by refraction, thin lenses. 6. Optical instruments: eye, camera, simple magnifying devices, microscopes, telescopes. 7. Interference: Young's two-slit experiment, multi-slit interference, thin film interference. 8. Diffraction: single and double slit diffraction, diffraction gratings. 9. The theory of relativity: invariance of physical laws, relativity of simultaneity, time dilation, length contraction.
Prerequisites and co-requisites	Basic knowledge of high school physics. Knowledge of the mathematical apparatus at the level of engineering studies.
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Assessment of a written work on a given topic	0.0%	75.0%
Active participation in classes	0.0%	25.0%

Recommended reading		
	Basic literature	1. University Physics by Open Stax
	Supplementary literature	1. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, John Villey & Sons, 2001
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1.Determine whether the slope of the roofs of the designed buildings is significant in areas with particularly heavy rainfall. 3. Determine whether the slope of the roofs of the designed buildings is significant in high winds. 4. Determine whether the distance between frontages on opposite sides of the street in the place of strong winds affects the comfort of building use. If so, when is the problem most significant? 5. What principles of geometric optics can be used to obtain an attractive, eye-catching appearance of building facades? Please, provide some examples. 6. How can the phenomenon of light wave interference be used to obtain an attractive, eye-catching appearance of building facades? Please, provide some examples.
Work placement	Not applicable