GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physics 1, PG_00042018		
Field of study	Power Engineering		
Date of commencement of studies	October 2025	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	1	Language of instruction	English
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Faculty of Ocean 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	0.0	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	15.0	50

Subject objectives

Acquisition of basic knowledge in selected branches of physics, both classical and modern. Acquiring the skills of qualitative understanding of selected principles and laws of classical physics and modern and quantitative analysis of selected phenomena in this area Understanding the basic techniques and methods of measurement of selected physical Developing social skills, such as emotional intelligence (the ability to work in a group of students), with a view to effective problem solving and tasks, sense of responsibility, honesty and integrity in academia and society.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W02] has a basic knowledge of physics (including optics, electricity and magnetism), chemistry, technical thermodynamics, fluid mechanics and general mechanics needed to understand and describe the basic phenomena occurring in devices and systems, energy plants and transmission networks and their environment	The student explains the basic knowledge in the field of physics, chemistry, technical thermodynamics and fluid mechanics, necessary to understand and describe the basic phenomena occurring in energy devices and systems and in their environment, the power industry and opportunities for further education	[SW1] Assessment of factual knowledge
[K6_U01] can obtain information from literature and other sources, organize, interpret it and draw and formulate conclusions; has the ability to self-educate, interprets the results of completed engineering tasks, is able to design simple energy systems and their systems	The student is able to solve simple problems in the field of basic physics based on examples	[SU2] Assessment of ability to analyse information

Subject contents	Introduction: Physical quantities , vectors , the international system of units (SI) , mass , time and length, an overview of the sizes found in nature . Principles of dynamics : fundamental interactions, the first law of dynamics, the second law of dynamics equations of motion trajectory , the third law of dynamics, friction. The definition of work for constant and variable force, the assertion of labor and energy , the definition of power , conservative forces . The principle of conservation of energy : energy potential , the potential energy of gravity , the law of conservation of mechanical energy , the principle of conservation of energy . The principle of conservation of momentum : the center of mass , the momentum of the bodies , the principle of conservation of momentum , rocket motion , collision of bodies. The principle of conservation of angular momentum : rotation, moment of inertia , kinetic energy in a rotating motion . Moment of force , the definition of angular momentum , the relationship between the torque value and angular momentum , angular momentum of a rigid body , the principle of conservation of angular momentum . The special theory of relativity : Galilean transformation , Michelson -Morley experiment , Einstein's principle of relativity , simultaneity of events , the relativity of time, time dilation , twin paradox , length contraction , Lorentz transformation , the transformation speed , relativistic momentum and energy. Simple harmonic motion : swing , velocity, acceleration , force and energy of the harmonic motion . Pendulum , physical pendulum , damped harmonic motion , forced vibration , mechanical resonance . Mechanical waves : transverse and longitudinal waves , reflection of waves , harmonic waves , sound waves , the intensity of the wave. Interference of harmonic waves , strengthening and decay of waves, standing waves , vibrations, strings , Doppler effect. The gravitational field : the experience of Galileo's law of universal gravitation , the measurement of the gravitational constant , the intensity and the potential of the gravitational field , gravity and weightlessness , tidal , Kepler's laws , satellite motion , and second cosmic velocity , elements of the general theory of relativity. Hydrostatics : properties of liquids, Pascal's law , hydrostatic pressure , Archimedes' principle , swimming bodies. Hydrodynamics : characteristics of fluid motion , Bernoulli's law , law Toricellego , viscosity, flow of non-viscous liquid and viscous , laminar and turbulent flow , Reynolds number , the resistance of the medium. Temperature and heat: thermal expansion, heat, heat transfer processes, conductivity, convection.Kinetic theory of an ideal gas: kinetic theory of an ideal gas, diffusion, laws of thermodynamics, engines, heaters, coolers
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Written test (open questions)	50.0%	100.0%

Recommended reading	Basic literature	David Halliday, Robert Resnick,Jearl Walker *Fundamentals of Physics, Wiley, any edition*

	Supplementary literature	H.D. Young, R.A. Freedman, SEARS AND ZEMANSKYS UNIVERSITY PHYSICS WITH MODERN PHYSICS, Addison-Wesley Publishing Company, wyd. 12. z 2008 r. D.C. Giancoli, Physics Principles with Applications, 6th Ed., Addison-Wesley, 2005; Physics: Principles with Applications with MasteringPhysics, 6th Ed., Addison-Wesley 2009. R.A. Serway, Physics for Scientists and Engineers with Modern Physics, 8th Ed., Brooks/Cole, Belmont 2009; zapowiadane jest kolejne wydanie w styczniu 2013 r. P.A. Tipler, G. Mosca, Physics for Scientists and Engineers, Extended Version, W. H. Freeman 2007
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Give the second law of dynamics and the conclusions resulting therefrom What are conservative and non-conservative forces, what is the work done by them; Give examples of conservative and non-conservative forces Give examples of systems moving harmonically; What equation describes the simple harmonic motion?; Write and draw a relationship deflection from the equilibrium position of the time; What happens if the frequency of the exciting force is close to the natural frequency of the system?	
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.