GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physics - Laboratory, PG_00038087		
Field of study	Automation, Robotics and Control Systems		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Leszek Litzbarski	
	Teachers	dr inż. Leszek Litzbarski	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	15.0	0.0	0.0	15

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	15	2.0	33.0	50

Subject objectives

Familiarizing students with basic physical phenomena, with particular emphasis on phenomena occurring in electrical, electronic and electrical devices.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] can work individually and in a team, can communicate using various techniques in a professional environment, as well as document and analyze the results of their work, can estimate the time needed to perform the entrusted task can prepare and present a presentation on the problems and results of an engineering task	Ability to perform a connection of basic electrical circuits, perform measurements of electrical quantities and interpretation of waveforms of these quantities. The ability to practical use of an electric transformer. The ability to determine the basic quantities characterizing the motion of a solid body and the quantities describing propagation of light.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
[K6_W02] has basic knowledge of physics including electrostatics, electromagnetism, electrodynamics, wave motion, acoustics, mechanics, thermodynamics, optics, solid state physics; including knowledge necessary to understand the basic physical phenomena occurring in devices of systems and systems of automation and robotics	Knowledge of basic phenomena and principles concerning rigid body motion kinematics and geometric and wave optics. Understanding the transformer's operating principle. Knowledge of basic principles describing electrical circuits in steady and transient states.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents

Course content – laboratory
Basic principles of kinematics and dynamics of rigid body motion - uniformly accelerated motion and harmonic motion, moment of inertia, principle of energy conservation, determination of terrestrial acceleration. Fundamentals of geometric and wave optics - light propagation, refraction, dispersion, diffraction, polarization, measurements of light intensity. The phenomenon of electromagnetic induction - testing of a transformer with a ferromagnetic core. Ohm's law and Kirchhoff's law in linear and non-linear DC circuits. Relations between voltage and electric current in sinusoidal circuits with linear RLC elements. Transient states in electrical circuits.

Prerequisites and co-requisites

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written final test	50.0%	36.0%
	ongoing control of the theoretical preparation for the laboratory exercises	50.0%	16.0%
	reports on laboratory exercises	50.0%	48.0%
Recommended reading	Basic literature	1. Instrukcje do ćwiczeń 2. Bolton W.: Zarys fizyki. PWN, Warszawa 1988. 3. Jaworski B., Dietłaf A.: Kurs fizyki. PWN, Warszawa 1976. 4. Halliday D., Resnick R., Walker J.: Podstawy fizyki. PWN, Warszawa 2011. 5. Czemplik A.: Modele dynamiki układów fizycznych dla inżynierów, Wydawnictwo WNT, Warszawa 2010. 6. Taylor J.R.: Mechanika klasyczna. PWN, Warszawa 2007. 7. Meyer-Arendt J.R.: Wstęp do optyki. Wyd. 1. PWN, Warszawa 1977. 8. Encyklopedia fizyki współczesnej. PWN, Warszawa 1983. 9. Poradnik Inżyniera Elektryka. Tom 1-3. WNT Warszawa 10. Kurdziel R.: Podstawy elektrotechniki. WNT Warszawa 11.	
	Supplementary literature	1. Bujko A.: Zadania z fizyki z rozwiązaniami i komentarzami, Wydawnictwo WNT, Warszawa 2009	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Determine gravity of Earth *g* with the aid of simple pendulum (mathematics). 2. Explain measurement of the focal length of a convex lens using Bessel's method. 3. Explain the principle of operation and the method of determining the transformer parameters. 4. Characterize transient states in serial circuits RL, RC, RLC. 5. Sketch the currents and voltages waveforms in the examplary linear AC circuit.		
Practical activites within the subject	Not applicable		

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