GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physics - Laboratory, PG_00003417		
Field of study	Hydrogen Technologies and Electromobility		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
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		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Adam Młyński	
	Teachers	dr inż. Adam Młyński	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	30.0	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

Design of experiments selected physical phenomena, the measurement of selected physical quantities and the development of reports from research, along with a discussion of the results.

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	Determines the physical meaning of the phenomena being studied, makes observations and performs measurements of characteristic quantities. Actively participates in the work of the team	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K6_W02] has knowledge of physics and chemistry including electrostatics, electromagnetism, electrodynamics, wave motion, acoustics, mechanics, thermodynamics, optics, solid state physics; including knowledge necessary to understand the basic physical phenomena occurring in hydrogen devices, systems and installations as well as automation and robotics systems	Analyzes the data and prepares a report in which it assesses the quality of the results obtained.	[SW3] Assessment of knowledge contained in written work and projects
[K6_K02] can work in a group taking on different roles in it	Carries out tasks in a group, establishing their schedule, cooperates with other team members during measurements and their verification.	[SK3] Assessment of ability to organize work [SK1] Assessment of group work skills
[K6_W03] knows the methods of analysis of DC and AC circuits, the laws of electrical engineering and the properties of elements of electrical circuits	Uses knowledge from various modules to analyze and evaluate the results of observations and measurements in the laboratory.	[SW1] Assessment of factual knowledge

Subject contents	LABORATORY EXERCISES. The purpose of laboratory exercises is familiarize students with experimental methods of selected physical phenomena. The students learn about basic measuring instruments used in physics. The students prepare preliminary calculations to determine the value of the measured physical quantities, then assemble the measurement system and perform the experiment. There are 12 laboratory exercises in the course. The students familiarize with measuring of material, kinetic, dynamic, acoustic and electric quantities parameters. There are new generation analogue and digital devices (such as digital oscilloscopes with memory, power supplies and digital signal generators) available in the laboratory. The students can prepare themselves in advanced to laboratory exercises by reading listed literatures and laboratory instructions.
Prerequisites and co-requisites	Knowledge of the subject Physics , knowledge of electrical circuits course

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written reports of lab	100.0%	35.0%
Tests of the subject of several laboratory exercises	60.0%	65.0%

Recommended reading

Basic literature	1. Bobrowski Cz.: Fizyka krótki kurs. WNT Warszawa 2007. 2. Kozłowski K., Kolka W.: Ćwiczenia laboratoryjne z fizyki. Wydawnictwo PG. Gdańsk 1990. 3. Orear J.: Fizyka T.1 i2. WNT Warszawa 2008. 4. Halliday D., Resnich R.: Fizyka T.1 i 2. PWN Warszawa 2001 5. Bolkowski S.: Teoria obwodów elektrycznych. WNT Warszawa 2009. 6. Kurdziel R.: Podstawy elektrotechniki. WNT Warszawa 1973.
Supplementary literature	Feynman R.P., Leighton R. B., Sands M.: Feynmana wykłady z fizyki. PWN Warszawa 2007.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Realized issues:

1.The study of phenomena of geometrical optics and wave - propagation of light, refraction, dispersion, diffraction, polarization, measurement of light intensity.

2 The study of fundamental phenomena kinematics and dynamics motion of bodies - harmonic motion, moment of inertia, the principle of conservation of energy, determination of the acceleration of gravity.

3 The study of wave phenomena.4 Investigations of DC linear circuits.5 The test non-linear circuit.6 The test circuits with linear RLC elements.7 The study of resonance in electrical circuits.8 Investigation of transients in electrical circuits.9 Investigations active circuits. 10 Investigations of the iron-core transformers.11 Study of 3-phase electrical circuit.12 The test circuit magnetically coupled coils.Sample questions:Give the definition of Ohm's law and generally discuss the methods of solving DC circuits.Give the definition of Ohm's law and generally discuss the methods of solving AC circuits.Report the distribution of forces for the inclined plane.Describe the method of determining the acceleration due to gravity using the system with an inclined planeWhat are the conditions for a standing wave?Describe the static and dynamic model of a nonlinear element at the duty point. What elements are included in this model, what is their geometric interpretation.Provide the equivalent diagram of a transformer with a ferromagnetic core. Describe the parameters of this diagram.

Work placement	Not applicable

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