GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Vibrations and wave phenomena laboratory , PG_00037301		
Field of study	Technical Physics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
Education level	first-cycle studies	Subject group	Optional subject group 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	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Physics of Electronic Phenomena -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Daniel Pelczarski	
	Teachers		

Lesson types

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	2.0	18.0	50

Subject objectives

Utilisation of the knowledge of physics of oscillations and waves in order to perform an experiment.

Ability to plan and perform the measurements of physical quantities.

Ability to elaborate and present in written form the results of measurements.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U04] is able, individually or in a team, to plan and conduct experiments in physics and related fields, including applied computer science or energy engineering, and to analyse and interpret results and formulate conclusions.	Is able to plan and perform experiments on physics of waves and oscillations. Is able to analyse critically the results of own measurements and to draw conclusions. Possesses experience of laboratory work.	[SU5] Assessment of ability to present the results of task
[K6_W04] has advanced knowledge of the principles of experimental design, experimental methods, measurement techniques and scientific equipment used in physics and related sciences, including their life cycle.	Possesses knowledge of planning and performing of an experiment in physics of oscillations and waves. Is able to analyse critically the results of such experiment.	[SW1] Assessment of factual knowledge
[K6_W02] possesses structured knowledge of the fundamentals of physics, including mechanics, thermodynamics, electricity and magnetism, optics, atomic and molecular physics, solid-state physics, and nuclear and particle physics.	The student knows and understands the fundamentals of physics in the field of oscillations and wave phenomena, including the description of oscillatory motion, wave propagation, and phenomena such as interference, diffraction, and resonance.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Course content – laboratory
The Set of Experiments: 1. Investigation of vibrations of a string. 2. Determination of the speed of sound in air with the use of Quincke interferometer. 3. Determination of the light wavelength with the use of Michelson interferometer. 4. Investigation of light polarization by a quarter-wave plate. 5. Investigation of a serial- and parallel RLC circuits. 6. Investigation of a steady-state in a sinusoidally-excited transmission line. 7. Investigation of propagation of pulses in a transmission line. 8. Investigation of single- and coupled resonance circuits. 9. Determination of the radius of a curvature of a lens by means of Newton rings. 10. Investigation of electron diffraction.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>1. Knowledge of wave physics. 2. Knowledge of physics of mechanical and electrical oscillations. 3. Basic knowledge of theory of electric ciruits (incl. ac-circuits). 4. Basic konowledge of theory of transmission lines. 4. Basic knowledge of optics. 5.Integral and differential calculus skills.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Credit for the theory of each experiment</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>Acceptance of reports onseven experiment according to schedule</td><td>100.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. P. Grygiel i R. Włodarski ,,Laboratorium dragń i zjawisk falowych"", skrypt na prawach rekopisu, Politechnika Gdańska, 2008.</td></tr>
<tr><td>Supplementary literature</td><td>1. D. Haliday, R. Resnick, J.Walker ,,Podstawy fizyki"", t. 1 - 5, Wydawnictwo Naukowe PWN, Warszawa 2005. 2. A. Januszajtis ,,Fizyka dla politechnik"" t. III ,,Fale"", Wydawnictwo Naukowe PWN, Warszawa 1991. 3. J. Massalski, M. Massalska ,,Fizyka dla inzynierów"" cz. I ,,Fizyka klasyczna"", Wydawnictwa Naukowo-Techniczne, Warszawa 2007. 4. S. Szczeniowski ,,Fizyka doswiadczalna"" cz. III ,,Optyka"", Panstwowe Wydawnictwo Naukowe, Warszawa 1983. 5. E.M. Purcell ,,Elektryczność i magnetyzm"", Panstwowe Wydawnictwo Naukowe, Warszawa 1974. 6. F.S. Crawford ,,Fale"", Panstwowe Wydawnictwo Naukowe, Warszawa 1973. 7. J. Osiowski ,,Teoria obwodów"" t. II, Wydawnictwa Naukowo - Techniczne, Warszawa 1971. 9. Cz. Rajski ,,Teoria obwodów"" t.1, Wydawnictwa Naukowo - Techniczne, Warszawa 1971.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Measurement of speed of sound in air using the Quincke interferometer.

Determination of the radius of a curvature of a lens by means of Newton rings.

Investigation of a steady-state in a sinusoidally-excitated transmission line.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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