



## Subject card

Subject name and code	Vibrations and wave phenomena laboratory , PG_00037301						
Field of study	Technical Physics						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2024/2025		
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						
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	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_W07] Has knowledge of the construction and operation of physical instruments, measurement and research equipment.	Possesses the basic knowledge of construction and principles of working of measuring devices of electric-, optical- and acoustic quantities.			[SW1] Assessment of factual knowledge		
	[K6_W12] Knows basic health and safety rules.	Knows the principal work safety regulations in physics laboratory, in particular during measurements of electric-, optical- and acoustic quantities.			[SW1] Assessment of factual knowledge		
	[K6_W08] Has knowledge of planning and conducting physical experiments, and critical analysis of its results.	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_U04] Can plan and conduct experiments, critically analyze their results, draw conclusions and form opinions. Has laboratory work experience.	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		

Subject contents	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.		
Prerequisites and co-requisites	1. Knowledge of wave physics. 2. Knowledge of physics of mechanical and electrical oscillations. 3. Basic knowledge of theory of electric circuits (incl. ac-circuits). 4. Basic knowledge of theory of transmission lines. 5. Basic knowledge of optics. 6. Integral and differential calculus skills.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Acceptance of reports on seven experiment according to schedule	100.0%	50.0%
	Credit for the theory of each experiment	50.0%	50.0%
Recommended reading	Basic literature	1. P. Grygiel i R. Włodarski „Laboratorium drgań i zjawisk falowych”, skrypt na prawach rękopisu, Politechnika Gdańska, 2008.	
	Supplementary literature	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 inżynierów” cz. I „Fizyka klasyczna”, Wydawnictwa Naukowo-Techniczne, Warszawa 2007. 4. S. Szczęniowski „Fizyka doświadczalna” cz. III „Optyka”, Państwowe Wydawnictwo Naukowe, Warszawa 1983. 5. E.M. Purcell „Elektryczność i magnetyzm”, Państwowe Wydawnictwo Naukowe, Warszawa 1974. 6. F.S. Crawford „Fale”, Państwowe Wydawnictwo Naukowe, Warszawa 1973. 7. J. Osiowski „Teoria obwodów” t. II, Wydawnictwa Naukowo - Techniczne, Warszawa 1971. 9. Cz. Rajska „Teoria obwodów” t.1, Wydawnictwa Naukowo - Techniczne, Warszawa 1971.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<p>Measurement of speed of sound in air using the Quincke interferometer.</p> <p>Determination of the radius of a curvature of a lens by means of Newton rings.</p> <p>Investigation of a steady-state in a sinusoidally-excited transmission line.</p>		
Work placement	Not applicable		