

Subject card

Subject name and code	Physical laboratory 2 for quantum physics and biophysics, PG_00154144						
Field of study	Medical Physics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish not applicable		
Semester of study	5		ECTS credits		4.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Justyna Strankowska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	60.0	0.0	0.0	60
	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	60		0.0		60.0	120
Subject objectives	Familiarizing students with topics related to experiments within the scope of concepts formulated in the 20th and 21st centuries, with particular emphasis on physical phenomena and technical problems occurring in the medical environment; demonstrating physics as a fundamental science for the entire group of natural sciences, including medicine, chemistry, and biology; presenting a physical description of biological systems; exploring and understanding the structure and functioning of living matter; presenting the physical principles of measurement methods used in quantum physics and biophysics.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FIZMEDL3_W03] knows how to plan and perform a simple physical experiment and analyze the obtained results; knows the elements of the theory of measurement uncertainty as applied to physical experiments, knows the basic units of the SI system and its most important derived units; knows other systems of units of measurement	not applicable	[SW2] presentation/project/paper/report
	[FIZMEDL3_U02] has the ability to measure basic physical quantities; can develop, describe and present the results of simple physical experiments and computer simulations; is able to perform quantitative analyzes and formulate qualitative conclusions on this basis; can estimate measurement uncertainties	not applicable	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report
	[FIZMEDL3_K09] can think and act in an entrepreneurial way	not applicable	[SK8] observation of student's independent or team work
	[FIZMEDL3_K07] has a sense of responsibility for jointly performed tasks; is able to cooperate and work in a group, taking on various roles in it	not applicable	[SK8] observation of student's independent or team work
	[FIZMEDL3_K06] is aware of professionalism and compliance with the principles of professional ethics	not applicable	[SK8] observation of student's independent or team work
	[FIZMEDL3_K01] knows the limitations of his own knowledge and understands the need for further education	not applicable	[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report
	[FIZMEDL3_U11] can use basic application software packages to present results and analyze data	not applicable	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
	[FIZMEDL3_W13] knows the basic principles of ergonomics and occupational health and safety	not applicable	[SW1] oral statement/conversation/discussion
	[FIZMEDL3_W12] knows basic measuring instruments, their structure and principles of operation, and the use of simple electronic systems	not applicable	[SW1] oral statement/conversation/discussion
	[FIZMEDL3_U16] is able to communicate effectively with co-workers and other employees, is able to work in a team, and is able to properly manage his and his co-workers' time	not applicable	[SU8] observation of student's independent or team work
	[FIZMEDL3_K14] complies with work safety rules	not applicable	[SK8] observation of student's independent or team work
	[FIZMEDL3_U24] can independently plan and implement their own learning	not applicable	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report

Subject contents	1. Optical simulation of a DNA X-ray diffraction pattern 2. Investigation of the physical properties of optical fibers 3. Laser light diffraction by a single slit and a circular aperture 4. Analysis of radiographs using X-ray computed tomography (CT) 5. Investigation of cardiac function using ECG and PCG methods 6. Investigation of the fluorescence of organic dyes 7. Identification of substances based on their excitation and emission spectra 8. Investigation of cardiac function using ECG and PCG methods 9. Laser Doppler anemometry (LDA) 10. Absorption spectra of polyatomic molecules 11. Image analysis in optical microscopy and scanning electron microscopy (SEM) 12. Physical principles of magnetic resonance		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	not applicable	51.0%	50.0%
	not applicable	51.0%	50.0%
Recommended reading	Basic literature	not applicable	
	Supplementary literature	not applicable	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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