

**Subject card**

<b>Subject name and code</b>	Medical Physics Laboratory, PG_00182172						
<b>Field of study</b>	Medical Physics						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>			2028/2029		
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	3	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	6	<b>ECTS credits</b>			1.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			credit		
<b>Conducting unit</b>	Division of Biomaterials and Medical Physics -> Institute of Experimental Physics -> Faculty of Mathematics, Physics and Informatics -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Justyna Strankowska				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	0.0	15.0	0.0	0.0	15
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	15		0.0		15.0	30
<b>Subject objectives</b>	Familiarizing students with the techniques for measuring fundamental quantities in the electrophysiology of the circulatory and respiratory systems, as well as with the basic clinical interpretation of the measured parameters. Introducing students to methods for analyzing the recorded signal using highly specialized software.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FIZMEDL3_W06] Knows and understands at an advanced level key concepts of human anatomy and physiology, with a particular focus on the physical aspects of biological systems.	The student knows and understands the physical aspects of cardiovascular system function at an advanced level, including the fundamentals of cardiac electrophysiology and phenomena such as the QRS complex. They know and understand the physical basis of the blood pressure regulation mechanism and the importance of analyzing ECG and systolic blood pressure signals in assessing baroreceptor function. They know and understand the relationships between the respiratory signal and heart rhythm, including their synchronization mechanisms.	[SW1] oral statement/ conversation/discussion
	[FIZMEDL3_U09] Can communicate effectively with colleagues and other employees, works in a team, including interdisciplinary teams, and manages his/her own and his/her colleagues' time appropriately.	The student can effectively communicate with other team members, including physicians, to exchange information and interpret complex study results, such as ECG analysis and signal synchronization.  They can work in a team, properly allocating tasks and managing time during the measurement of physiological quantities (e.g., blood pressure, respiration, and heart rate). They can clearly present data analysis results so that other colleagues can easily understand and use them.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
	[FIZMEDL3_U05] Can program and use specialised software for calculations and data analysis, including in the field of imaging diagnostics, radiotherapy and biomedical signal analysis.	The student can use specialized software for the analysis of biomedical signals, including QRS complex detection and heart rate variability analysis. They can perform quantitative analyses of ECG signals, systolic blood pressure, and respiratory signals, including the synchronization of this data. They can use software to perform advanced calculations, such as the assessment of baroreceptor function.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
	[FIZMEDL3_U02] He can perform measurements of physical quantities, prepare, describe, and present the results of physical experiments, including the estimation of measurement uncertainties, and perform quantitative analyses and formulate qualitative conclusions based on them.	The student can perform measurements of physiological quantities such as heart rate, blood pressure, and respiratory signals using specialized equipment. They can develop, describe, and present the results of experiments, for example, from Holter monitoring, including the estimation of measurement uncertainty. They can perform quantitative data analyses and, on this basis, formulate qualitative conclusions regarding the patient's cardiovascular and respiratory status.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report

	<table border="1"> <thead> <tr> <th>Course outcome</th> <th>Subject outcome</th> <th>Method of verification</th> </tr> </thead> <tbody> <tr> <td>[FIZMEDL3_U10] Can independently plan and implement his/her own lifelong learning.</td> <td>The student can independently search, analyze, and synthesize information on new methods for physiological signal analysis, such as heart rate variability (HRV) analysis and baroreceptor function assessment. They can plan and execute their own research projects, taking into account the specifics of working in a clinical laboratory, such as a Holter monitoring lab. They can independently acquire knowledge about the latest advancements in the field of cardiovascular and respiratory electrophysiology to enhance their skills.</td> <td>[SU2] presentation/project/paper/report</td> </tr> </tbody> </table>	Course outcome	Subject outcome	Method of verification	[FIZMEDL3_U10] Can independently plan and implement his/her own lifelong learning.	The student can independently search, analyze, and synthesize information on new methods for physiological signal analysis, such as heart rate variability (HRV) analysis and baroreceptor function assessment. They can plan and execute their own research projects, taking into account the specifics of working in a clinical laboratory, such as a Holter monitoring lab. They can independently acquire knowledge about the latest advancements in the field of cardiovascular and respiratory electrophysiology to enhance their skills.	[SU2] presentation/project/paper/report			
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Subject contents	<p>This section covers the specifics of working in a clinical laboratory, such as a Holter monitoring lab. It includes a demonstration of techniques for measuring and analyzing ECG using Holter recorders, with a focus on the problem of QRS complex detection. It also covers heart rate variability analysis.</p> <p>The course will also address techniques for the combined measurement and analysis of multiple physiological parameters, including blood pressure, respiration, and heart rate. Students will learn about the analysis of respiratory and cardiac signals and their synchronization, as well as the analysis of ECG and systolic pressure signals in the assessment of baroreceptor function.</p>									
Prerequisites and co-requisites										
Assessment methods and criteria	<table border="1"> <thead> <tr> <th>Subject passing criteria</th> <th>Passing threshold</th> <th>Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>raport</td> <td>51.0%</td> <td>80.0%</td> </tr> <tr> <td>oral examination</td> <td>51.0%</td> <td>20.0%</td> </tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	raport	51.0%	80.0%	oral examination	51.0%	20.0%
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eResources addresses										
Example issues/ example questions/ tasks being completed	not applicable									
Work placement	Not applicable									

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