University of Gdańsk

Subject card

Subject name and code	Master Laboratory 1, PG_00207571						
Field of study	Medical Physics						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2027/2028			
Education level	Master'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	2		Language of instruction	Polish			
Semester of study	3		ECTS credits	8.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Anna Synak					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	75.0	0.0	0.0	75
	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	75		0.0	125.0	200	
Subject objectives	The aim of the Masters Laboratory I is to prepare students for the independent realization of research forming the basis of their masters thesis. Such research may be experimental, theoretical, numerical, or computational in nature and is carried out within the broader field of medical physics. Working under the supervision of a thesis advisor, students acquire skills in planning research, applying methods and measurement tools, and using data analysis procedures. An important component is also the critical use of scientific literature, the comparison of results with published data, and the proper presentation of findings in written and oral form, in accordance with the principles of research ethics.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FIZMEDMU2_W03] Knows and understands to an in-depth degree advanced experimental and numerical techniques that allow for planning and performing complex physical experiments.	The student has knowledge and understanding of advanced experimental and numerical techniques that enable the planning and execution of complex physical experiments. They are familiar with measurement methods, calibration procedures, and approaches to minimizing errors and uncertainties. The student is aware of the potential of modern numerical and simulation tools to support data analysis and interpretation. They understand the importance of selecting appropriate research methods for a given problem and can identify the limitations of specific techniques.	[SW2] presentation/project/paper/ report
	[FIZMEDMU2_K02] Is ready to create, adhere to and develop patterns of good conduct, including the principles of professional ethics and intellectual honesty in one's own activities and in the work environment; is aware of ethical issues in the context of research integrity and in the work of a medical physicist.	The student is ready to establish and follow principles of proper conduct in scientific and professional work. They understand the importance of professional ethics and intellectual honesty in planning, conducting, and presenting research. They are aware of ethical issues related to research integrity, including data processing, citation of literature, and the protection of intellectual property. The student recognizes potential risks arising from disregarding these principles and strives to develop the attitude of a responsible medical physicist who ensures credibility and transparency in their professional environment.	[SK1] oral statement/conversation/ discussion
	[FIZMEDMU2_U03] Can find necessary information in professional literature, both in databases and other sources.	The student is able to search for essential information in professional literature, databases, and other sources, including online resources. They can use both Polish- and English-language publications, assessing their reliability and relevance to the research being conducted. The student is capable of critically analyzing the collected information, comparing it with the current state of knowledge, and integrating it with their own results. They can apply these skills to the preparation of literature reviews and the proper analysis of data.	[SU2] presentation/project/paper/ report

	Course outcome	Subject outcome	Method of verification
	[FIZMEDMU2_W09] Knows and understands the basic concepts and principles of industrial property protection and copyright, as well as the need to manage intellectual property resources; knows the principles of using patent information resources.	The student knows and understands the basic concepts and principles of industrial property protection and copyright law. They are aware of the necessity of properly managing intellectual property resources, including their own research results, source materials, and developed outputs. The student understands the rules of correct citation and respecting the work of other authors, and is able to avoid infringements such as plagiarism or the unauthorized use of external materials. They are familiar with the basic possibilities of using patent information resources, can retrieve simple data related to technical solutions, and recognize their importance in assessing the novelty and originality of research. The student understands that this knowledge forms part of research integrity and the responsible practice of the medical physicist's profession.	[SW1] oral statement/ conversation/discussion
	[FIZMEDMU2_U02] Can plan and conduct an experiment using new or adapt existing methods and tools, and critically analyse the results of measurements, observations or numerical calculations, assessing the accuracy of the results using known methods and tools.	The student is able to design and carry out research using new or adapted methods and tools. They can conduct experiments, make observations, and perform numerical calculations in accordance with the principles of research integrity. They know the operating principles and basic construction of research and diagnostic equipment, which enables them to properly select measurement methods and interpret the obtained results. The student is capable of subjecting results to critical analysis, taking into account their reliability, limitations, and possible sources of error. They can apply established methods to assess accuracy and measurement uncertainty, as well as compare their findings with literature data or other research results.	[SU1] oral statement/conversation/ discussion
	[FIZMEDMU2_W04] Knows and understands in depth the theoretical foundations and principles of operation of measurement systems and research, diagnostic and therapeutic equipment specific to the field of physics and medicine.	The student has an advanced knowledge and understanding of the theoretical foundations and operating principles of measurement systems as well as research, diagnostic, and therapeutic equipment used in physics and medicine. They understand the design and functioning of selected devices and are able to indicate their capabilities and limitations resulting from applied technical solutions. The student is aware of the importance of accuracy and reliability of equipment for the quality of research and for patient safety. They are familiar with examples of modern technologies used in medical physics and the directions of their development.	[SW2] presentation/project/paper/ report

Subject contents	Depending on the nature of the masters thesis experimental or theoretical the student deepens their knowledge of the current state of research in the relevant field. They become familiar with the conditions, organization, and health and safety regulations in a laboratory equipped with advanced research, diagnostic, and/or computational facilities. The student learns the operating principles of measurement and diagnostic equipment as well as available software, and then prepares the research setup or develops codes necessary for the study. They perform experimental measurements and/or numerical calculations, process and analyze the obtained results, and compare them with literature data.
Prerequisites and co-requisites	Completion of courses thematically related to the masters thesis

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	conversation	51.0%	15.0%
	report or part of the master’s thesis	51.0%	85.0%
Recommended reading	Basic literature	Relevant to the topic of the masters thesis, suggested by the thesis supervisor and independently selected by the student.	
	Supplementary literature	not applicable	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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