

Subject card

Subject name and code	Signal Analysis and Visualization, PG_00182191						
Field of study	Medical Physics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study 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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		5.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Marek Krośnicki				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	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		65.0	125
Subject objectives	not applicable						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[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 conduct analysis of biological and medical signals using machine learning methods and image segmentation techniques, and perform a critical evaluation of the obtained results.		[SU2] presentation/project/paper/report		
	[FIZMEDMU2_W05] Knows and understands in depth the theoretical foundations of computational methods and computer techniques used to model and simulate physical and biological systems.		The student has an in-depth knowledge and understanding of the theoretical foundations of computational methods and Machine Learning techniques applied to the analysis and processing of medical imaging data, including segmentation, filtering, and visualization methods.		[SW2] presentation/project/paper/report		
	[FIZMEDMU2_W02] Knows and understands in depth the issues of mathematics and mathematical methods used in physics and medicine, as well as the relationships between them.		The student has an in-depth knowledge and understanding of mathematical concepts and methods applied in the analysis and visualization of medical signals, including machine learning methods.		[SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report		
Subject contents	not applicable						
Prerequisites and co-requisites	not applicable						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Completion and presentation of 3 projects	51.0%	100.0%
Recommended reading	Basic literature	1) Ch. Solomon, T. Breckon "Fundamentals of Digital Image Processing", Willey-Blackwell 2011 2) G. James, D. Witten, T. Hastie, R. Tibshirani, J. Taylor, An Introduction to Statistical Learning, https://www.statlearning.com/ 3 J. L. Semmlow, Bioisignal and Biomedical Image Processing Marcel Dekker INC 2004	
	Supplementary literature	not applicable	
	eResources addresses		
	Example issues/ example questions/ tasks being completed	not applicable	
Work placement	Not applicable		

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