

**Subject card**

<b>Subject name and code</b>	Signal Analysis and Visualization, PG_00182191						
<b>Field of study</b>	Medical Physics						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>			2026/2027		
<b>Education level</b>	Master'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>	1	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	2	<b>ECTS credits</b>			5.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			exam		
<b>Conducting unit</b>	Faculty of Mathematics, Physics and Informatics -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr hab. inż. Marek Krośnicki				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	30.0	0.0	30.0	0.0	0.0	60
	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>	60		0.0		65.0	125
<b>Subject objectives</b>	not applicable						
<b>Learning outcomes</b>	<b>Course outcome</b>		<b>Subject outcome</b>			<b>Method of verification</b>	
	[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	
	[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_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	
<b>Subject contents</b>	not applicable						
<b>Prerequisites and co-requisites</b>	not applicable						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		Completion and presentation of 3 projects	51.0%
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, <a href="https://www.statlearning.com/">https://www.statlearning.com/</a>  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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