



## Subject card

Subject name and code	, PG_00030015						
Field of study	Mathematics						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
Education level	second-cycle studies	Subject group			Optional subject group		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Zakład Fizyki Teoretycznej i Informatyki Kwantowej -> Instytut Fizyki i Informatyki Stosowanej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marcin Wilczewski				
	Teachers		dr inż. Marcin Wilczewski				
Lesson types and methods of instruction	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						
	Address on the e-learning platform: <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19515">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19515</a>						
	Additional information: Lectures on site						
Labs on-line							
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	5.0	60.0	125		
Subject objectives	To learn the fundamentals of image processing in theory and practice.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_W11	Student implements algorithms in a given programming language			[SW3] Assessment of knowledge contained in written work and projects		
	K7_K02	Student learns and practices how to deal with complicated problems by decomposition to smaller parts			[SK5] Assessment of ability to solve problems that arise in practice		
	K7_U11	The student learns the methods of image modeling. Learns how to use linear algebra and mathematical analysis to image processing			[SU1] Assessment of task fulfilment		
	K7_U12	Student learns how to use algebraic structures (vector spaces) to solve image processing problems			[SU1] Assessment of task fulfilment		
	K7_W08	The student learns the fundamentals of machine learning methods.			[SW1] Assessment of factual knowledge		

Subject contents	1. Colorspaces  2. Point and context operations. Image filters.  3. Image discretizations: scalar and vector.  4. CBIR systems  6. Methods of image compression											
Prerequisites and co-requisites	The fundamentals of mathematical analysis and linear algebra.											
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Subject passing criteria</th> <th style="width: 33%;">Passing threshold</th> <th style="width: 34%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>lab</td> <td>0.0%</td> <td>60.0%</td> </tr> <tr> <td>test</td> <td>0.0%</td> <td>40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	lab	0.0%	60.0%	test	0.0%	40.0%
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Recommended reading	Basic literature		1. Gonzalez, Woods, "Digital Image Processing", Person									
	Supplementary literature		none									
	eResources addresses		Adresy na platformie eNauczenie:									
Example issues/ example questions/ tasks being completed	1. Basics of matrix operations on images  2. Implementation of image filters  3. Discretization  4. Implementation of CBIR systems											
Work placement	Not applicable											