



Subject card

Subject name and code	Multimedia processing, PG_00031931						
Field of study	Technical Physics						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group 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	1	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Theoretical Physics and Quantum Information -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marcin Nowakowski				
	Teachers		dr inż. Marcin Nowakowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	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	45		5.0		25.0	75
Subject objectives	The main goal of the course is to introduce student into the field of multimedia processing especially based on digital images and video. During the course students will be able to basic and intermediate concepts of image processing, data compression (including images and video) and content based image processing.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W04] Has enhanced knowledge of mathematical, numerical and simulation methods applied in the description and modelling of physical phenomena.		Student can fluently move in the field of multimedia processing and can apply basic methods and algorithms.		[SW1] Assessment of factual knowledge		
	[K7_U05] Can plan and conduct theoretical calculations, experimental research and computer simulations, critically analyze their results, draw conclusions and form reasoned opinions.		Student is able to independently choose the right method to solve posed problem. Student is able to implement basic algorithms in programming languages.		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task		

Subject contents	<p>1. Statistical description of digital images and video streams.</p> <p>2. Digital image processing: algebraic operations, histogram based operations, piecewise functions, point operations</p> <p>3. Scalar and vector quantization</p> <p>4. Introduction do data mining and content based image retrieval</p> <p>5. Context operations. Image filters.</p> <p>6. Multimedia compression: Huffmann coding, dictionary methods, special methods, RLE, JPEG.</p> <p>7. Vector filters.</p>								
Prerequisites and co-requisites	<p>1. Students have competence in computer programming (at least one language including programming in mathematical packages)</p> <p>2. Student knows basic notions in the field of statistics.</p>								
Assessment methods and criteria	<table border="1" data-bbox="451 918 1487 992"> <thead> <tr> <th data-bbox="451 918 798 958">Subject passing criteria</th> <th data-bbox="798 918 1141 958">Passing threshold</th> <th data-bbox="1141 918 1487 958">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 958 798 992">Total score lecture + lab</td> <td data-bbox="798 958 1141 992">51.0%</td> <td data-bbox="1141 958 1487 992">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Total score lecture + lab	51.0%	100.0%
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Recommended reading	Basic literature	<p>1. R. C. Gonzalez, R. E. Woods, Digital Image Processing, Prentice Hall, 2007</p> <p>2. A. Przelaskowski, Kompresja danych obrazowych, BTC, 2005</p> <p>3. M. Wilczewski, Algorytmy graficzne, skrypt do wykładu, nieopublikowane/dostępne na stronach www przedmiotu</p>							
	Supplementary literature	<p>1. K. Sayood, Introduction to Data Compression, Morgan Kaufmann, 2012</p>							
	eResources addresses	Adresy na platformie eNauczanie:							
Example issues/ example questions/ tasks being completed									
Work placement	Not applicable								