GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Multimedia processing, PG_00031931
Field of study	Technical Physics

Date of commencement of studies	February 2023	Academic year of realisation of subject	2022/2023
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 Wilczewski
	Teachers	dr inż. Marcin Wilczewski

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_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.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	[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

Subject contents	1. Statistical description of digital images and video streams.
	2. Digital image processing: algebraic operations, histogram based operations, piecewise functions, point operations
	3. Scalar and vector quantization
	4. Introduction do data mining and content based image retrieval
	5. Context operations. Image filters.
	6. Multimedia compression: Huffmann coding, dictionary methods, special methods, RLE, JPEG.
	7. Vector filters.
Prerequisites and co-requisites	1. Students have competence in computer programming (at least one language including programming in mathematical packages)
	2. Student knows basic notions in the field of statistics.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Total score lecture + lab	51.0%	100.0%

Recommended reading	Basic literature	1. R. C. Gonzalez, R. E. Woods, Digital Image Processing, Prentice Hall, 2007
		2. A. Przelaskowski, Kompresja danych obrazowych, BTC, 2005
		3. M. Wilczewski, Algorytmy graficzne, skrypt do wykładu, nieopublikowane/dostępne na stronach www przedmiotu
	Supplementary literature	1. K. Sayood, Introduction to Data Compression, Morgan Kaufmann, 2012
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable