



## Subject card

Subject name and code	Multimedia Interactive Systems, PG_00058856						
Field of study	Informatics						
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		exam		
Conducting unit	Department of Intelligent Interactive Systems -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Mariusz Szwoch				
	Teachers		dr inż. Mariusz Szwoch				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	0.0	30
	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	30		6.0		39.0	75
Subject objectives	To familiarize students with the problems of: 2D and 3D image analysis , multimedia databases, augmented and mixed reality, affective computing, biometric data.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study by:n-appropriate selection of source information and its critical analysis, synthesis, creative interpretation and presentation,n-application of appropriate methods and toolsn	The student presents the problems and applications of multimedia data analysis obtained from various input channels. The student is able to create an application that uses the algorithms of computer vision, affective informatics, augmented reality and mixed reality. The student designs applications for mobile and stationary devices. The student uses a variety of application development platforms.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	[K7_W04] Knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	Student describes the methods of acquiring, processing and recognizing multimedia data obtained from various input channels. Characterizes and describes different types of biometric data and examples of their use. Shows attributes of acoustic speech signal. Prepares seminar presentation on topic concerned with biometrics or speech analysis and synthesis	[SW1] Assessment of factual knowledge
	[K7_U06] can analyse the operation of components, circuits and systems related to the field of study; measure their parameters; examine technical specifications; interpret obtained results and draw conclusions	The student presents the problems and applications of multimedia data analysis among others the analysis of images obtained with digital cameras, depth sensors and biometric sensors. Student is able to create an application that uses algorithms from computer vision, emotion recognition, augmented and mixed reality fields. Student develops applications for mobile devices. Student uses different object-oriented software development platform.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	[K7_W03] Knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum.	Student describes the methods of acquiring, processing and recognizing multimedia data obtained from various input channels, among others describes the methods of analyzing images obtained with digital cameras, depth sensors and data from biometric sensors. Characterizes and describes different types of biometric data and examples of their use.	[SW1] Assessment of factual knowledge
	[K7_U42] can solve engineering and research problems including design, assessment and maintenance of information systems and applications, using experimental methods and management techniques	The student presents problems and applications of image analysis obtained with digital cameras, depth sensors and data from biometric sensors. The student is able to create an application that uses the algorithms of computer vision, recognition of emotions, augmented and mixed reality. The student designs applications for mobile devices. The student uses a variety of manufacturing platforms	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
Subject contents	1. Introduction to the subject (scope of the material, rules of assessment, literature, auxiliary materials) 2. Multimedia, interactive multimedia, hypermedia: definitions and applications, media components: text, hypertext, image, sound, video, animation 3. Alternative methods of image acquisition 4. Selected multimedia data compression algorithms. 5. Basics of affective informatics and emotional recognition 6. Basics of affective game design 7. Depth sensors and photogrammetry 8. Augmented, extended and mixed reality 11. Multimedia input interface: music notation recognition - case study 12. Multimedia input interface: block diagram recognition - case study		
Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	51.0%	40.0%
	Presence	51.0%	10.0%
	Project	51.0%	50.0%

Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. R.Wang: Augmented Reality with Kinect, Packt Publishing, 2013.</li> <li>2. J.R. López Benito, E.Artetxe González: Enterprise Augmented Reality Projects, Packt Publishing, 2019.</li> <li>3. J.Glover, J.Linowes: Complete Virtual Reality and Augmented Reality Development with Unity, Packt Publishing, 2019.</li> <li>4. D.Vroegop: Microsoft HoloLens Developer's Guide, Packt Publishing, 2017.</li> <li>5. J.Howse, J.Minichino: Learning OpenCV 4 Computer Vision with Python 3 - Third Edition, Packt Publishing, 2020.</li> <li>6. CBDAR'11: Proceedings of the 4th international conference on Camera-Based Document Analysis and Recognition, Internet: ACM Digital Library, <a href="https://dl.acm.org/doi/proceedings/10.5555/2238208">https://dl.acm.org/doi/proceedings/10.5555/2238208</a>.</li> </ol>
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	