



## Subject card

Subject name and code	Digital Photogrammetry, PG_00048301						
Field of study	Informatics						
Date of commencement of studies	February 2023	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	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Geoinformatics -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Marcin Ciecholewski				
	Teachers		dr hab. Marcin Ciecholewski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	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	The aim of the course is to familiarize students with the subject of digital photogrammetry.						
	The main emphasis is on the use of information technology in digital photogrammetry.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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.	The student knows the camera models used in photogrammetry. The student knows stereoscopic vision models and ways of representing them, such as the fundamental matrix.	[SW1] Assessment of factual knowledge
	[K7_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, making assessment and critical analysis of the prepared software as well as a synthesis and creative interpretation of information presented with it	Student is able to apply photogrammetric models and techniques during the development of proprietary software.	[SU1] Assessment of task fulfilment
	[K7_W05] Knows and understands, to an increased extent, methods of process and function support, specific to the field of study.	The student knows the ways to automate photogrammetry processing.	[SW3] Assessment of knowledge contained in written work and projects
	[K7_U07] can apply advanced methods of process and function support, specific to the field of study	The student is able to use advanced libraries during the development of proprietary software.	[SU4] Assessment of ability to use methods and tools
Subject contents	<p>Introduction to digital photogrammetry</p> <p>Overview of photogrammetric technology</p> <p>Photogrammetric products: digital terrain model, orthophotomap</p> <p>Sources of data in photogrammetry</p> <p>The geometry of the single-image - pinhole camera calibration</p> <p>Principles of stereoscopic vision and stereoscopic observation. The geometry of the photogrammetric stereo pair - fundamental matrix</p> <p>Correlation of images and automation of measurement - detectors and descriptors SIFT</p> <p>Estimation of homography, fundamental matrix, aerial triangulation - RANSAC method</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Collection of laboratory tasks	50.0%	50.0%
	Oral colloquium	50.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Krzysztof Bruniecki; Materiały do wykładu z Fotogrametrii Cyfrowej; Online; 2014</li> <li>2. S. Przewłocki: Geodezja dla kierunków niegeodezyjnych. PWN, Warszawa, 2006</li> <li>3. Z. Kurczyński: Lotnicze i satelitarne obrazowanie Ziemi. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2006</li> <li>4. Z. Kurczyński, Ryszard Preuss: Podstawy fotogrametrii. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2003</li> </ol>	
	Supplementary literature	Richard Hartley; Andrew Zisserman; Multiple View Geometry in Computer Vision; Cambridge University Press, 2004	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	<p>camera calibration</p> <p>Estimation of the fundamental matrix</p> <p>Algorithm of 8-point correspondence</p> <p>RANSAC algorithm</p> <p>3D visualization of photogrammetric products</p>		
Work placement	Not applicable		