

Subject card

Subject name and code	Application of UAV in Hydrography - laboratory classes , PG_00201149						
Field of study	Marine Hydrography						
Date of commencement of studies	October 2027		Academic year of realisation of subject		2029/2030		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Optional subject group Subject group related to practical vocational preparation		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		3.0		
Learning profile	practical		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Piotr Bekier				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	40.0	0.0	0.0	40
	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	40		2.0		30.0	72
Subject objectives	1. Discussion of the possibilities and limitations of using photogrammetric data obtained remotely using satellite, air and unmanned aerial vehicle systems in hydrography. 2. To familiarize students with photogrammetry methods, satellite data correction and photogrammetric data processing. 3. Developing skills in creating bathymetric maps and separating the coastline based on photogrammetric data from unmanned aerial vehicle raids. 4. Familiarization with the basic BST flight conditions and aviation law regarding flights.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[HML3-U09] is able to critically analyse the functioning of existing technical solutions and evaluate these solutions	is able to critically analyze the functioning of existing technical solutions and evaluate them	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
	[HML3-U06] is able to make a preliminary economic assessment of the proposed solutions and engineering activities undertaken	is able to conduct a preliminary economic assessment of proposed solutions and engineering measures	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
	[HML3-U04] is able to use analytical, simulation and experimental methods to identify, formulate and solve engineering tasks	is able to use analytical, simulation and experimental methods to identify, formulate and solve engineering tasks	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
	[HML3-W08] knows and understands, at an advanced level, principles of operation and use of measuring instruments used in professional activities related to the field of study, including principles for their calibration and accuracy assessment	knows at an advanced level the principles of operation and use of measuring instruments employed in professional activities related to their field of study, including the principles of their calibration and accuracy assessment	[SW3] text preparation/written work
	[HML3-U05] when identifying, formulating and solving engineering tasks, is able to integrate knowledge from various fields and disciplines and perceive their systemic and non-technical aspects, including ethical aspects	when identifying, formulating, and solving engineering problems, is able to integrate knowledge from various fields and disciplines and recognize their systemic and non-technical aspects, including ethical considerations	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
	[HML3-U07] is able to effectively use information and communication techniques, including utility programs to solve professional problems	is able to effectively use information and communication technologies, including software applications, to solve professional problems	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
Subject contents	Classes: Aviation law. Laboratories: Preparation and implementation of a high-precision photogrammetric survey. Improving the operation of a multi-rotor aircraft. Performing a multi-stage photogrammetric raid. Processing a measurement session obtained from a photogrammetric mission in aerial photogrammetry processing software. Principles of processing three-dimensional lidar point clouds. Generating a TIN and GRIG mesh using data collected during a photogrammetric raid. Processing of a three-dimensional lidar point cloud from an air raid		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	report	51.0%	30.0%
	observation	51.0%	70.0%
Recommended reading	Basic literature	1. KURCZYŃSKI Z.: Lotnicze i satelitarne obrazowanie Ziemi. Tom I i II. Oficyna wydawnicza Politechniki Warszawskiej, Warszawa 2006. 2. KURCZYŃSKI Z., PREUSS R.: Podstawy fotogrametrii. Oficyna wydawnicza Politechniki Warszawskiej, 2011. 3. SZCZEPKOWSKI M.: Drony - teoria i praktyka. Kabe, 2016.	
	Supplementary literature	1. ADAMCZYK J., BĘDKOWSKI K.: Metody cyfrowe w teledetekcji. Wydawnictwo SGGW, Warszawa 2007.	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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