University of Gdańsk

Subject card

Subject name and code	Remote sensing and photogrammetry - lecture, PG_00131494						
Field of study	Marine Hydrography						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2025/2026			
Education level	Bachelor's studies		Subject group	Obligatory subject group 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	4		ECTS credits	1.0			
Learning profile	practical		Assessment form	credit			
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Krzysztof Naus				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	0.0	0.0	0.0	0.0	20
	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	20		1.0		9.0	30
Subject objectives	1. Discussion of the Capabilities and Limitations of Using Photogrammetric Data, Multispectral and Hyperspectral Images, and LiDAR Data (Topographic and Bathymetric) in Hydrography, Acquired Remotely via Satellite, Aerial, and Unmanned Aerial Systems. 2. Introducing Students to Photogrammetry Methods, Satellite Data Correction, and LiDAR Data Processing. 3. Developing Skills in Creating Bathymetric Maps and Extracting Shorelines Based on Satellite Data and Photogrammetric Data.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[HML3-W04] the issue of measurements related to the exploration of sea basins and inland waters and tools allowing to describe, interpret and present the results of measurements	Knowledge: -Issues related to measurements in marine and inland water studies, and tools for describing, interpreting, and presenting measurement results.	[SW4] test/exam - oral or written
[HML3-U11] use navigation devices, means of technical observation and communication as well as measuring instruments, as well as apply in practice various techniques of measurement and observation in the field of professional activity related to the field of study	Skills: - Operate measurement instruments in the field of remote sensing and apply various measurement techniques in professional activities related to the field of study.	[SU4] test/exam - oral or written
[HML3-W05] map construction and its symbolism	Knowledge: - Map construction and its symbolism.	[SW4] test/exam - oral or written
[HML3-U14] use the applicable terminology in presenting and discussing problems related to the field of study	Skills: - Utilize current terminology in presenting and discussing problems related to the field of study.	[SU4] test/exam - oral or written
[HML3-U07] effectively use information and communication techniques, including utility programs to solve professional problems	Skills: - Effectively utilize information and communication technologies, including software applications, to solve professional problems.	[SU4] test/exam - oral or written

Subject contents

Lectures: Introduction to satellite remote sensing: Electromagnetic radiation as an information carrier, interaction of electromagnetic radiation with marine water components, penetration depth, atmospheric influence on the recorded signal. Characteristics of sensors and satellite systems used in coastal zone studies: Orbit characteristics, temporal, spatial, spectral, and radiometric resolution. Stages of satellite data processing: Instrumental correction, atmospheric correction, reflection correction, cloud area masking, overview of satellite bathymetric models. Fundamentals of aerial photogrammetry. Characteristics of modern photogrammetric technologies. Technological conditions for building a Digital Terrain Model. Technological stages of creating an aerial orthophotomap, basics of aviation law concerning unmanned aerial vehicles. Principles, capabilities, and limitations of data acquisition from LiDAR devices in bathymetric and topographic variants. Methods of extracting bathymetric and topographic information from LiDAR data and their use for supplementing spatial data in coastal areas.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Colloquium	51.0%	100.0%

Recommended reading

Basic literature	1. KORCZYŃSKI Z.: Fundamentals of Photogrammetry. Publishing House of Warsaw University of Technology, 2003. 2. KURCZYŃSKI Z.: Aerial and Satellite Imaging of the Earth. Volumes I and II. Publishing House of Warsaw University of Technology, Warsaw 2006.
Supplementary literature	1. ADAMCZYK J., BĘDKOWSKI K.: Digital Methods in Remote Sensing. SGGW Publishing House, Warsaw 2007.
eResources addresses	

Example issues/ example questions/ tasks being completed

1. What are the key differences between multispectral and hyperspectral imaging?
2. How does LiDAR technology penetrate the water surface to measure bathymetry?

Work placement

Not applicable

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