University of Gdańsk

Subject card

Subject name and code	Introduction to remote sensing of the environment - laboratory exercises, PG_00091485		
Field of study	Water Management and Protection of Water Resources		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study Subject group related to practical vocational preparation
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	1.0
Learning profile	practical	Assessment form	credit
Conducting unit	Laboratory of Physical Oceanography -> Department of Physical Oceanography and Climate Research -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Katarzyna Bradtke	
	Teachers	dr Katarzyna Bradtke	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	15.0	0.0	0.0	15

E-learning hours included: 0.0

eNauczanie source addresses:

Moodle ID: 13768 GWOZW-L3DZ- Podstawy teledetekcji środowiska (2026/27)
https://mdl.ug.edu.pl/course/view.php?id=13768

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	15	2.0	13.0	30

Subject objectives

To familiarize students with the sources and methods of visualisation and processing satellite remote sensing data, and their interpretation for the purposes of environmental monitoring and hydrological modeling.

Developing skills in the practical use of Image Processing and GIS software in the analysis of satellite imagery.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GWOZWL3-U02] select and independently apply basic research techniques and tools, with adhering to established analytical procedures in the field of environmental research in water management, adequately to the considered research problem	The student selects and independently applies basic techniques and research tools in the field of environmental research, adequately to the research problem under consideration.	[SU5] implementation of a problem task [SU8] observation of student's independent or team work
[GWOZWL3-U08] use basic mathematical and statistical methods to analyze data and describe phenomena and processes occurring in the environment, as well as methods of information technology to assess the risk of threats to the of the environment, especially the hydrosphere	The student uses basic mathematical and statistical methods to analyze satellite data and describe phenomena and processes occurring in the environment.	[SU5] implementation of a problem task
[GWOZWL3-W02] the importance of knowledge in the sciences allowing to understand the processes and phenomena occurring in the hydrosphere, as well as knowledge of the social sciences and of the Earth's geographic environment - as a a system of interrelated and interacting components	The student understands the importance of knowledge in the field of exact sciences allowing understanding the processes and phenomena occurring in the hydrosphere as a system of interconnected and interacting components.	[SW1] oral statement/ conversation/discussion
[GWOZWL3-W04] research techniques, methods and tools currently used in water management and protection of water resources both in the field of natural sciences and social sciences, including basic statistical and information technology tools that make it possible to describe, model and interpret data on phenomena and processes occurring in the aquatic environment, as well as tools for describing relationships in social-ecological systems	The student knows and understands satellite techniques and satellite data processing tools currently used in water management and water resources protection.	[SW1] oral statement/ conversation/discussion [SW5] implementation of a problem task

Subject contents

1. Using databases and browsers of satellite data. Initial data analysis in a web browser.
2. Acquisition and preparation for further analysis of multispectral and SAR data (from devices operating on circumpolar satellites).
3. Visual interpretation, creation of color composites, identification of objects (e.g. water reservoirs, areas with different types of land cover) and their measurements.
4. Quantitative analysis based on satellite data: creating maps of spectral indices (vegetation, drought, etc.), analysis of changes over time, etc.

Prerequisites and co-requisites

basic skills in working in a Windows environment, knowledge of the basics of digital data models and the basics of using the ArcGIS Pro program (in the scope of the course curriculum: "Geographic Information Systems - laboratory exercises 1")

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
practical test	51.0%	50.0%
active participation in classes	51.0%	50.0%

Recommended reading

Basic literature

- Hejmanowska B., Wężyk P., Dane satelitarne dla administracji publicznej, Polska Agencja Kosmiczna 2020; https://polsa.gov.pl/wp-content/themes/polsa/files/Podrecznik.pdf
- Lavender S., Practical handbook of remote sensing, CRC Press 2016

	Supplementary literature	• Adamczyk J., Będkowski K., Metody cyfrowe w teledetekcji. Wyd. SGGW, Warszawa 2007 • Szturc J., Teledetekcja satelitarna i radarowa w meteorologii i hydrologii, Wydawnictwo ATH, Bielsko-Biała 2004 • Kurczyński Z., Lotnicze i satelitarne obrazowanie Ziemi. Oficyna Wyd. Polit. Warsz., Warszawa 2006. • Xiaojun Yang (ed.), Remote Sensing and Geospatial Technologies for Coastal Ecosystem Assessment and Management, Springer 2009 • Lillesand T.M., Kiefer R.W., Remote sensing and image interpretation, Wiley 2000
	eResources addresses	
Example issues/ example questions/ tasks being completed	The practical test involves performing selected elements of the analyzes learned during the workshops (labs 1 - 4), including: • searching for information in satellite databases • visualization of satellite images • spectral data processing, interpretation, • obtaining information from data	
Work placement	Not applicable	

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