

Subject card

Subject name and code	Introduction to satellite remote sensing - laboratory exercises, PG_00150838						
Field of study	Oceanography						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study 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	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		2.0		
Learning profile	academic		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 Wojciech Brodziński				
	Teachers		dr Wojciech Brodziński				
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						
	eNauczanie source addresses: Moodle ID: 13990 OCEAN-L3DZ-(2026/2027)-Wprowadzenie do teledetekcji satelitarnej https://mdl.ug.edu.pl/course/view.php?id=13990						
	Additional information: Computer workshops (12 meetings): analysis of satellite data using specialized computer software. The exercises are supplemented by the student's own work, which involves performing analyzes and reporting the results in order to consolidate the acquired knowledge and skills.						
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		1.0		19.0	60
Subject objectives	Preparing students to use satellite data and image processing programs to describe phenomena occurring in the marine environment, as well as familiarizing them with the basic methods of analyzing raster data.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OCEANL3-W05] has an advanced knowledge of techniques, research methods, and tools (mathematical, statistical, and computational) used by oceanographers to describe and interpret processes and phenomena occurring in the marine environment	The student has advanced knowledge of techniques, research methods and IT tools used in the work of an oceanographer to describe and interpret processes and phenomena occurring in the marine environment using satellite data	[SW3] text preparation/written work [SW5] implementation of a problem task
	[OCEANL3-U05] is able to use general-purpose and specialized software, as well as mathematical and statistical methods, in data analysis and the presentation of results	The student is able to use utility and specialized software, as well as mathematical and statistical methods in the analysis of satellite data and the presentation of results	[SU3] text preparation/written work [SU5] implementation of a problem task [SU8] observation of student's independent or team work
Subject contents	1. Satellite data sources and formats. Data acquisition. Specialized software for visualization and data pre-processing. 2. Visualization of raster data, contrast enhancement, use of color palettes 3. Examples of maps of geophysical quantities created on the basis of satellite data recorded using various techniques (high-level satellite products - L2, L3) and their exploration, including: the use of cloud and land masks, validation of satellite data; identification of objects/structures, their extraction and characterization; analysis of changes over time 4. Multispectral analysis, examples of satellite data at lower levels of processing 5. Visual interpretation of images recorded in the VIS-SWIR band, identification of objects, various types of land cover, optical diversity of water 6. Application of color composites, spectral enhancement, index analysis, fusion of images with different spatial resolution 7. Atmospheric correction, processing to higher levels with Case-2 algorithms for water		
Prerequisites and co-requisites	basic computer skills (Windows environment), basic knowledge of cartography and digital data models (scope of courses: "ABC IT", "Technologia informacyjna - ćw. laboratoryjne", "Mapy i GIS - ćw. laboratoryjne")		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	independent task solving 1	51.0%	25.0%
	report 2	51.0%	25.0%
	independent task solving 2	51.0%	25.0%
	report 1	51.0%	25.0%
Recommended reading	Basic literature	• Hejmanowska B., Wężyk P. (ed.), Dane satelitarne dla administracji publicznej, Polska Agencja Kosmiczna 2020; https://polsa.gov.pl/wp-content/themes/polsa/files/Podrecznik.pdf • Emery W., Camps A., 2017, Introduction to Satellite Remote Sensing. Atmosphere, Ocean, Land and Cryosphere Applications, Elsevier • Emilio Chuvieco, 2016, Fundamentals of Satellite Remote Sensing, CRC Press	
	Supplementary literature	• Martin S., 2014, An introduction to ocean remote sensing. Wydanie drugie. Cambridge University Press • Robinson I.S., 2004, Measuring the oceans from space : the principles and methods of satellite oceanography, Springer • Adamczyk J., Będkowski K., 2007, Metody cyfrowe w teledetekcji. Wyd. SGGW, Warszawa	
	eResources addresses		
	Example issues/ example questions/ tasks being completed	Assessment criteria: • ability to use satellite data analysis software in practice • ability to select data transformation and analysis methods to solve specific research problems based on satellite data • ability to interpret satellite data and the results of their analysis in the context of analyzing phenomena and processes occurring in the natural environment	
Work placement	Not applicable		

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