

Subject card

Subject name and code	Satellite oceanography - lecture, PG_00117839						
Field of study	Oceanography						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Master'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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		1.0		
Learning profile	academic		Assessment form		exam		
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						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
	Additional information: Multimedia-based lecture.						
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	Introducing students to aspects of oceanography that can be investigated from a satellite perspective, including remote sensing techniques, with particular emphasis on microwave techniques, satellite databases, and methods for their processing and analysis						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[OCEANMU2-W04] knows and understands the latest research trends in the field of oceanography as well as the possibilities of practical application of scientific achievements		The student knows and understands in-depth the latest trends in oceanographic research using satellite remote sensing devices and systems		[SW4] test/exam - oral or written		
	[OCEANMU2-W03] knows and understands research methods used in oceanography and related sciences		The student knows and understands in-depth research methods used in the work of an oceanographer to describe and interpret phenomena and processes occurring in the aquatic environment using satellite data		[SW4] test/exam - oral or written		
	[OCEANMU2-W01] knows and understands in-depth specialized terminology used in oceanography and related sciences (in Polish and a selected foreign language)		The student knows and understands in-depth specialized terminology related to satellite remote sensing methods used in oceanography, in particular microwave techniques.		[SW4] test/exam - oral or written		

Subject contents	1. Satellite techniques used in Earth Observation. Basic concepts of satellite remote sensing. 2. Spatial and temporal scales of marine phenomena. Applications and limitations of satellite remote sensing in monitoring, e.g.: - large-scale Phenomena (e.g., ice cover in polar regions, El Niño) - mesoscale and submesoscale Phenomena (e.g., eddies, fronts, coastal upwelling, internal waves) - aquatic productivity (types 1 and 2 waters) - coastal zones (bathymetry, river plume extent, shoreline changes) - potential hazards (oil spills, iceberg trajectories, anthropogenic atmospheric pollution). 3. Satellite data in temporal trend analysis and ecohydrodynamic modeling 4. Operational earth observation programs. Overview of sensors and available data for Marine Areas and coastal zones (parameters, temporal and spatial resolution). 5. Synergy of data from different satellite systems. Methods for assessing satellite data quality. Filtering, transforming, segmentation and classification methods for image data analysis.		
Prerequisites and co-requisites	Knowledge of the basics of satellite remote sensing and GIS		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test	51.0%	100.0%
Recommended reading	Basic literature	- Robinson I., 2010. Discovering the Oceans from Space: The unique applications of satellite oceanography, Springer-Verlag, Berlin and Heidelberg - Emery W., Camps A., 2017, Introduction to Satellite Remote Sensing. Atmosphere, Ocean, Land and Cryosphere Applications, Elsevier	
	Supplementary literature	- Berizzi F., Martorella M., Giusti E., 2016, Radar Imaging for Maritime Observation, CRC Prss, Taylor & Francis Group 348 s. - Martin S., 2004, An introduction to Ocean Remote Sensing, Cambridge University Press, 426 s. - Chapman R., Gasparovic R., 2022, Remote sensing physics: an introduction to observing earth from space, Wiley, Hoboken USA, 468 ss. - Chang N.-B., Bai K., 2018, Multisensor data fusion and machine learning for environmental remote sensing, CRC Press, Boca Raton, 508 ss.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Assessment criteria: Knowledge of - physical processes occurring in the sea that can be studied using satellite methods - satellite techniques used to study specific processes in the sea - surface properties that enable remote detection of the phenomena discussed in the lecture - satellite data processing stages necessary to obtain specific environmental information from satellite data - spatial data analysis methods used in the analysis of satellite data in oceanography		
Work placement	Not applicable		

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