

**Subject card**

<b>Subject name and code</b>	Satellite Oceanography - lecture, PG_00198883						
<b>Field of study</b>	Marine Hydrography						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>			2029/2030		
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>			Obligatory subject group in the field of study Optional subject group		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	4	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	7	<b>ECTS credits</b>			1.0		
<b>Learning profile</b>	practical	<b>Assessment form</b>			credit		
<b>Conducting unit</b>	Laboratory of Physical Oceanography -> Department of Physical Oceanography and Climate Research -> Faculty of Oceanography and Geography -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Katarzyna Bradtke				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	15		1.0		9.0	25
<b>Subject objectives</b>	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						
<b>Learning outcomes</b>	<b>Course outcome</b>		<b>Subject outcome</b>			<b>Method of verification</b>	
	[HML3-W03] knows and understands, at an advanced level, directions of development and the latest discoveries in the field of scientific disciplines forming the theoretical basis appropriate to the field of study		knows and understands the directions of development and the latest discoveries in the use of satellite observation techniques and image analysis in marine hydrography			[SW4] test/exam - oral or written	
	[HML3-K02] is ready to correctly determine the priorities in professional work for the implementation of a task specified by himself/ herself or others		is ready to correctly determine priorities and effectively organize work when carrying out practical tasks related to the use of satellite data in the work of a hydrographer			[SK1] oral statement/conversation/discussion	
	[HML3-W04] knows and understands, at an advanced level, 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		knows and understands at an advanced level the methods, techniques and research tools used in physical research of seas and oceans using satellite techniques			[SW4] test/exam - oral or written	

Subject contents	<p>1. Satellite techniques used in Earth Observation. Basic concepts of satellite remote sensing.</p> <p>2. Spatial and temporal scales of marine phenomena. Applications and limitations of satellite remote sensing in monitoring:  - 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).</p> <p>3. Satellite data in temporal trend analysis and ecohydrodynamic modeling</p> <p>4. Operational earth observation programs. Overview of sensors and available data for Marine Areas and coastal zones (parameters, temporal and spatial resolution).</p> <p>5. Synergy of data from different satellite systems. Methods for assessing satellite data quality. Filtering, transforming and classification methods for image data analysis.</p>								
Prerequisites and co-requisites	Knowledge of the basics of satellite remote sensing and GIS								
Assessment methods and criteria	<table border="1" data-bbox="448 725 1487 797"> <thead> <tr> <th data-bbox="448 725 798 763">Subject passing criteria</th> <th data-bbox="802 725 1142 763">Passing threshold</th> <th data-bbox="1147 725 1487 763">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 770 798 797"></td> <td data-bbox="802 770 1142 797">50.0%</td> <td data-bbox="1147 770 1487 797">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade		50.0%	100.0%
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Recommended reading	Basic literature	<ul style="list-style-type: none"> <li>• Robinson I., 2010. Discovering the Oceans from Space: The unique applications of satellite oceanography, Springer-Verlag, Berlin and Heidelberg</li> <li>• Emery W., Camps A., 2017, Introduction to Satellite Remote Sensing. Atmosphere, Ocean, Land and Cryosphere Applications, Elsevier</li> </ul>							
	Supplementary literature	<ul style="list-style-type: none"> <li>• Berizzi F., Martorella M., Giusti E., 2016, Radar Imaging for Maritime Observation, CRC Prss, Taylor &amp; Francis Group 348 s.</li> <li>• Martin S., 2004, An introduction to Ocean Remote Sensing, Cambridge University Press, 426 s.</li> <li>• Chapman R., Gasparovic R., 2022, Remote sensing physics: an introduction to observing earth from space, Wiley, Hoboken USA, 468 ss.</li> <li>• Chang N.-B., Bai K., 2018, Multisensor data fusion and machine learning for environmental remote sensing, CRC Press, Boca Raton, 508 ss.</li> </ul>							
	eResources addresses								
Example issues/ example questions/ tasks being completed	<p>Assessment criteria: Knowledge of</p> <ul style="list-style-type: none"> <li>• physical processes occurring in the sea that can be studied using satellite methods</li> <li>• satellite techniques used to study specific processes in the sea sea</li> <li>• surface properties that enable remote detection of the phenomena discussed in the lecture</li> <li>• satellite data processing stages necessary to obtain specific environmental information from satellite data</li> <li>• spatial data analysis methods used in the analysis of satellite data in oceanography</li> </ul>								
Work placement	Not applicable								

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