

**Subject card**

<b>Subject name and code</b>	Oceanographic Instruments and Measurements - Lecture, PG_00204993						
<b>Field of study</b>	Oceanography						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>			2026/2027		
<b>Education level</b>	Master's studies	<b>Subject group</b>			Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	1	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	1	<b>ECTS credits</b>			2.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			credit		
<b>Conducting unit</b>	Faculty of Oceanography and Geography -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr hab. Dorota Burska				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	30.0	0.0	0.0	0.0	0.0	30
	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>	30		2.0		18.0	50
<b>Subject objectives</b>	Theoretical knowledge of the principles of instruments/devices and measurement platforms used today in oceanographic research (physical, chemical and geological) and the use of the existing database to solve research, environmental, management problems.						
<b>Learning outcomes</b>	<b>Course outcome</b>		<b>Subject outcome</b>			<b>Method of verification</b>	
	[OCEANMU2-W03] has an in-depth understanding of research methods used in oceanography and related sciences, and interprets their mechanisms and interrelationships across different spatial and temporal scales		knows and understands, in-depth, advanced research methods used in oceanographic metrology, as pertains to (a) modern sensors and devices used for in situ measurements and (b) specialized software used to conduct measurements, describe and interpret the phenomena and processes occurring in marine and aquatic environments.			[SW4] test/exam - oral or written	
	[OCEANMU2-K04] is ready to critically evaluate his/her knowledge and received content in the field of natural sciences in particular in the field of the studied specialty, a in problematic situations, supports oneself with knowledge experts		is ready to critically evaluate his/her knowledge of modern equipment and sensors used in oceanographic surveying and to seek expert support in solving problems.			[SK4] test/exam - oral or written	

Subject contents	<p>1.Principle of operation of selected instruments/equipment used in modern marine physics, chemistry and geology research; measurement uncertainties and regression analysis.</p> <p>2.Measurement platforms (manned/unmanned vessels, floating buoys, moored, etc.);principle of operation, measurement range, data sharing.</p> <p>3.Ocean Observatories Initiative (OOI): objectives, infrastructure, research, functioning global observatory fixed systems, scientific expeditions, repositories and access to data.</p> <p>4.Sampling requirements, methodology and strategies related to the design of scientific and environmental monitoring programs.</p>														
Prerequisites and co-requisites															
Assessment methods and criteria	<table border="1" data-bbox="448 629 1487 770"> <thead> <tr> <th data-bbox="448 629 794 667">Subject passing criteria</th> <th data-bbox="794 629 1141 667">Passing threshold</th> <th data-bbox="1141 629 1487 667">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 667 794 701">midterm test 2</td> <td data-bbox="794 667 1141 701">51.0%</td> <td data-bbox="1141 667 1487 701">33.0%</td> </tr> <tr> <td data-bbox="448 701 794 734">midterm test 1</td> <td data-bbox="794 701 1141 734">51.0%</td> <td data-bbox="1141 701 1487 734">34.0%</td> </tr> <tr> <td data-bbox="448 734 794 770">midterm test 3</td> <td data-bbox="794 734 1141 770">51.0%</td> <td data-bbox="1141 734 1487 770">33.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	midterm test 2	51.0%	33.0%	midterm test 1	51.0%	34.0%	midterm test 3	51.0%	33.0%
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midterm test 1	51.0%	34.0%													
midterm test 3	51.0%	33.0%													
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Różdżyński K., (1996) Oceanographic surveying, vol. 1-12, IMGW, Warsaw (in Polish).</li> <li>2. Szydłowski H. 1981, Theory of measurements, PWN Warszawa,</li> <li>3. Bolalek J., (red.) 2010, Physical, biological and chemical studies of marine bottom sediments. 2010.Wydawnictwo UG, Gdańsk (in Polish).</li> <li>4. Lekkerkerk, H. J., Van der Velden, R., Roders, J., Haycock, T., De Vries, R., Jansen, P., Beemster ,C. (2006) Handbook of Offshore Surveying- Acquisition and Processin. Clarkson Research Services, London.</li> <li>5. Brzózka Z., Malinowska E., Wróblewski W.,(2022) Sensory chemistry and biosensor, Wydawnictwo Naukowe PWN, Warszawa.</li> <li>6. The online platform of the international Ocean Observatories Initiative (OOI) programme, <a href="https://oceanobservatories.org/">https://oceanobservatories.org/</a> and the publications available on it.</li> </ol>													
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Instructions and manuals for use of equipment/instrumentation.</li> <li>2. Reports from IMGW, WIOŚ, HELCOM, hydrodynamic model of the southern Baltic Sea, weather forecasts, SatBaltic platform, GOOS,NOA, scientific articles.</li> <li>3. Websites: <a href="https://hydro.imgw.pl">https://hydro.imgw.pl</a>, <a href="https://www.iopan.gda.pl/hydrodynamics/po/Argo/argo_pl.html">https://www.iopan.gda.pl/hydrodynamics/po/Argo/argo_pl.html</a>, <a href="https://nafalinauki.pl/argonauciw-sluzbie-nauki-cz-1">https://nafalinauki.pl/argonauciw-sluzbie-nauki-cz-1</a></li> </ol>													
	eResources addresses														
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Determination of dissolved oxygen can be carried out using electrochemical sensors (galvanic,polarographic), among others. Give the most important characteristics of these sensors.</li> <li>2. State in what range the relative spectral transmittance of water in the 814 nm band in the direction perpendicular to the water surface falls.</li> <li>3. Discussion of infrastructure included in OOI (e.g. cables, moorings, profilers, AUVs), discussion of example systems, e.g. Axial Seamount, Continental Margin or Global Southern Ocean, discussion of publicly available online databases.</li> </ol>														
Work placement	Not applicable														

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