

**Subject card**

<b>Subject name and code</b>	Oceanographic Methods Used in Marine Hydrography - laboratory classes , PG_00201145						
<b>Field of study</b>	Marine Hydrography						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>			2028/2029		
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>			Obligatory subject group in the field of study Optional subject group Subject group related to practical vocational preparation		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	3	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	5	<b>ECTS credits</b>			1.0		
<b>Learning profile</b>	practical	<b>Assessment form</b>			credit		
<b>Conducting unit</b>	Laboratory of Marine Geology -> Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Ewa Szymczak				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	0.0	18.0	0.0	0.0	18
	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>	18		1.0		11.0	30
<b>Subject objectives</b>	To increase theoretical and practical knowledge of underwater sound sources, in particular related to signal processing and interpretation of the results obtained. To understand the role of the marine hydrographer in work related to the use of non-invasive methods of surveying the seabed surface, based on underwater unmanned platforms, for the detection of anthropogenic objects present on the seabed.						
<b>Learning outcomes</b>	<b>Course outcome</b>		<b>Subject outcome</b>		<b>Method of verification</b>		
	[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 at an advanced level the methods for studying anthropogenic marine pollution in the form of underwater noise and objects found on the seabed		[SW2] presentation/project/paper/report		
	[HML3-U02] is able to select and apply basic research techniques and tools in the field of aquatic environment research, as well as plan and carry out measurements, develop the obtained results and interpret them correctly		is able to independently plan scenarios of surveys of the seabed and water depths of marine areas using passive hydro-acoustic methods and unmanned underwater vehicles for anthropogenic detection		[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work		

Subject contents	<p>Processing of recordings.</p> <p>Acoustic spectrum interpretation.</p> <p>Sound source identification.</p> <p>Mission planning for unmanned underwater vehicles.</p> <p>Interpretation of data.</p> <p>Solving tasks related to the content of case studies lectures.</p> <p>Multimedia presentations by students.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		51.0%	90.0%
		85.0%	10.0%
Recommended reading	Basic literature	<p>Clay C. S. and Medwin H., 1977. Acoustical Oceanography: Principles and Applications. Wiley, New York.</p> <p>Medwin H., 2005. Sounds in the sea. From ocean acoustics to acoustical oceanography. Cambridge University Press, New York.</p> <p>Lurton X., 2002. An introduction to underwater acoustics. Principles and applications. Springer Berlin, Heidelberg.</p> <p>Salamon R., 2006. Hydrolocation systems. Gdańskie Towarzystwo Naukowe, Gdańsk.</p>	
	Supplementary literature	<p>Beldowski J., Been R., Turmus E., 2017 Towards the Monitoring of Dumped Munitions Threat (MODUM): A study of Chemical Munition Dumpsites in the Baltic Sea. NATO Science for Peace and Security Series C: Environmental, Springer</p>	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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