

Subject card

Subject name and code	Oceanographic Methods Used in Marine Hydrography - lecture, PG_00201146						
Field of study	Marine Hydrography						
Date of commencement of studies	October 2027		Academic year of realisation of subject		2029/2030		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Optional subject group		
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		1.0		
Learning profile	practical		Assessment form		credit		
Conducting unit	Laboratory of Marine Geology -> Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Ewa Szymczak				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	12.0	0.0	0.0	0.0	0.0	12
	E-learning hours included: 0.0						
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	12		1.0		12.0	25
Subject objectives	To improve 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.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[HML3-K01] is ready to correctly identify and resolve professional dilemmas, especially in the aspects of security and entrusted property		is prepared to correctly identify factors that enable the safe use of equipment such as hydrophones and unmanned underwater vehicles in the detection of anthropogenic pollution of the marine environment in the form of underwater noise and bottom objects		[SK2] presentation/project/paper/report		
	[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		
Subject contents	Sources of sound in the sea (natural, biological and anthropogenic). Sound recording in the marine environment. Noise recording with a hydrophone and processing of the data thus collected. Analysis of acoustic signals. Frequency characteristics of individual acoustic sources. Interpretation of the spectrum of sounds in the sea. Indicators describing noise in the environment. Locating acoustic sources using hydrophone antennas. Problems of anthropogenic objects occurring on the sea bed (types, origin, hazards associated with them). Types of unmanned underwater vehicles and their equipment. Tools and methods for detection of anthropogenic objects on the seabed based on unmanned underwater vehicles. Mission planning of unmanned underwater vehicles.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	attendance in classes	85.0%	10.0%
	presentation	51.0%	90.0%
Recommended reading	Basic literature	Clay C. S. and Medwin H., 1977. Acoustical Oceanography: Principles and Applications. Wiley, New York. Medwin H., 2005. Sounds in the sea. From ocean acoustics to acoustical oceanography. Cambridge University Press, New York. Lurton X., 2002. An introduction to underwater acoustics. Principles and applications. Springer Berlin, Heidelberg. Salamon R., 2006. Hydrolocation systems. Gdańskie Towarzystwo Naukowe, Gdańsk.	
	Supplementary literature	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	
	eResources addresses		
	Example issues/ example questions/ tasks being completed		
Work placement	Not applicable		

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