

Subject card

Subject name and code	Introduction to marine acoustics auditory exercise, PG_00131478						
Field of study	Marine Hydrography						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Subject group related to practical vocational preparation		
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	practical		Assessment form		credit		
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 Jakub Idczak				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	20.0	0.0	0.0	0.0	20
	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	20		1.0		9.0	30
Subject objectives	Introducing students to the basic phenomena related to the propagation of acoustic waves in the sea, as well as their generation and reception, the laws governing these processes, and the methods used to study them.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[HML3-U19] plan and implement independent learning and improvement of his/her professional competences	To plan and carry out self-directed learning and enhance one's professional competencies.	[SU3] text preparation/written work [SU5] implementation of a problem task [SU8] observation of student's independent or team work
	[HML3-K02] correctly determine the priorities in professional work for the implementation of a task specified by himself/ herself or others	Timely completion of tasks during individual and team work.	[SK3] text preparation/written work [SK5] implementation of a problem task [SK6] demonstration of practical skills [SK8] observation of student's independent or team work
	[HML3-U07] effectively use information and communication techniques, including utility programs to solve professional problems	To use specialized software for the analysis of hydroacoustic data.	[SU8] observation of student's independent or team work
	[HML3-U14] use the applicable terminology in presenting and discussing problems related to the field of study	To correctly use the appropriate terminology when presenting and discussing issues in the field of marine acoustics.	[SU1] oral statement/conversation/discussion [SU3] text preparation/written work [SU5] implementation of a problem task [SU8] observation of student's independent or team work
	[HML3-U08] independently use the professional literature available in traditional and electronic form, make an assessment, critical analysis and synthesis as well as the correct interpretation of the information obtained	Independently use professional literature in the field of marine acoustics, available in both traditional and electronic formats, to evaluate, critically analyze, synthesize, and correctly interpret the obtained information.	[SU5] implementation of a problem task [SU8] observation of student's independent or team work
Subject contents	[HML3-W01] selected facts, phenomena and processes, as well as methods and theories concerning them, explaining the complex relationships between them, constituting basic general knowledge in the field of scientific disciplines forming the theoretical foundations specific to the field of study	Fundamental phenomena related to the propagation of acoustic waves in the sea, their generation and reception, and the laws governing these processes.	[SW3] text preparation/written work [SW5] implementation of a problem task
	Calculations covering:		
	1. The basic laws of acoustic wave propagation in a water medium.		
	2. Wave phenomena: interference, reflection and transmission, refraction, and scattering of acoustic waves.		
	3. Transmission and reception of acoustic waves using the example of acoustic transducers.		
Prerequisites and co-requisites	Fundamentals of physics and mathematics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	colloquia	51.0%	100.0%
Recommended reading	Basic literature	1. CLAY C. S., MEDWIN H.: Acoustical Oceanography: Principles and Applications. Wiley, New York 1977. 2. MEDWIN H., CLAY C. S.: Fundamentals of Acoustical Oceanography. Academic Press, Boston 1998. 3. MEDWIN H.: Sounds in the Sea. From Ocean Acoustics to Acoustical Oceanography. Cambridge University Press, New York 2005. 4. ŚLIWIŃSKI A.: Ultradźwięki i ich zastosowania. Wyd. Nauk.-Tech., Warszawa 2001.	
	Supplementary literature	1. KOWALIK Z., ŁĘGOWSKI S., SZYMBORSKI S.: Podstawy hydroakustyki, Wydawnictwo Morskie, Gdynia 1965. 2. STEPNOWSKI A.: Systemy akustycznego monitoringu środowiska morskiego. Gd. Tow. Nauk., Gdańsk 2001. 3. http://hyperphysics.phy-astr.gsu.edu/hbase/sound/soucon.html 4. http://www.physicsclassroom.com/Class/sound/soundtoc.html 5. http://www.dosits.org/science/intro.htm	
	eResources addresses		

Example issues/ example questions/ tasks being completed	Calculate the pressure of the transmitted wave, knowing that the pressure of the incident wave was 10 Pa. The density of water above the boundary between the two media is $\rho_1 = 1000 \text{ kg/m}^3$, and the speed of acoustic wave propagation in this layer is $c_1 = 1500 \text{ m/s}$. Below the boundary (in the transmission layer), the medium's density and the wavelength in this medium are described by the following relationships: $\rho_2 = 3\rho_1$ and $\lambda_2 = 1.21\lambda_1$. The wave frequency is $f = 0.12 \text{ kHz}$.
Work placement	Not applicable

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