University of Gdańsk

Subject card

Subject name and code	Introduction to Marine Acoustics - classes, PG_00201109		
Field of study	Marine Hydrography		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
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-W01] knows and understands, at an advanced level, 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	knows and understands, at an advanced level, the phenomena related to the propagation of acoustic waves in the sea, as well as their generation and reception, and the laws governing these processes	[SW3] text preparation/written work [SW5] implementation of a problem task
[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 complete tasks on time, whether working individually or as part of a team	[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] is able to effectively use information and communication techniques, including utility programs to solve professional problems	is able to use specialized software to analyze hydroacoustic data	[SU8] observation of student's independent or team work
[HML3-U08] is able to 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	is able to independently use professional literature on marine acoustics available in both print and electronic formats, and to evaluate, critically analyze, synthesize, and correctly interpret the information obtained	[SU5] implementation of a problem task [SU8] observation of student's independent or team work
[HML3-U14] is able to use the applicable terminology in presenting and discussing problems related to the field of study	is able to correctly use the relevant terminology when presenting and discussing issues related to 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-U19] is able to plan and implement independent learning and improvement of his/her professional competences	is able to plan and carry out self-directed learning and improve their professional skills	[SU3] text preparation/written work [SU5] implementation of a problem task [SU8] observation of student's independent or team work

Subject contents

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 1 = 1000 kg/m³, and the speed of acoustic wave propagation in this layer is c1 = 1500 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: 2 = 31 and 2 = 1.21. The wave frequency is f = 0.12 kHz.
Work placement	Not applicable

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