

Subject card

Subject name and code	Non-invasive methods of seabed surveys - lecture, PG_00091122						
Field of study	Geology						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		3.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Geophysics -> Faculty of Oceanography and Geography -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Jarosław Tęgowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	40.0	0.0	0.0	0.0	0.0	40
	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	40		14.0		25.0	79
Subject objectives	Acquire the ability to analyse echograms and determine geological facies from them.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[GEOLL3_W03] knows and identifies paleontological, mineralogical, petrographic and structural objects using appropriate methods		knows and identifies structures in the structure of the seabed using appropriate methods		[SW3] text preparation/written work		
	[GEOLL3_W02] knows and understands the terminology appropriate in science and natural sciences		knows and understands the terminology specific to non-invasive methods of seabed surveying		[SW3] text preparation/written work		
	[GEOLL3_U04] is able to use specialized computer software and mathematical and statistical methods in the analysis of geological data		is able to use dedicated computer software in analysis of data obtained by seabed surveying methods		[SU8] observation of student's independent or team work		
	[GEOLL3_U06] is able to identify geological objects and combine them with geological processes and anthropogenic environmental transformations		Is able to identify geological objects in hydroacoustic recordings hydroacoustic recordings		[SU8] observation of student's independent or team work		
	[GEOLL3_W04] knows and understands phenomena and processes occurring in the past and today in the interior of the Earth and on its surface, defines the methods of how to study them		defines non-invasive methods of seabed exploration		[SW3] text preparation/written work		

Subject contents	Reflection and scattering of acoustic signals from the seabed. Practical interpretation of seabed echograms recorded with low-frequency hydroacoustic equipment; determination of seismostratigraphic units. Analysis of bathymetric maps recorded with multibeam echosounders, analysis of sonar images of the seabed, learning the principles of mapping sediment mapping from sonar recordings. Planning and design of non-invasive bottom surveys.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	colloquium, observation	51.0%	100.0%
Recommended reading	Basic literature	Lurton X., 2002. An introduction to Underwater Acoustics. Principles and applications, Wyd. Springer Stepnowski, A., 2001. Systemy Akustycznego Monitoringu Środowiska Morskiego, GTN, Gdańsk Śliwiński A., 2001. Ultradźwięki i ich zastosowania, Wyd. Nauk.-Tech., Warszawa Tęgowski J., 2006. Akustyczna Klasyfikacja Osadów Dennyh, Wyd. Rozprawy i Monografie IO PAN Blondel P., 2009. The Handbook of Sidescan Sonar, Springer MacLennan D. N., Simmonds E. J., 2005. Fisheries Acoustics Theory and Practice, Blackwell Publishing Limited; 2 edition (September 1)	
	Supplementary literature	Medwin H., Clay C. S., 1998. Fundamentals of Acoustical Oceanography, Academic Press, Boston Medwin H., 2005. Sounds in the Sea. From Ocean Acoustics to Acoustical Oceanography, Cambridge University Press, New York Urick R. J., 1975. Principles of underwater sound, McGraw-Hill	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Reflection and scattering of acoustic signals from the seabed. Practical interpretation of seabed echograms recorded with low-frequency hydroacoustic equipment; determination of seismostratigraphic units. Analysis of bathymetric maps recorded with multibeam echosounders, analysis of sonar images of the seabed, learning the principles of mapping sediment mapping from sonar recordings. Planning and design of non-invasive bottom surveys.		
Work placement	Not applicable		

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