University of Gdańsk

Subject card

Subject name and code	Non-invasive methods of seabed surveys - laboratory classes, PG_00193044		
Field of study	Geology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research 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	2.0
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	0.0	0.0	15.0	0.0	0.0	15

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	15	2.0	33.0	50

Subject objectives

To learn and understand the mechanism of interaction of acoustic waves with the seabed and methods of investigating the seabed using hydroacoustic, laser, gravimetric and magnetometric equipment.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GEOLL3_W02] knows and understands the terminology appropriate in science and natural sciences	knows and understands the terminology specific to non-invasive seabed surveying methods	[SW4] test/exam - oral or written
[GEOLL3_U06] is able to identify geological objects and combine them with geological processes and anthropogenic environmental transformations	can identify geological objects on the seabed and connect them to geological processes and anthropogenic environmental transformations	[SU4] test/exam - oral or written
[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	knows and understands the phenomena and processes occurring in the past and today on the seabed, defines the methods of their study	[SW4] test/exam - oral or written
[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	[SW4] test/exam - oral or written
[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 the analysis of data obtained by non-invasive methods of seabed researchg	[SU4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td colspan="3">Geophysical properties of bottom sediments.
Theoretical basis of acoustic wave propagation in the bottom.
Sources and receivers of acoustic signals.
Hydroacoustic equipment for bottom exploration.
Introduction to acoustic signal processing.
Acoustic classification of sediments.
Non-invasive seabed survey techniques (gravimetry, magnetometry, 3D laser scanner, underwater photography).
Organisation of non-invasive seabed surveys.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td colspan="3"></td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>colloquium</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">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 Dennych, 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)</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">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</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">Geophysical properties of bottom sediments.
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<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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