University of Gdańsk

Subject card

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|---|---|---|---|---|---|---|---|
| Subject name and code | Introduction to Marine Acoustics - lecture, PG_00205340 | | | | | | |
| Field of study | Oceanography | | | | | | |
| 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<br>Optional subject group<br>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 | 5 | | ECTS credits | | 2.0 | | |
| Learning profile | academic | | Assessment form | | credit | | |
| Conducting unit | 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 | 25.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25 |
| | 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 | 25 | | 2.0 | | 23.0 | 50 |
| Subject objectives | To familiarize students with the basic phenomena relating to the propagation of acoustic waves in the sea and their generation and reception. | | | | | | |

## Learning outcomes

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [OCEANL3-U04] is able to independently search for information in Polish and foreign specialist literature, as well as on the Internet and in databases | Is able to independently search for information on marine acoustics in Polish and English specialist literature, as well as on the Internet and databases | [SU4] test/exam - oral or written |
| [OCEANL3-W05] has an advanced knowledge of techniques, research methods, and tools (mathematical, statistical, and computational) used by oceanographers to describe and interpret processes and phenomena occurring in the marine environment | Knows and understands the importance of innovative remote hydroacoustic techniques used in interdisciplinary research and monitoring of the marine environment | [SW4] test/exam - oral or written |
| [OCEANL3-W04] has an advanced understanding of issues and research problems in oceanography, and recognizes their connection with other scientific disciplines | Knows and understands the most important research problems in the field of marine acoustics and their connections with other fields of oceanography | [SW4] test/exam - oral or written |
| [OCEANL3-U01] is able to use the current scientific terminology in the field of oceanography in various forms of expression | Is able to correctly use current scientific terminology in various forms of expression in the field of marine acoustics | [SU4] test/exam - oral or written |
| [OCEANL3-W01] has an advanced knowledge and understanding of the terminology used in oceanography and related exact and natural sciences (in Polish and a selected foreign language) | Has an advanced knowledge and understanding of the terminology used in hydroacoustics | [SW4] test/exam - oral or written |

## Subject contents

1 Acoustic wave: definition, parameters characterizing an acoustic wave (spatial and temporal changes). 2 Acoustic wave propagation: geometric propagation (traveling waves: plane, cylindrical, spherical waves), sound absorption in sea water. 3 Wave phenomena: wave interference phenomenon, reflection and transmission of waves at the boundary of two media, refraction of acoustic waves, scattering of acoustic waves. 4 Acoustic transducers. 5 Principle of operation of selected acoustic devices and their application (single- and multi-beam echosounder, ADCP). 6 Acoustic data processing. 7 Selected applications of acoustic methods for studying marine ecosystems.

## Prerequisites and co-requisites

## Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| exam | 51.0% | 100.0% |

## Recommended reading

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| Basic literature | 1. Clay C. S. and Medwin H., 1977. Acoustical Oceanography: Principles and Applications. Wiley, New York, 544.<br>2. Medwin H. and Clay C. S., 1998. Fundamentals of Acoustical Oceanography. Academic Press, Boston, 712.<br>3. Medwin H., 2005. Sounds in the Sea. From Ocean Acoustics to Acoustical Oceanography. Cambridge University Press, New York, 643.<br>4. Śliwiński A., 2001. Ultradźwięki i ich zastosowania. Wyd. Nauk.-Tech., Warszawa (in Polish) |
| Supplementary literature | 1. Tolstoy I., Clay C. S., 1966. Ocean acoustics: Theory and experiments in underwater sound. McGraw-Hill.<br>2. MacLennan D. N., Simmonds E. John, 2005. Fishery Acoustics. Blackwell Science |
| eResources addresses | |

## Example issues/ example questions/ tasks being completed

## Work placement

Not applicable

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