

**Subject card**

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|--|--|--|-----------------|-------------------------------------|--|------------|-----|
| <b>Subject name and code</b>                       | Mineral resources of seas and oceans, PG_00131543  |  |                 |                                     |  |            |     |
| <b>Field of study</b>                              | Marine Hydrography   |  |                 |                                     |  |            |     |
| <b>Date of commencement of studies</b>             | October 2024   | <b>Academic year of realisation of subject</b>           |                 |                                     | 2027/2028                                      |            |     |
| <b>Education level</b>                             | Bachelor's studies   | <b>Subject group</b>                                     |                 |                                     | Obligatory subject group in the field of study |            |     |
| <b>Mode of study</b>                               | full-time studies  | <b>Mode of delivery</b>                                  |                 |                                     | at the university                              |            |     |
| <b>Year of study</b>                               | 4  | <b>Language of instruction</b>                           |                 |                                     | Polish   |            |     |
| <b>Semester of study</b>                           | 7  | <b>ECTS credits</b>                                      |                 |                                     | 2.0  |            |     |
| <b>Learning profile</b>                            | practical  | <b>Assessment form</b>                                   |                 |                                     | credit   |            |     |
| <b>Conducting unit</b>                             | Laboratory of Marine Geology -> Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector  |  |                 |                                     |  |            |     |
| <b>Name and surname of lecturer (lecturers)</b>    | <b>Subject supervisor</b>  |  | dr Ewa Szymczak |                                     |  |            |     |
|  | <b>Teachers</b>  |  |                 |                                     |  |            |     |
| <b>Lesson types</b>                                | <b>Lesson type</b>   | Lecture  | Tutorial        | Laboratory                          | Project  | Seminar    | SUM |
|  | <b>Number of study hours</b>   | 30.0   | 0.0             | 0.0                                 | 0.0  | 0.0        | 30  |
|  | E-learning hours included: 0.0   |  |                 |                                     |  |            |     |
|  | Additional information:<br>lecture with multimedia presentation<br><br>lecture with discussion<br><br>oxford debate  |  |                 |                                     |  |            |     |
| <b>Learning activity and number of study hours</b> | <b>Learning activity</b>   | Participation in didactic classes included in study plan |                 | Participation in consultation hours |  | Self-study | SUM |
|  | <b>Number of study hours</b>   | 30   |                 | 2.0                                 |  | 20.0       | 52  |
| <b>Subject objectives</b>                          | Knowledge of geological conditions for the formation and occurrence of deposits. Familiarisation with the geological structure of the most important and largest Polish and world deposits discussed according to the technological classification: energetic, metallic, chemical and rock raw materials. The legal basis of mineral exploitation, the effects of raw material exploitation in the marine environment. |  |                 |                                     |  |            |     |

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| Learning outcomes   | Course outcome  | Subject outcome  | Method of verification  |
|   | [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  | presents, based on literature sources, selected issues on the occurrence, exploitation or effects of mineral resources in the marine environment   | [SU1] oral statement/conversation/discussion<br>[SU4] test/exam - oral or written   |
|   | [HML3-W13] global environmental problems resulting from the development of civilisation, in particular strong anthropopressure in the coastal regions of seas and oceans  | presents the legal basis for the development and use of deposits and the impact of deposit exploitation on the natural environment   | [SW4] test/exam - oral or written<br>[SW1] oral statement/conversation/discussion   |
|   | [HML3-W02] selected phenomena and processes occurring in the hydrosphere, atmosphere, lithosphere and biosphere, their interconnections and relations, as well as practical applications of this knowledge in professional activities related to the field of study   | indicates the areas where deposits occur in the marine environment and presents their genesis against the background of geological processes   | [SW1] oral statement/conversation/discussion<br>[SW3] text preparation/written work |
|   | [HML3-U14] use the applicable terminology in presenting and discussing problems related to the field of study   | uses basic terms used in the geology of deposits occurring in the marine environment   | [SU1] oral statement/conversation/discussion<br>[SU4] test/exam - oral or written   |
|   | [HML3-U16] prepare in Polish and foreign language a study of a problem in the field of study with documented conclusions, supported by a report and a multimedia presentation   | presents, based on literature sources, selected issues on the occurrence, exploitation or effects of mineral resources in the marine environment   | [SU1] oral statement/conversation/discussion<br>[SU4] test/exam - oral or written   |
| [HML3-W04] the issue of measurements related to the exploration of sea basins and inland waters and tools allowing to describe, interpret and present the results of measurements | characterises methods of surveying the ocean floor and the minerals found there   | [SW4] test/exam - oral or written<br>[SW1] oral statement/conversation/discussion  |   |
| Subject contents  | Methods of exploration of the ocean floor and mineral deposits. Legal basis for the use of oceanic minerals. Genesis of minerals. Distribution of polymetallic mineral deposits and their resources. Distribution of energy mineral deposits and their resources. Distribution of chemical mineral deposits and their resources. Occurrence and exploitation of gemstones. Distribution of rock mineral deposits and their resources. Forecast development of deposits. Exploitation of the resources from the bottom of the seas and oceans and its impact on the natural environment. |  |   |
| Prerequisites and co-requisites   |   |  |   |
| Assessment methods and criteria   | Subject passing criteria  | Passing threshold  | Percentage of the final grade   |
|   | written assessment  | 51.0%  | 100.0%  |
| Recommended reading   | Basic literature  | <p>Depowski S., Kotliński R., Rühle E., Szamałek K., 1998. Mineral resources of the seas and oceans, Wyd. Naukowe Scholar, Warszawa.</p> <p>Gurvich Evgeny G., 2006. Metalliferous Sediments of the World Ocean, Springer</p> <p>Mizerski W., Szamałek K., 2009. Geology and Mineral Resources of the Oceans, Wyd. Naukowe PWN, Warszawa</p> <p>Kotliński R., Mucha J., Wasilewska M., 2008. Problems of resource estimation of polymetallic nodule deposits in the Pacific. <i>Gospodarka surowcami mineralnymi</i>, 24 (2/4)</p> <p>Marine Resources - Opportunities and Risks. <i>World Ocean Review</i> 3. 2014.</p> |   |

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|  | Supplementary literature   | <p>Max Michael D., Johnson Arthur H., Dillon William P., 2006. Economic Geology of Natural Gas Hydrate, Springer</p> <p>Kotliński R., 1999. Metallogenesis of the worlds ocean against the background of ocean crust evolution. Polish Geological Institute Special Papers, 4: 170</p> <p>Piestrzyński A., 2011. Ocean Mineral Resources, Mining and Geoengineering, 35 (4/1) Mucha J. Kotliński R., Wasilewska-Błaszczyk M., 2011. Methodology for estimating resource parameters of polymetallic nodule deposits in the Pacific Interoceanmetal area. Zeszyty Naukowe Instytutu Gospodarki Surowcami Mineralnymi i Energią Polskiej Akademii Nauk, 81</p> |
|  | eResources addresses   | <p>Basic</p> <p><a href="https://www.isa.org.jm/">https://www.isa.org.jm/</a> - website of International Seabed Authority</p>   |
| Example issues/<br>example questions/<br>tasks being completed | <p>Name the polimetallic minerals found on the ocean floor</p> <p>Describe the effects of oil exploitation in the marine environment</p> |   |
| Work placement   | Not applicable   |   |

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