University of Gdańsk

Subject card

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| Subject name and code | Marine and Atmospheric Chemistry - lecture, PG_00205314 | | |
| Field of study | Oceanography | | |
| 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 |
| Mode of study | full-time studies | Mode of delivery | at the university |
| Year of study | 2 | Language of instruction | Polish |
| Semester of study | 4 | ECTS credits | 2.0 |
| Learning profile | academic | Assessment form | exam |
| Conducting unit | Laboratory of the Biogeochemical Cycle of Elements -> Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | prof. dr hab. Magdalena Bełdowska | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 30.0 | 0.0 | 0.0 | 0.0 | 0.0 | 30 |

E-learning hours included: 0.0

Additional information:

Lecture with multimedia presentation.

**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 | 30 | 2.0 | 18.0 | 50 |

**Subject objectives**

- Presentation of selected problems in the field of marine and atmospheric chemistry, in relation to selected natural and anthropogenic components.
- Familiarization with chemical phenomena and processes in sea water and the Earth's atmosphere.
- Understanding the functioning of the Earth Atmosphere system.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [OCEANL3-W02] has a broad knowledge and understanding of physical, biological, chemical, and geological processes and phenomena occurring in aquatic environments, with particular emphasis on the marine environment | Knows and understands a wide range of processes affecting the exchange streams of chemical substances at the atmosphere-water interface. Understands the processes influencing the variability of chemical concentrations in seawater and the atmosphere. | [SW4] test/exam - oral or written |
| [OCEANL3-W06] has an advanced understanding of the principles of managing the marine environment and its resources, as well as the consequences of disrupting the balance of marine ecosystems | Knows and understands the basic chemical processes and phenomena occurring in the sea and atmosphere<br>Understands the problem of sustainable management of the marine environment and the consequences of disturbing the balance in the marine ecosystem and atmosphere resulting from anthropopressure. | [SW4] test/exam - oral or written |

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| Subject contents | 1. Chemical composition and structure of the atmosphere, chemical and photochemical reactions occurring in individual layers of the atmosphere;<br>2. Earth's heat balance and radiation budget in the Earth-Atmosphere system;<br>3. Natural and anthropogenic atmospheric pollutants - sources of their origin, transformations, removal processes from the atmosphere, their impact on the land and marine environment, climate and human health;<br>4. Trace elements in seawater;<br>5. Horizontal and vertical transport of elements in seawater, including the role of the sea surface microlayer in the exchange of elements between the sea and the atmosphere |
| Prerequisites and co-requisites | |

Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| atmospheric chemistry exam | 51.0% | 50.0% |
| marine chemistry exam | 51.0% | 50.0% |

Recommended reading

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| Basic literature | • Falkowska L., 1996, Sea surface microlayer: properties and processes. University of Gdańsk Publishing House, Gdańsk -183;<br>• Falkowska L., A. Lewandowska, Aerosols and gases in the atmosphere - global changes, 2009. Publishing House of the University of Gdańsk, Gdańsk, - 505;<br>• Stepnowski P., Synak E., Szafranek B., Kaczyński Z., 2010, Monitoring and analysis of environmental pollution, UG Publishing House, ISBN 978-83- 7326-712-1, -283. |
| Supplementary literature | • Juda-Rezler K., 2006, Impact of air pollution on the environment, Publishing House of the Warsaw University of Technology, Warsaw;<br>• Sainfeld J.H., Pandis S.N., 2016, Atmospheric Chemistry and Physics: From Air Pollution to Climate Change, 3rd Edition. John Wiley & Sons, Inc., New York, Chichester, Weinheim, Brisbane, Singapore, Toronto, -1152;<br>• Baltic Sea Environment Proceedings No 120B, 2010, Hazardous substances in the Baltic Sea, Helsinki Commission |
| eResources addresses | |

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| Example issues/ example questions/ tasks being completed | |
| Work placement | Not applicable |

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