University of Gdańsk

Subject card

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|---|---|---|---|
| Subject name and code | Aerosols and Gases in the Atmosphere - laboratory , PG_00204951 | | |
| Field of study | Oceanography | | |
| Date of commencement of studies | October 2026 | Academic year of realisation of subject | 2026/2027 |
| Education level | Master'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 | 1 | Language of instruction | Polish |
| Semester of study | 1 | ECTS credits | 3.0 |
| Learning profile | academic | Assessment form | credit |
| 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 | dr hab. Anita Lewandowska | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 0.0 | 0.0 | 45.0 | 0.0 | 0.0 | 45 |

E-learning hours included: 0.0

Additional information:

Laboratory exercises conducted using the project method.

**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 | 45 | 3.0 | 27.0 | 75 |

**Subject objectives**

1. Identification of current problems related to atmospheric pollution with aerosols and gases.

2. Practical familiarization of students with measurement and analytical methods used in aerosol and gas research.

3. Conducting a scientific experiment using the project method, culminating in a mini-conference prepared by the students.

## Learning outcomes

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [OCEANMU2-K01] is ready to plan, implement and supervise, individually or collectively, next stages of the entrusted task, is ready to take responsibility for its results; | is ready to plan, implement and supervise, individually or in a team, subsequent stages of the entrusted task, is ready to take responsibility for its results, cooperates effectively in a team, performing various functions in it, including managerial ones | [SK8] observation of student's independent or team work |
| [OCEANMU2-W04] has an in-depth understanding of the latest research trends in oceanography, as well as the possibilities for practical application of related achievements; evaluates their usefulness and limitations in solving scientific research problems, and critically analyzes and assesses their applicability | knows and understands in-depth the latest research trends in the field of aerosol and gas chemistry as well as the possibilities of practical application of scientific achievements in this field | [SW4] test/exam - oral or written<br>[SW3] text preparation/written work |
| [OCEANMU2-U04] is ready to develop in an analytical and synthetic way research and analysis results and based on them creating conclusions | is able to analytically and synthetically develop the results of chemical research and analyzes and based on them, draw correct conclusions during a presentation or poster presented as part of a mini-conference | [SU2] presentation/project/paper/ report |
| [OCEANMU2-W05] knows and understands the principles of planning and conducting field and laboratory research as well as advanced methods and tools of scientific research, especially in the field of the studied specialty | knows and understands in-depth the principles of planning and conducting field and laboratory research as well as advanced/ detailed methods and tools of scientific research in the field of aerosols and gases | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/ report<br>[SW3] text preparation/written work |
| [OCEANMU2-U08] is able to prepare a study of a given issue/ problem in Polish and a selected foreign language in written form (short scientific text, documented research work) and orally (paper, presentation) and discuss with specialists on topics related to oceanographic issues, with particular emphasis on the studied specialty | is able to prepare a study of a selected issue/problem in Polish and a selected foreign language in written form (scientific abstracts prepared for a mini-conference, written studies) and oral (presentation or poster) and discuss with specialists on topics related to aerosols and gases in outdoor and indoor air as well as atmospheric deposition | [SU2] presentation/project/paper/ report<br>[SU3] text preparation/written work |

## Subject contents

- Planning an environmental/ laboratory experiment for a selected problem covering aerosols and gases in outdoor/internal air/atmospheric deposition.
- Conducting environmental research depending on the topic in a given year, e.g. sampling aerosols/ bioaerosols/precipitation/gases in the sea shore zone (PMx samplers, on-line analyzers, multi-cascade impactors).
- Conducting independent chemical analyzes of aerosol and precipitation samples using ion-exchange and liquid chromatography and the thermo-optical method of organic and elemental carbon analysis.
- Creation of a database, preparation of results and their statistical analysis (preparation of chemical and meteorological analysis data, air mass movement trajectories according to the NOAA model, wind direction variations, estimation of immission fluxes and the fall speed of gases and aerosols).
- Preparing and conducting a mini conference
- Summary of the project during a mini-conference in the form of presentations or posters presented, consisting of discussion of the results obtained as part of the experiment and their discussion based on specialized Polish and English-language scientific publications and Internet sources.

## Prerequisites and co-requisites

## Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| step-by-step written studies | 51.0% | 25.0% |
| organization of conferences and preparation of conference materials | 51.0% | 10.0% |
| presentation of results during the conference | 51.0% | 30.0% |
| active participation in practical classes | 51.0% | 10.0% |
| presentation and abstract review | 51.0% | 10.0% |
| theoretical knowledge test | 51.0% | 15.0% |

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| Recommended reading | Basic literature | 1. Falkowska L., Sea surface microlayer: properties and processes. University of Gdańsk Publishing House, Gdańsk, 1996,<br>2. Falkowska L., A. Lewandowska, Aerosols and gases in the atmosphere - global changes, University of Gdańsk Publishing House, Gdańsk, 2009<br>3. Lewandowska A., L. Falkowska, Aerosols and gases in the atmosphere, methodological guide for exercises. University of Gdańsk Publishing House, Gdańsk, 2009<br>4. Stepnowski P., Synak E., Szafranek B., Kaczyński Z, Monitoring and analysis of environmental pollution, Wydawnictwo UG,2010<br>5. Collective work edited by Józef Kuropka, Kazimierz Gaj and Izabela Sówka, Current problems in engineering and atmospheric protection, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2018.<br>6. Teamwork edited by Katarzyna Judy-Rezler and Barbara Toczko, Fine dust in the atmosphere. Compendium of knowledge about air pollution with suspended dust in Poland, Environmental Monitoring Library, Warsaw, 2016 |
| | Supplementary literature | Scientific publications indicated by the lecturer necessary to prepare a multimedia presentation for the mini-conference |
| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | | |
| Work placement | Not applicable | |

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