University of Gdańsk

Subject card

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 Optional subject group 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, prof. UG	
	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-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 [SU3] text preparation/written work
[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 [SW2] presentation/project/paper/ report [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-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 [SW3] 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
theoretical knowledge test	51.0%	15.0%
presentation and abstract review	51.0%	10.0%
active participation in practical classes	51.0%	10.0%
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%

Recommended reading	Basic literature	1. Falkowska L., Sea surface microlayer: properties and processes. University of Gdańsk Publishing House, Gdańsk, 1996, 2. Falkowska L., A. Lewandowska, Aerosols and gases in the atmosphere - global changes, University of Gdańsk Publishing House, Gdańsk, 2009 3. Lewandowska A., L. Falkowska, Aerosols and gases in the atmosphere, methodological guide for exercises. University of Gdańsk Publishing House, Gdańsk, 2009 4. Stepnowski P., Synak E., Szafranek B., Kaczyński Z, Monitoring and analysis of environmental pollution, Wydawnictwo UG,2010 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. 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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