University of Gdańsk

Subject card

Subject name and code	Aerosols and gases in the atmosphere - laboratory exercises, PG_00054990		
Field of study	Oceanography		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	postgraduate 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	1	Language of instruction	Polish polish at students' request - English
Semester of study	1	ECTS credits	3.0
Learning profile	academic	Assessment form	
Conducting unit	Pracownia Biogeochemicznego Obiegu Pierwiastków -> Katedra Oceanografii Chemicznej i Geologii Morza -> Faculty of Oceanography and Geography		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Anita Lewandowska	
	Teachers	dr hab. Anita Lewandowska dr Michalina Bielawska	

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 class

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	10.0	30.0	85

Subject objectives

Identification of current problems related to atmospheric pollution with aerosols and gases. Practical acquaintance of students with measurement and analytical methods used in atmospheric chemistry research. Conducting a scientific experiment using the design method, ending with a mini-conference prepared by students.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OCEANMU2-W04] knows and understands the latest research trends in the field of oceanography as well as the possibilities of practical application of scientific achievements	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
[OCEANMU2-K03] is ready to effectively organize his/her own work, is active and persistent and punctuality in completing tasks, is ready to carrying out evaluation of their own activities	is ready to effectively organize his/her own work, is active and is characterized by perseverance and punctuality in the implementation of tasks, is ready to evaluate his/her own activities	[SK8] observation of student's independent or team work
[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, cooperates effectively in the team and performs its functions in it various functions, including managerial ones	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-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-W06] knows and identifies potential threats to the marine environment on a local and global scale resulting from strong anthropopressure, predicts their effects on various time and space scales	knows and identifies potential threats to the marine environment resulting from strong anthropopressure of the atmosphere in coastal areas of seas and oceans and predicts their effects on various time and space scales	[SW4] test/exam - oral or written [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 [SU3] text preparation/written work
[OCEANMU2-U03] can plan and carry out independently advanced research and measurements, both in field and laboratory, using appropriately selected measurement and analytical techniques in the field of oceanography, adequately to the studied specialty and research problem	is able to independently plan and carry out advanced chemical research and analyses, both in the field and in the laboratory, using appropriately selected measurement and analytical techniques, adequate to the considered research problem in the field of aerosols and gases in outdoor and indoor air as well as atmospheric deposition	[SU6] demonstration of practical skills [SU8] observation of student's independent or team 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-U06] can use specialized computer software and advanced mathematical and statistical methods in data analysis and description of processes and phenomena occurring in the marine environment and coastal zone	is able to use specialized computer software and mathematical and statistical methods to analyze data and describe phenomena and processes occurring with the participation of aerosols and gases in the atmosphere, with particular emphasis on the sea shore zone	[SU2] presentation/project/paper/report [SU3] text preparation/written work [SU8] observation of student's independent or team work

Subject contents

- Planning an environmental and 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%
step-by-step written studies	51.0%	25.0%
presentation and abstract review	51.0%	10.0%
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%

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	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Work placement

Not applicable

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