University of Gdańsk

Subject card

Subject name and code	Aerosols and Gases in the Atmosphere - lecture, PG_00204952		
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	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	dr hab. Anita Lewandowska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

E-learning hours included: 0.0

Additional information:

Lecture with elements of problem-solving lecture.

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	15	2.0	33.0	50

Subject objectives

Discussion of the evolution of the chemical composition of air under the influence of the processes of interaction of the ocean, land, biosphere (man) with the atmosphere. Identification of current problems related to atmospheric pollution with aerosols and gases.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OCEANMU2-W02] knows and understands complex processes and phenomena occurring in the marine environment, with particular emphasis on the coastal zone, as well as complex relationships between living and non-living elements of the aquatic environment	Knows and understands in greater detail the complex relationships between the ocean, land, biosphere (man) and the atmosphere. Identifies and correctly describes complex phenomena occurring in the atmosphere with the participation of aerosols and gases and explains their course in relation to processes occurring in the aquatic environment, with particular emphasis on marine environment and marine coastal zone.	[SW4] test/exam - oral or written
[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 anthropogenic atmospheric pressure in coastal areas of seas and oceans and is able to discuss their effects at various time and space scales.	[SW4] test/exam - oral or written

Subject contents

1. Origin of aerosols and gases in the atmosphere.
2. Size distribution and lifetime of aerosols.
3. Processes of aerosol and gas removal from the atmosphere.
4. The role of aerosols and gases in shaping climate and its change.
5. The impact of aerosols and gases on human health.
6. The impact of air quality on the incidence of COVID-19 and other viral and bacterial diseases worldwide.
7. The impact of restrictions introduced due to COVID-19 on air quality.
8. The impact of synoptic conditions on the degree of air pollution from aerosols and gases.
9. Natural environmental factors shaping air quality in the coastal zone, with particular emphasis on the southern Baltic Sea.
10. Local, regional, and distant sources of anthropogenic pollution in the atmosphere of the urbanized coastal zone of the southern Baltic Sea. 11. European and global legal regulations aimed at reducing poor air quality in terms of its pollution with aerosols and gases.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
oral or written exam with open questions	51.0%	100.0%

Recommended reading

Basic literature

1. Falkowska L., Sea surface microlayer: properties and processes. UG 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. Stepnowski P., Synak E., Szafranek B., Kaczyński Z, Monitoring and analysis of environmental pollution, UG Publishing House, 2010
4. Collective work edited by Józef Kuropka, Kazimierz Gaj and Izabela Sówka, Current problems in engineering and atmospheric protection, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2018.
5. 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

1. Juda-Rezler K., Impact of air pollution on the environment, Publishing House of the Warsaw University of Technology, Warsaw, 2006,
2. Liss P.S., Johnson M.T., Ocean-Atmosphere Interactions of Gases and Particles, Springer Earth System Sciences, 2014
3. Sainfeld J.H., Pandis S.N., Atmospheric Chemistry and Physics: From Air Pollution to Climate Change, 3rd Edition. John Wiley & Sons, Inc., New York, Chichester, Weinheim, Brisbane, Singapore, Toronto, 2016

eResources addresses

Example issues/ example questions/ tasks being completed

Work placement

Not applicable

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