University of Gdańsk

Subject card

Subject name and code	Dynamical Meteorology - lecture, PG_00206218		
Field of study	Oceanography		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	2.0
Learning profile	academic	Assessment form	exam
Conducting unit	Laboratory of Physical Oceanography -> Department of Physical Oceanography and Climate Research -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Mirosław Miętus	
	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

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

To familiarize students with the physical processes and phenomena characteristic of the atmosphere over marine areas. To familiarize students with the aspects of ocean-atmosphere interactions relevant to marine processes and the basic methods and possibilities of using meteorological data in oceanography.

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-depth the specialist terminology used in atmospheric sciences; knows and understands in-depth the complex relationships between processes occurring in the sea and the atmosphere	[SW4] test/exam - oral or written
[OCEANMU2-W01] knows and understands in-depth specialized terminology used in oceanography and related sciences (in Polish and a selected foreign language)	Knows and understands in-depth the specialist terminology used in atmospheric sciences; knows and understands in-depth the complex relationships between processes occurring in the sea and the atmosphere	[SW4] test/exam - oral or written
[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 basic and advanced techniques, research methods and computational tools used in contemporary atmospheric sciences, including the possibilities related to the use of numerical weather models	[SW4] test/exam - oral or written
[OCEANMU2-U02] is able to fluently and accurately use scientific terminology when presenting and discussing oceanographic issues, and to propose and justify innovative solutions	Is able to use scientific terminology fluently and appropriately in presenting and discussing problems in the field of meteorology.	[SU4] test/exam - oral or written
[OCEANMU2-K04] is ready to critically evaluate his/her knowledge and received content in the field of natural sciences in in particular in the field of the studied specialty, a in problematic situations, supports oneself with knowledge experts	Is ready to critically evaluate the knowledge he/she has and the content he/she receives in the field of atmospheric sciences	[SK4] test/exam - oral or written

Subject contents

A.1 Introduction. Sea-atmosphere interaction. The boundary layer of the atmosphere.
A.2 Stability of the atmosphere over the ocean. Fog and stratus generated by dynamic processes.
A.3. Meteorology of the coastal zone. Specifics of ocean-atmosphere interactions in the coastal zone.
A.4. Meteorology and oceanography of ocean front zones.
A.5. Large-scale atmospheric circulation. Teleconnection patterns. Relationship of ocean circulation to atmospheric circulation.
A.6. Atmospheric circulation in tropical, extratropical and p[olar region of Noth Atlantic.
A.7. Sea ice and its role in ocean-atmosphere interactions. Atmospheric processes over bodies of water covered by sea ice.
A.8. Basics of numerical weather prediction and use of atmospheric model results in oceanography.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	51.0%	100.0%

Recommended reading

Basic literature	Herman, A., 2006, Podstawy meteorologii. Uniwersytet Gdański. Holton J.R., Hakim G.J., An Introductioon to Dynamics Meteorology, 5th ed. Academic Press. Lindzen R.S. Dynamics in Atmospheric Physics. Cambridge Univ. Press
Supplementary literature	Satoh M., Atmospheric Circulation Dynamics and General Circulation Models. Springer and Praxis Publishing.
eResources addresses	

Example issues/ example questions/ tasks being completed

1. Describe the general atmospheric circulation pattern.
2. Describe the development of a mid-latitude low pressure system.
3. What is ENSO and how does it work?
4. What is the mechanism of polar vortex evolution?
5. Describe the ocean-atmosphere interaction during hurricane development.

Work placement

Not applicable

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