University of Gdańsk

Subject card

Subject name and code	Natural extreme phenomena - practical, PG_00135509						
Field of study	Physical geography and geoinformation						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2025/2026			
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	2		Language of instruction	Polish Polish			
Semester of study	3		ECTS credits	2.0			
Learning profile	academic		Assessment form				
Conducting unit	Pracownia Badań Klimatu -> Katedra Oceanografii Fizycznej i Badań Klimatu -> Faculty of Oceanography and Geography						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Mirosława Malinowska					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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		15.0	15.0	60	
Subject objectives	To familiarize students with the following contents:1. Types, causes and locations of natural extreme phenomena (meteorological, hydrological and geomorphological).2. Selected social, economic and ecological aspects of the occurrence of natural extreme phenomena and their risk reduction.3. The organization of systems of assessment and risk reduction of hazards.4. Methods of risk analysis of the occurrence of natural extreme phenomena and the implementation of practical skills in the application of advanced statistical techniques used in analyses of this type.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GFGMU2_U03] effectively use selected scientific literature in the field of physical geography and geoinformation, both in Polish and English	Can effectively use skillfully selected for the purpose of application scientific literature in the field of analysis of natural extreme phenomena both in Polish and in English	[SU3] text preparation/written work
	[GFGMU2_U04] describe and analyze the causes and course of physical and geographical processes and phenomena, selecting and applying advanced techniques and research tools in the field of statistical and geoinformation methods, interpreting the results, using theoretical knowledge to formulate own opinions and conclusions	Able to describe and analyze the causes and course of natural extreme phenomena, skillfully selecting and applying advanced techniques and research tools from the field of statistical methods, interpreting the results obtained as a consequence, and then using theoretical knowledge to formulate their own opinions and conclusions	[SU3] text preparation/written work [SU4] test/exam - oral or written
	[GFGMU2_U05] integrate knowledge from the discipline of Earth and environmental sciences, explaining and interpreting the interrelationships between environmental processes and phenomena in order to solve research problems in physical geography and geoinformation	Is able to integrate knowledge from the discipline of earth and environmental sciences, correctly explaining and interpreting the interrelationships between environmental processes and phenomena in order to solve research problems of modern climatology, hydrology and geomorphology in the context of the analysis of natural extreme phenomena	[SU3] text preparation/written work [SU4] test/exam - oral or written
	[GFGMU2_W01] the specificity of Earth sciences in the field of physical geography, its internal structure, research subject and main research directions, conceptual apparatus, as well as practical applications of scientific achievements	He knows and understands the conceptual apparatus, as well as the practical applications of scientific achievements in the analysis of the theory of analysis of extreme phenomena	[SW4] test/exam - oral or written [SW3] text preparation/written work
	[GFGMU2_U02] precisely and appropriately use terminology in the field of physical geography and geoinformation in oral statements and written works	Able to proficiently and appropriately apply terminology from the analysis of natural extreme phenomena in written work	[SU3] text preparation/written work [SU4] test/exam - oral or written
	[GFGMU2_K02] active actions to raise awareness of changes occurring in the natural environment and their consequences, as well as initiating activities for the protection of the natural environment	He is ready to be active in raising awareness about natural extreme phenomena and their consequences in human life	[SK8] observation of student's independent or team work
	[GFGMU2_K01] critical assessment of knowledge in the field of Earth and environmental sciences and geoinformation, its completion and verification through critical analysis of scientific literature	He is ready to critically evaluate his knowledge of natural extreme phenomena, to supplement it and to verify his knowledge and skills through critical reading of the literature on the subject	[SK3] text preparation/written work [SK8] observation of student's independent or team work
	[GFGMU2_W02] issues in the field of exact sciences enabling the understanding of complex processes and phenomena occurring in the Earth's natural environment, and in their interpretations consistently relay on empirical foundations, using qualitative and quantitative methods	He knows and understands the issue of the formation of natural extreme phenomena as a consequence of the occurrence of complex processes and phenomena occurring in the Earth's natural environment, and in their interpretation consistently relies on empirical foundations, using qualitative and quantitative methods	[SW4] test/exam - oral or written [SW3] text preparation/written work
	[GFGMU2_W08] the most important contemporary problems on a regional and global scale, their essence, genesis and possible consequences	Knows and understands the problem of occurrence of natural extreme phenomena on a regional and global scale, their essence, genesis, possible consequences and techniques for analyzing their occurrence,	[SW4] test/exam - oral or written [SW3] text preparation/written work
Subject contents	1. Introduction to the theory of analysis of extreme phenomena and risk assessment of their occurrence.2. Review of statistical methods used in the analysis of extreme phenomena.3. Probabilistic approach - analysis of high-order quantiles.4. Modeling the probability of occurrence of extreme phenomena using GEV distribution.5. Modeling the probability of extreme phenomena using the GP distribution.6. Modeling the probability of extreme events with additional explanatory variables.7. Methodology for assessing the risk of extreme events.		

Prerequisites and co-requisites		
Assessment methods and criteria		

Subject passing criteria	Passing threshold	Percentage of the final grade
Preparation of three papers on hydrosphere, atmosphere and lithosphere	51.0%	100.0%

Recommended reading	Basic literature	Falarz M., (red.), 2021, Climate Change in Poland. Past, Present, Future, Springer Keller E.A., DeVecchio D.E., 2011, Natural Hazards; Earths Processes as Hazards, Disasters, and Catastrophes. Pearson Prentice Hall. Kundzewicz Z.W., Matczak P, 2010, Threats of natural extreme events, Nauka 4/2010.Rucińska D., 2012, Extreme natural phenomena and social awareness, UW, Warsaw.
	Supplementary literature	Ciurean R.L., Schröter D., Glade T., 2013, Conceptual Frameworks of Vulnerability Assessments for Natural Disasters Reduction. Approaches to Disaster Management - Examining the Implications of Hazards, Emergencies and Disasters. Coles A., 2001, An Introduction to Statistical Modeling of Extreme Values, Springer. Cyberski J. (ed.), 2003, Flooding in Gdańsk 2001, GTN Wydz. V, Gdańsk. IPCC, 2012, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. Special Report of the IPCC Technical Summary. Cambridge University Press, Nowy Jork. Rosenzweig C., Solecki W.D., Hammer S.A., Mehrotra S., 2011, Climate change and cities. First Assessment Report of the Urban Climate Change Research Network. Soczyńska U. (ed.), 1997, Prediction of precipitation and floods with a given recurrence time, UW, Warsaw.Walmsley D.J., Lewis G.J, 1997, Human geography. Behavioral approaches, PWN, Warsaw, Poland. Wilks D., 2011, Statistical methods in the atmospheric sciences. Academic Press.
	eResources addresses	Uzupełniające Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Assess the risk of extreme meteorological events in Gdansk.Based on a case study, select a district of Gdansk for pilot implementation of adaptation and mitigation solutions to climate change.	
Work placement	Not applicable	

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