University of Gdańsk

Subject card

Subject name and code	Statistical methods in geology - lecture, PG_00091099						
Field of study	Geology						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
Education level	undergraduate 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		
Semester of study	2		ECTS credits		1.0		
Learning profile	academic		Assessment form				
Conducting unit	Pracownia Rekonstrukcji Geomorfologicznych -> Katedra Geomorfologii i Geologii Czwartorzędu -> Faculty of Oceanography and Geography						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Damian Moskalewicz					
	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						
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		13.0	30
Subject objectives	Lecture: introduction to various statistical tools in scientific and professional applications; acquiring the ability to correctly and transparently present the results of geological research; understanding the typology of variables, objects, populations, distributions and measurement scales; familiarization with basic methods of statistical analyzes and descriptive statistics, understanding the impact of measurement error on the interpretation of results; familiarization with the issues of estimation and hypothesis testing; understanding of selected statistical analyzes used in geology						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GEOLL3_W06] knows statistical and IT tools as well as the principles of preparing engineering and geological documentation and cartographic materials	knows statistical and IT tools and the principles of preparing geological and engineering documentation and studies of cartographic materials based on statistical analysis	[SW4] test/exam - oral or written
[GEOLL3_W02] knows and understands the terminology appropriate in science and natural sciences	knows and understands the appropriate terminology in the field of statistical methods used in geology	[SW4] test/exam - oral or written
[GEOLL3_K03] is willing to exercise caution and criticism in receiving information from scientific literature, the Internet and other media related to natural sciences	is ready to be cautious and critical in accepting information from scientific literature, the Internet and other media relating to natural sciences in the field of statistics	[SK4] test/exam - oral or written
[GEOLL3_U04] is able to use specialized computer software and mathematical and statistical methods in the analysis of geological data	is able to use specialized computer software and mathematical and statistical methods in the analysis of geological data	[SU4] test/exam - oral or written
[GEOLL3_U02] has the skill of analytical and synthetic way of reasoning leading to correct inference based on the results obtained or the facts presented	has the ability to use analytical and synthetic reasoning leading to correct conclusions based on the results obtained or presented facts in the field of geology	[SU4] test/exam - oral or written

Subject contents

Statistical tools, data sources, data visualization, basic concepts in statistical analyses
Classification of objects and variables, types of data, populations, distributions, measurement scales
Basic measures in quantitative and qualitative data, descriptive statistics, measurement error
Estimation, hypothesis testing, parametric and non-parametric tests
Analysis of variance, correlations and regressions
Principal component analysis, cluster analysis, discriminant analysis, advanced statistical tools
Statistical methods of analyzing geological data in time (e.g. time series analysis) and space (e.g. kriging), statistical analyzes within outcrops and geological profiles (e.g. paleocurrent statistics, modal sequences)

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	50.0%	100.0%

Recommended reading

Basic literature	Davis, J.C., 2002. Statistics and data analysis in geology. Wiley & Sons. Krysicki, W., Bartos, J., Dyczka, W., Królikowska, K., Wasilewski, M., 2011. Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach. Cz. 1 i 2. Wyd. PWN Literatura uzupełniająca: Koronacki, J., Mielniczuk, J., 2009. Statystyka dla studentów kierunków technicznych i przyrodniczych. Wyd. Naukowo-techniczne. Łomnicki, A., 2014. Wprowadzenie do statystyki dla przyrodników. Wyd. PWN
Supplementary literature	Gaetan, C., Guyon, X., 2010. Spatial Statistics and Modelling. Springer. Healy, K., 2018. Data Visualization: A Practical Introduction. Princeton University Press
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Calculate Pearson's r correlation coefficient, perform linear regression, perform a statistical test
Work placement	Not applicable

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