University of Gdańsk

Subject card

Subject name and code	Statistic in Environmental Protection, PG_00044156		
Field of study	Environmental Protection		
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
Semester of study	1	ECTS credits	1.0
Learning profile	academic	Assessment form	
Conducting unit	Faculty of Biology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Magdalena Remisiewicz	
	Teachers	dr hab. Magdalena Remisiewicz Ignacy Gołębiewski	

Lesson types							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	0.0	0.0	15
	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	15	2.0	8.0	25

Subject objectives	
	1. Acquiring the skills to use computer statistical programs. 2. Understanding basic concepts related to descriptive statistics and hypothesis testing. 3. Learning and understanding methods of numerical data analysis. 4. Acquiring the skills to select methods for statistical data analysis.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OŚMU2_W06] Analyses the impact of human activities on biodiversity and environmental quality on a local, regional and global scale.	Applies statistical methods and IT techniques and tools to describe phenomena in the field of environmental protection and to analyze specialized data.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW5] implementation of a problem task
[OŚMU2_K06] Recognises the importance of knowledge in solving encountered cognitive and practical problems and consults experts in the event of difficulties in solving a problem on her/his own.	Has knowledge on methods in descriptive statistics methods, formulating statistical hypotheses and testing them, and analyzing relationships between environmental variables	[SK4] test/exam - oral or written [SK5] implementation of a problem task [SK8] observation of student's independent or team work
[OŚMU2_W07] Distinguishes between legal and administrative mechanisms and procedures in environmental protection and interprets its international dimension.	Applies statistical methods and IT techniques and tools to describe phenomena in the field of environmental protection and to analyze specialized data.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[OŚMU2_K02] Recognises threats, creates safe work conditions and is responsible for the safety of own and other people's work.	Works in a team and leads the work of a small team in the area of statistical data analysis.	[SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[OŚMU2_W02] Hypothesises and analyses the results using statistical methods and modelling in environmental protection.	Interprets phenomena and facts using precise, verifiable methods.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[OŚMU2_U05] Searches, selects and analyses the literature achievements of environmental sciences, including scientific journals and databases, reading and understanding scientific texts in her/his native language and in English.	Selects and applies statistical techniques and tools appropriate to the problems of the studied specialty.	[SU1] oral statement/conversation/ discussion [SU6] demonstration of practical skills [SU8] observation of student's independent or team work

Subject contents

Calculation of arithmetic mean and weighted arithmetic mean, standard deviation, median and quartiles, mode. Determination of the consistency of the variable values distribution with the normal distribution and selection of appropriate tests for testing hypotheses about differences between means and sample distributions for two samples (Student's t-test, Mann-Whitney U test) and for multiple samples (ANOVA and Kruskal-Wallis test). Examination of the relationship between variables using Spearman and Pearson correlations, and linear regression. Practical application of frequency analysis in environmental protection. Preparation and analysis of charts based on statistical data. These issues are implemented using examples of biological data with the use of Excel and Statistica programs.

Prerequisites and co-requisites

none

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
3 written assignments testing the degree of material mastery; in written form.	51.0%	100.0%

Recommended reading

Basic literature	Zar J.R. 2018. Biostatistical Analysis. 5th Edition. Pearson. ISBN: 0134995449.
Supplementary literature	Quinn G.P., Keough M.J.2023. Experimental Design and Data Analysis for Biologists. Cambridge University Press. Sokal R. R., Rohlf F.J. 1994. Biometry: The Principles and Practices of Statistics in Biological Research 3rd Edition. W. H. Freeman
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Calculation of arithmetic mean and weighted arithmetic mean, standard deviation, median and quartiles, mode. Determination of the consistency of the variable values distribution with the normal distribution and selection of appropriate tests for testing hypotheses about differences between means and sample distributions, for two samples (Student's t-test, Mann-Whitney U test) and for multiple samples (ANOVA and Kruskal-Wallis test). Examination of the relationship between variables using Spearman and Pearson correlations, and linear regression. Practical application of frequency analysis in environmental protection. Preparation and analysis of charts based on statistical data. These issues are addressed using examples of biological data with the use of Excel and Statistica programs.

Work placement

Not applicable