University of Gdańsk

Subject card

Subject name and code	Statistics, PG_00204518						
Field of study	Nuclear safety and radiological protection						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's 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		5.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Anita Dąbrowska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	45.0	0.0	0.0	60
	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	60		0.0		65.0	125
Subject objectives	Equipping the student with mathematical tools necessary for describing physical phenomena.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BJORL3_U10] Graduate applies fundamental mathematical and statistical methods to describe phenomena and analyze data	Students are able to: 1. solve simple tasks in probability calculus, 2. select and apply appropriate statistical methods to develop research results, 3. present and interpret the results of statistical analyses.	[SU6] demonstration of practical skills
[BJORL3_W02] Understands the role of physical and chemical experimentation, mathematical theoretical models approximating reality, and computer simulations in scientific research methodology; is aware of technological, apparatus, and methodological limitations in scientific research.	Students understand: the need for and importance of probabilistic and statistical description, including statistical inference, in research methods	[SW4] test/exam - oral or written
[BJORL3_W12] Has sufficient knowledge of mathematical and statistical methods to analyze data.	The student knows: 1. basic concepts and theorems of probability calculus, 2. concepts and methods of descriptive statistics, 3. concepts of point and interval estimation, 4. basics of statistical inference, including principles of formulating statistical hypotheses and their verification, 5. basic parametric and non-parametric tests, 6. methods of analyzing associations between variables.	[SW4] test/exam - oral or written
[BJORL3_U04] Can use mathematical and computer apparatus to analyze and solve problems in radiological protection and nuclear safety.	The student is able to use computer software to perform statistical analysis of research results. Students will be able to, using Python, 1. prepare data for statistical analysis, 2. present data in graphical form, 3. calculate basic descriptive statistics from a sample, 4. determine confidence intervals for mean, fraction, and variance, 5. perform basic parametric and nonparametric tests, 6. test normality of distribution, 7. analyze relationships between variables	[SU6] demonstration of practical skills

Subject contents

1. Probabilistic foundations of statistics: probability space, independent events, conditional probabilit, Bayes Theorem
2. Discrete and continuous random variables. Distributions of a random variable: binomial, Poisson, normal, and exponential
3. Descriptive statistics: frequency distributions, graphical presentation of empirical data, measures of central tendency and variability, measures of skewness and kurtosis
4. Central Limit Theorem
5. Concept of population. Random sample and sampling distributions
6. Point and interval estimation. Problem of minimum sample size
7. Statistical inference: Type I and Type II errors, critical value, statistical significance
8. Basic parametric and nonparametric tests
9. Statistical inference in correlation and regression analysis

Prerequisites and co-requisites

The basics of the Python language.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
tests	51.0%	70.0%
tests	51.0%	30.0%

Recommended reading

Basic literature

J. Podgórski, Statystyka dla studiów licencjackich, Wydawnictwo PWE, Warszawa 2019

A. Plucińska, E. Pluciński, Rachunek prawdopodobieństwa. Statystyka matematyczna. Procesy stochastyczne, Wydawnictwo Naukowe PWN, Warszawa 2019

D. C. Montgomery, G. C. Runger, Applied Statistics and Probability for Engineers, John Wiley & Sons, 2014

	Supplementary literature	M. Gągolewski, M. Bartoszuk, A. Cena, Przetwarzanie i analiza danych w języku Python, Wydawnictwo Naukowe PWN, Warszawa 2016
	eResources addresses	
Example issues/ example questions/ tasks being completed	not applicable	
Work placement	Not applicable	

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