University of Gdańsk

Subject card

Subject name and code	Statistics and Probability Theory for Teachers, PG_00204267						
Field of study	Mathematics						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2028/2029		
Education level	Bachelor'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	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		5.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Institute of Mathematics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Agnieszka Demby				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	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		3.0		62.0	125
Subject objectives	Deepening and broadening the knowledge of students - future teachers of mathematics - both about the basic concepts of descriptive statistics, combinatorics and probability calculus used in school mathematics, as well as the ability to solve tasks related to these concepts, including the use of an Excel spreadsheet.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[MATL3_U05] is able to correctly use the concepts of probability and statistics, is able to apply the theorems and methods of these fields and is able to interpret the obtained results	- Is able to correctly use the concepts of combinatorics, probability, and statistics learned during this lecture, is able - at a simple and medium level of difficulty - to apply the theorems and methods of these fields, and is able to interpret the obtained results, especially when solving more difficult problems in combinatorics and probability in school mathematics, as well as when preparing, presenting, and interpreting statistical data.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU4] test/exam - oral or written
[MATL3_U07] is able to plan a way to solve a complex problem and prepare a correct record of this solution, providing strict and precise justification for the correctness of his/her reasoning	- Is able to plan a method for solving a specific problem and prepare a correct record of that solution, providing precise and precise justifications for the correctness of their reasoning within the scope of the course objectives and content, with particular attention to accessibility for students. - Is able to use Excel and GeoGebra computer programs for analyzing statistical data.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU4] test/exam - oral or written
[MATL3_W05] knows and understands at an advanced level selected concepts, methods and theorems of probability and statistics, as well as basic examples both illustrating specific concepts in this field and allowing to refute false hypotheses or invalid reasoning	- Knows and understands the basic concepts and theorems of combinatorics and probability theory, as well as the basic concepts and tools of descriptive statistics; knows basic examples that both illustrate specific concepts from these fields and allow for the refutation of erroneous hypotheses or invalid reasoning, including examples of manipulation and erroneous reasoning that arise when applying statistics and probability theory to everyday interpretations.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion

Subject contents

1. Basic types of statistical series. Analysis of statistical data - measures of central tendency, location, dispersion. Frequency distribution. Gaussian curve.
2. Graphical representation of data series and dependencies between two data series. Correlation, regression.
3. Examples of descriptive statistics exercises using a spreadsheet.
4. Orderly counting of element systems, including the use of basic combinatorial schemes, trees and other graphs.
5. Probability and statistics. Various definitions of probability.
6. Modeling random experiments, including multi-stage ones.
7. Bernoulli's scheme - various aspects and applications.
8. Games of chance and lotteries. Expected value of winning.
9. Solving more difficult combinatorics and probability problems from school mathematics.
10. Relationships between statistics and probability theory with everyday life, including decision-making problems, examples of manipulation and fallacies. Examples of popularization of issues in statistics, combinatorics and probability theory.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
exam	51.0%	30.0%
Activity	51.0%	20.0%
Student Attitude Assessment	51.0%	0.0%
Project	51.0%	25.0%
Test	51.0%	25.0%

Recommended reading	Basic literature	1. M.Zakrzewski, T.Żak, Kombinatoryka, prawdopodobieństwo i zdrowy rozsądek, Quadrivium, Wrocław 1998. 2. M.Kałuszka, Rachunek prawdopodobieństwa i statystyka dla uczniów szkół średnich, Wydawnictwa Naukowo-Techniczne, Warszawa 1997. 3. Preparatory materials for the European Statistics Competition: https://eks.stat.gov.pl/materialy.html 4. T.Michalski, Statystyka, WSiP, Warszawa 2012. 5. A.Engel, T.Varga, W.Walser, Strategia czy przypadek? Gry kombinatoryczne i probabilistyczne, Wydawnictwa Szkolne i Pedagogiczne, Warszawa 1979.
	Supplementary literature	1. Popular science books, e.g. from the series: Świat jest mathematical, RBA Collectables, S.A.. 2. Articles from popular science magazines and portals (e.g. deltami.edu.pl) and portals and magazines for teachers (np."Matematyka w Szkole", "Matematyka"). 3. A.Obecny, Statystyka opisowa w Excelu dla szkół. Ćwiczenia praktyczne, Helion, Gliwice 2002. 4. W.J.Gmurman, Zbiór zadań z rachunku prawdopodobieństwa i statystyki matematycznej, Wydawnictwo Naukow-Techniczne, Warszawa 1976 5. T.Gerstenkorn, T.Śródka, Kombinatoryka i rachunek prawdopodobieństwa, Państwowe Wydawnictwo Naukowe,Warszawa 1983.
	eResources addresses	
Example issues/ example questions/ tasks being completed	For the data set from the task below, determine two measures that make sense for the given study: (i) central tendency - other than the arithmetic mean and the weighted mean, (ii) dispersion. Provide the names of the measures determined. Task (from a school textbook): Andrzej asked 20 adults he met by chance how many children they had. He received the following answers: 2, 2, 3, 0, 1, 1, 0, 2, 3, 4, 0, 2, 1, 1 0, 4 5 0, 1, 0.	
Work placement	Not applicable	

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