

Subject card

Subject name and code	Probability theory and statistics, PG_00143540						
Field of study	Informatics						
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			exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Joanna Czarnowska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	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	Introducing students to the basics of probability theory and statistics.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[INFOL3_U01] can apply mathematical knowledge to formulate, analyze and solve problems related to computer science	<ul style="list-style-type: none"> • Can solve simple problems in probability theory, such as calculating event probabilities and determining distribution parameters like expected value and variance. • Can apply learned methods to verify statistical hypotheses, using appropriate tools for data analysis. • Constructs models using learned regression methods for prediction, creating their own algorithms or using dedicated tools for this purpose. 	[SU4] test/exam - oral or written
	[INFOL3_U02] can precisely formulate questions to deepen one's understanding of a given topic or find missing elements of reasoning	Can correct an incorrect or incomplete solution to a problem in probability or statistics	[SU4] test/exam - oral or written
	[INFOL3_W02] knows and understands advanced concepts of discrete mathematics, probabilistic methods and statistics	Knows the basic concepts of probability theory, including basic discrete and continuous probability distributions, and distribution parameters (e.g. expected value, variance, and standard deviation). <ul style="list-style-type: none"> • Has basic knowledge of estimators (including estimators of expected value and variance) and statistical hypothesis testing, including tests concerning expected value and variance. • Knows the basics of regression analysis, including linear regression. 	[SW4] test/exam - oral or written
Subject contents	<ul style="list-style-type: none"> • Discrete and continuous random variables (cumulative distribution function, probability density function). Distribution parameters: expected value, variance, standard deviation, quantiles. • Random vectors. Distribution of vectors including the normal distribution. Marginal distributions. Independence of random variables. Correlation coefficient. • Point estimation, maximum likelihood method. Selected statistics - sample mean, sample variance, empirical distribution function. Distribution of statistics using Monte Carlo methods. • Interval estimation - confidence intervals for at least expected value and variance. • Verification of statistical hypotheses concerning at least expected value and variance. Selected goodness-of-fit tests. Examples of bootstrap methods in hypothesis testing. • Basics of regression - including linear regression. 		
Prerequisites and co-requisites	Knowledge of the basics of mathematical analysis and combinatorics.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	51.0%	40.0%
	laboratory	51.0%	60.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. M. Baron, Probability and Statistics for Computer Scientists, Chapman and Hall Book 2. Gajek, M. Kałuszka, Wnioskowanie statystyczne dla studentów, WNT Warszawa 3. P. Dalgaard, Introductory Statistics with R, Springer 	
	Supplementary literature	<ol style="list-style-type: none"> 1. H. Wickham, ggplot2, Elegant graphics for data analysis, Springer 	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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