

Subject card

Subject name and code	Probability Theory and Statistics, PG_00198463						
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	part-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 Paweł Klinga				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	20.0	0.0	0.0	0.0	40
	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	40		0.0		85.0	125
Subject objectives	Introducing students to the basics of probability theory and statistics.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[INFOL3_W02] knows and understands advanced concepts of discrete mathematics, probabilistic methods and statistics		• Apply probability theory to model random phenomena — select a distribution, determine and interpret its parameters (expected value, variance, standard deviation). • Determine point and interval estimators and perform hypothesis tests concerning the expected value and variance. • Fit and interpret a linear regression model.		[SW4] test/exam - oral or written [SW2] presentation/project/paper/report		
	[INFOL3_U02] is able to use his/her knowledge of higher mathematics to model and solve complex problems		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). • 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.		[SU2] presentation/project/paper/report [SU4] test/exam - oral or written		

Subject contents	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%	60.0%
	laboratory	51.0%	40.0%
Recommended reading	Basic literature	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	1. H.Wicham, ggplot2, Elegant graphics for data analysis, Springer	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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