



Subject card

Subject name and code	Inference in Multivariate Statistics, PG_00044136						
Field of study	Mathematics						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2023/2024		
Education level	second-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		blended-learning		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Anna Szafrńska				
	Teachers		dr inż. Anna Szafrńska				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	15.0	60
	E-learning hours included: 30.0						
	Additional information: E-Learning course (lecture, laboratory, seminar): https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37001						
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		5.0		60.0	125
Subject objectives	Classical statistical introduction to data science. Computer laboratory oriented on practicable R packages tools.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W12] Knows well at least one symbolic computation software package and one statistical data processing package.		Is able to analyze empirical data using R packages.		[SW1] Assessment of factual knowledge		
	[K7_U08] Knows probability distributions and their properties; is able to use them in practical issues, is familiar with the basics of statistics (estimation issues and hypothesis testing) and the basics of statistical data processing.		Uses mathematical statistics techniques in the analysis of random phenomena.		[SU1] Assessment of task fulfilment		
	[K7_W09] Knows the rules of stochastic modeling in financial and actuarial mathematics or in natural sciences, in particular physics, chemistry or biology.		Models random phenomena using the language of statistics with computer support.		[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	[K7_W01] Has enhanced knowledge of basic branches of mathematics.		Is able to estimate parameters of distributions using analytical methods.		[SW1] Assessment of factual knowledge		
Subject contents	Elements of R. Styles, patterns and structures of data science. Functional analysis notations in data science. Statistical models. Introductory inference theory. Regression. Clustering methods. Introduction to classification and algorithms in data science. Classification methods. Multidimensional data problems. Elements of principal components. K-means algorithm.						
Prerequisites and co-requisites	Courses completed: Probability Theory, Mathematical Statistics.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test	50.0%	30.0%
	Project 2	50.0%	15.0%
	Oral	50.0%	30.0%
	Seminar	0.0%	10.0%
	Project 1	50.0%	15.0%
Recommended reading	Basic literature	J.Kogan, Introduction to Clustering Large and High-Dimensional Data, Cambridge University Press, 2007. T.Panek, J.Zwierzchowski, Statystyczne metody wielowymiarowej analizy porównawczej, Oficyna Wydawnicza SGH, 2013. I.Koch, Analysis of Multivariate and High Dimensional Data, Cambridge University Press, 2014. R.Johnson, D.Wichern, Applied Multivariate Statistical Analysis, Pearson, 2014.	
	Supplementary literature	W.K.Hardle, L.Simar, Applied Multivariate Statistical Analysis, Springer, 2015. C.Chatfield, A.J.Collins, Introduction to Multivariate Analysis, CRC, 2017.	
	eResources addresses	Adresy na platformie eNauczanie: Wnioskowanie w wielowymiarowej statystyce 2023/2024 - Moodle ID: 37001 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=37001	
Example issues/ example questions/ tasks being completed	Given a joint multidimensional distribution find its marginal and conditional distributions. Find principal components of a covariance matrix. Using the k-means method, cluster the given data set.		
Work placement	Not applicable		

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