



Subject card

Subject name and code	Inference in Multivariate Statistics, PG_00044136						
Field of study	Mathematics						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2022/2023		
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		at the university		
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						
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: 0.0						
	Additional information: E-Learning course (lecture, laboratory, seminar): https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29022						
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_U08		Exploites mathematical statistics techniques in analysis of random events.		[SU1] Assessment of task fulfilment		
	K7_W01		Is able to estimate parameters of distributions applying analytical methods.		[SW1] Assessment of factual knowledge		
	K7_W09		Can model random phenomena using language of statistics supported by computer.		[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	K7_W12		Can analyze empirical data using R packages.		[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 agorithm.						
Prerequisites and co-requisites	Courses completed: Probability Theory, Mathematical Statistics.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Seminar		0.0%		10.0%		
	Project 1		50.0%		15.0%		
	Oral		50.0%		30.0%		
	Project 2		50.0%		15.0%		
	Test		50.0%		30.0%		

Recommended reading	Basic literature	<p>J.Kogan, Introduction to Clustering Large and High-Dimensional Data, Cambridge University Press, 2007.</p> <p>T.Panek, J.Zwierzchowski, Statystyczne metody wielowymiarowej analizy porównawczej, Oficyna Wydawnicza SGH, 2013.</p> <p>I.Koch, Analysis of Multivariate and High Dimensional Data, Cambridge University Press, 2014.</p> <p>R.Johnson, D.Wichern, Applied Multivariate Statistical Analysis, Pearson, 2014.</p>
	Supplementary literature	<p>W.K.Hardle, L.Simar, Applied Multivariate Statistical Analysis, Springer, 2015.</p> <p>C.Chatfield, A.J.Collins, Introduction to Multivariate Analysis, CRC, 2017.</p>
	eResources addresses	<p>Podstawowe</p> <p>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29022 - E-Learning course (lecture, laboratory, seminar):</p> <p>Adresy na platformie eNauczanie:</p>
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	