



## 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): <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29022">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29022</a>						
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 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		
	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><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29022">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29022</a> - E-Learning course (lecture, laboratory, seminar):</p> <p>Adresy na platformie eNauczanie:</p>
Example issues/ example questions/ tasks being completed	<p>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.</p>	
Work placement	<p>Not applicable</p>	