

Subject card

Subject name and code	Data Analysis Laboratory, PG_00172484						
Field of study	Mathematical Modeling and Data Analysis						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2025/2026		
Education level	Bachelor's studies		Subject group		Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		6.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Szymon Myga				
	Teachers		dr hab. Adam Kwela				
			dr Szymon Myga				
			dr Nikodem Mrozek				
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		10.0		80.0	150
Subject objectives	The objective of the course is to familiarize students with fundamental methods in data mining, that is, the analysis of observational datasets aimed at identifying underlying relationships.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[MMiADL3_K02] is ready to precisely formulate questions to deepen his/her own understanding of a given topic or to find missing elements of reasoning		The student is familiar with the fundamental theoretical frameworks and can formulate questions using the relevant technical terminology.		[SK4] test/exam - oral or written		
	[MMiADL3_W09] knows and understands the basics of computational and programming techniques supporting mathematician's work and understands their limitations		The student is familiar with dimensionality reduction techniques, fundamental machine learning models, and basic optimization methods		[SW4] test/exam - oral or written [SW2] presentation/project/paper/report		
	[MMiADL3_U10] is able to recognise problems, including practical issues, that can be solved algorithmically; can make a specification of such a problem		The student is able to use existing implementations and make appropriate modifications to them.		[SU2] presentation/project/paper/report		
	[MMiADL3_U11] knows how to arrange and analyse an algorithm in accordance with the specification and save it in the selected programming language		The student is able to use existing implementations and make appropriate modifications to them.		[SU2] presentation/project/paper/report		

Subject contents	1. Dimensionality reduction methods: principal component analysis, factor analysis. 2. Regression modeling: linear, multiple, and logistic regression. 3. Discriminant analysis: linear and quadratic discriminant functions, nearest neighbor method, Bayesian classification. 4. Heuristic methods for state space search. 5. Neural networks. 6. Optimization algorithms. 7. Presenting the English nomenclature for the course.		
Prerequisites and co-requisites	Completed course in mathematical analysis. Programming skills.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Assessment of student's attitude	51.0%	0.0%
	Written or oral exam and/or project and/or tests and/or homework	51.0%	100.0%
Recommended reading	Basic literature	1. Daniel T. Larose, "Metody i modele eksploracji danych", Wydawnictwo Naukowe PWN, Warszawa 2008. 2. Marek Walesiak, Eugeniusz Gatnar, "Statystyczna analiza danych z wykorzystaniem programu R", Wydawnictwo Naukowe PWN, Warszawa 2009.	
	Supplementary literature	James, G., Witten, D., Hastie, T., & Tibshirani, R. <i>An introduction to statistical learning with applications in R</i> (2nd edition). Springer Texts in Statistics, Springer, 2023.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Principal Component Analysis. 2. Basis machine learning models		
Work placement	Not applicable		

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