

Subject card

Subject name and code	Numerical Algorithms Used in Regression Models, PG_00174276						
Field of study	Mathematical Modeling and Data Analysis						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	Bachelor's studies		Subject group				
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Szymon Myga				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	0.0	30.0	30
	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	30		0.0		0.0	30
Subject objectives	The goal of the course is to understand how regression models are created using R language libraries.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MMiADL3_K01] is ready to accept the limitations of his/her own knowledge and understands the need for further education	Students understand the vast theoretical details underlying the presented solutions.	[SK2] presentation/project/paper/report
	[MMiADL3_K04] is ready to understand and appreciate the importance of intellectual honesty in own and other people's actions; is ready to act ethically	The presented topics involve an honest acknowledgment of what can and cannot be computed.	[SK1] oral statement/conversation/discussion
	[MMiADL3_W12] has a basic knowledge and understanding of legal and ethical conditions related to scientific and didactic activities	Students make informed use of resources available under Open Access.	[SW1] oral statement/conversation/discussion
	[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	While preparing their presentation, students must be able to formulate relevant questions and respond to them satisfactorily.	[SK8] observation of student's independent or team work
	[MMiADL3_U15] can speak about mathematical problems in understandable colloquial language	Students present selected topics during the seminar and are expected to answer questions pertaining to their presentations.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report
	[MMiADL3_K10] is ready to analyse data and communicate the conclusions of such analysis in an accessible form	The student knows and understands regression models and knows how to interpret them	[SK2] presentation/project/paper/report
	[MMiADL3_K09] is ready to critically evaluate arguments, find gaps in reasoning, and constructively criticise other people's reasoning	Students engage in discussions regarding the proposed solutions.	[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report
	[MMiADL3_K06] is ready to formulate opinions on basic mathematical issues	The student answers questions related to the mathematical aspects of their presentation.	[SK1] oral statement/conversation/discussion
	[MMiADL3_U14] has the ability to prepare oral presentations in Polish and at least one foreign language about selected mathematical issues using various sources of knowledge	Students deliver presentations on selected topics during the seminar.	[SU2] presentation/project/paper/report
	[MMiADL3_W13] knows and understands the basic concepts and principles of industrial property protection and copyright, is able to use patent information resources	Students make informed use of resources available under Open Access.	[SW1] oral statement/conversation/discussion
Subject contents	1. Regression models 2. Numerical methods of linear algebra used in regression. 3. Optimization algorithms. 4. Statistical diagnostics of regression modes. 5. Generalized models. 6. Regularized models. 7. Advanced diagnostics. 8. Optimizing performance.		
Prerequisites and co-requisites	Linear Algebra, Probability		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Presentation	51.0%	100.0%
Recommended reading	Basic literature	1. Chambers, J. M, Hastie, T. J., <i>Statistical Models in S</i> , Chapman and Hall/CRC, 1991. 2. James W. Demmel, <i>Applied Numerical Linear Algebra</i> , Society for Industrial and Applied Mathematics (SIAM), Philadelphia, PA, 1997 3. McCullagh, P, Nelder, J.A., <i>Generalized Linear Models</i> , Monogr. Statist. Appl. Probab. Chapman & Hall, London, 1989.	
	Supplementary literature	Trevor Hastie, Robert Tibshirani, Jerome Friedman, <i>The Elements of Statistical Learning</i> , Springer Series in Statistics, Springer New York, NY, 2009.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. How are least squares computed using matrix decomposition? 2. How does Fisher scoring work?		
Work placement	Not applicable		

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