

Subject card

Subject name and code	Data-oriented Programming, PG_00153320						
Field of study	Mathematical Modeling and Data Analysis						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Master's studies		Subject group		Obligatory subject group 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	1		ECTS credits		6.0		
Learning profile	academic		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Janusz Przewocki				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	60.0	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	To familiarize the student with advanced programming techniques and their applications in the process of creating machine learning models and data analysis.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MMiADMU2_W04] knows and understands the theoretical basis of computational methods and IT techniques used to solve problems in a selected field of mathematics	1. The student knows and understands the mechanisms of operation of the selected programming language used in data analysis.	[SW2] presentation/project/paper/report
	[MMiADMU2_W05] knows and fully understands selected software packages or IT techniques used for symbolic calculations or for statistical data processing	1. The student knows and understands version control systems for code and data. 2. The student knows and understands tools supporting work with data.	[SW2] presentation/project/paper/report
	[MMiADMU2_K01] is ready to recognize the limitations of his own knowledge and is ready to continue his education	1. The student is ready to recognize the limitations of his or her own knowledge and to further education	[SK8] observation of student's independent or team work
	[MMiADMU2_K02] is ready to precisely formulate questions to deepen his own understanding of a given topic or to find missing elements of reasoning	The student is ready to precisely formulate questions regarding the subject.	[SK1] oral statement/conversation/discussion
	[MMiADMU2_K04] is ready to understand and appreciate the importance of intellectual honesty in the actions of himself and others; is ready to act ethically	1. The student is ready to understand the importance of intellectual honesty and ethical behavior	[SK8] observation of student's independent or team work
	[MMiADMU2_K05] is ready to independently search for information in literature, also in foreign languages	1. The student is ready to independently search for information in the literature.	[SK1] oral statement/conversation/discussion
	[MMiADMU2_U11] can evaluate, at a basic level, the usefulness of mathematical methods and IT tools	1. The student is able to find use cases of the acquired programming techniques and IT tools.	[SU2] presentation/project/paper/report
Subject contents	1. Code version control systems (e.g. GIT) 2. Object-oriented programming with selected design patterns 3. Libraries supporting numerical calculations (e.g. numpy, scipy) 4. Libraries supporting work with data (e.g. pandas) 5. Libraries supporting machine learning processes (e.g. SkLearn) 6. Version control systems for data (e.g. DVC) 7. Basics of virtualization for data analysts		
Prerequisites and co-requisites	N/A		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		51.0%	0.0%
		51.0%	100.0%
Recommended reading	Basic literature	1. G. Lanaro, Q. Nguyen, S. Kasampalis, "Advanced Python Programming", Packt Publishing, 2019 2. J. Vanderplas, Python Data Science Handbook, O'Reilly, 2017 3. C. Huyen, Designing Machine Learning Systems, O'Reilly, 2022	
	Supplementary literature	1. PEREIRA, B. de B.; RAO, Calyampudi Radhakrishna.; OLIVEIRA, F. B.; Statistical Learning Using Neural Networks: A Guide for Statisticians and Data Scientists with Python, CRC Press, London.	
	eResources addresses		

Example issues/ example questions/ tasks being completed	Exemplary topics: 1. How to create a GIT repository 2. How to effectively disinfect data using the "pandas" package
Work placement	Not applicable

Document generated electronically. Does not require a seal or signature.