University of Gdańsk

Subject card

Subject name and code	Data-oriented Programming, PG_00207079		
Field of study	Mathematical Modeling and Data Analysis		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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	5.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr Janusz Przewocki	
	Teachers	dr Janusz Przewocki	

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	3.0	62.0	125

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
[MMiADM2_W04] knows and understands in depth the theoretical foundations of computational methods and information technology techniques used to solve problems in a selected field of mathematics or its applications	1. The student knows and understands version control systems for code and data. 2. The student knows and understands tools supporting work with data. 3. The student knows and understands the mechanisms of operation of the selected programming language used in data analysis.	[SW2] presentation/project/paper/ report
[MMiADM2_U04] is able to apply the scientific method in solving advanced problems in a selected branch of mathematics or its applications, and correctly selects the methods and tools - mathematical or computer - needed to solve such problems	1. The student is able to find use cases of the acquired programming techniques and IT tools.	[SU2] presentation/project/paper/ report

<table>
<tr><td>Subject contents</td><td>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</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>N/A</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td></td><td>51.0%</td><td>100.0%</td></tr>
<tr><td></td><td>51.0%</td><td>0.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. G. Lanaro, Q. Nguyen, S. Kasampalis, "Advanced Python Programming", Packt Publishing, 2019
2. J. Vanderplas, Python Data Science Handbook, OReilly, 2017
3. C. Huyen, Designing Machine Learning Systems, OReilly, 2022</td></tr>
<tr><td>Supplementary literature</td><td>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.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Exemplary topics:

1. How to create a GIT repository

2. How to effectively disinfect data using the "pandas" package</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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