

**Subject card**

<b>Subject name and code</b>	Data processing (Laboratory classes), PG_00201196						
<b>Field of study</b>	Physical geography and geoinformation						
<b>Date of commencement of studies</b>	October 2026		<b>Academic year of realisation of subject</b>		2026/2027		
<b>Education level</b>	Master's studies		<b>Subject group</b>		Obligatory subject group in the field of study		
<b>Mode of study</b>	full-time studies		<b>Mode of delivery</b>		at the university		
<b>Year of study</b>	1		<b>Language of instruction</b>		Polish		
<b>Semester of study</b>	1		<b>ECTS credits</b>		3.0		
<b>Learning profile</b>	academic		<b>Assessment form</b>		credit		
<b>Conducting unit</b>	Laboratory of Geomorphological Reconstructions -> Department of Geomorphology and Quaternary Geology -> Faculty of Oceanography and Geography -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Maurycy Żarczyński				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	0.0	60.0	0.0	0.0	60
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	60		8.0		7.0	75
<b>Subject objectives</b>	<ul style="list-style-type: none"> <li>Developing practical skills in tabular data processing and analysis using the R programming language and the Positron environment, including the use of the Git version control system.</li> <li>Introducing students to the capabilities of the FME (Feature Manipulation Engine) ETL tool in the area of integration, transformation and automation of spatial and tabular data processing.</li> </ul>						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GFGMU2_U04] is able to describe and analyze the causes and course of physical and geographical processes and phenomena, selecting and applying advanced techniques and research tools in the field of statistical and geoinformation methods, interpreting the results, using theoretical knowledge to formulate own opinions and conclusions	Is able to process and analyse tabular data and perform spatial data transformation using specialised software.	[SU4] test/exam - oral or written [SU5] implementation of a problem task
	[GFGMU2_U02] is able to precisely and appropriately use terminology in the field of physical geography and geoinformation in oral statements and written works	Is able to prepare a report using specialist terminology from the field of physical geography and geoinformation.	[SU5] implementation of a problem task
	[GFGMU2_K01] is ready to critically assess the knowledge obtained in the field of Earth and environmental sciences, particularly physical geography and geoinformation, its completion and verification through further critical analysis of scientific literature	Demonstrates a critical approach to obtained results.	[SK5] implementation of a problem task
	[GFGMU2_U03] is able to effectively use selected scientific literature in the field of physical geography and geoinformation, both in Polish and English	Is able to select an appropriate data processing tool or method and justify the choice.	[SU5] implementation of a problem task
	[GFGMU2_K03] is ready to accepting responsibility for group work assuming various roles in it, participating in preparation of scientific projects, taking responsibility for the equipment and safety rules, active developing of professional competences and knowledge in Earth and environmental sciences and geoinformation, including interdisciplinarity, as well as developing the principles of professional ethics, respecting copyright rules	Demonstrates the ability to work in a team.	[SK2] presentation/project/paper/report [SK8] observation of student's independent or team work
	[GFGMU2_W04] knows and understands theoretical foundations of research methods used in physical geography and closely related sciences, descriptive and mathematical statistics, as well as in a deepened extent methods of analyzing spatial phenomena	Knows basic statistical measures and methods for processing and transforming tabular and spatial data.	[SW4] test/exam - oral or written
Subject contents	<ul style="list-style-type: none"> <li>• Operating system structure file paths and file locations.</li> <li>• Introduction to R and the Positron environment; basic syntax, code commenting; installation and package management.</li> <li>• Basic data types in R: vectors, lists, numeric and logical types, type hierarchy.</li> <li>• Introduction to version control with Git and GitHub.</li> <li>• Importing tabular data (CSV, Excel, TXT and other formats).</li> <li>• Indexing and operations on data frames.</li> <li>• Basic statistical measures and data transformations (mean, median, logarithm, arithmetic operations).</li> <li>• Data processing with the dplyr package: select, rename, filter, summarise, mutate; tidyselect syntax and anonymous functions.</li> <li>• Introduction and familiarization with basic functions of the ETL tool FME (Feature Manipulation Engine) by SAFE Software.</li> <li>• Integration of the various spatial data types as an example of batch data transformation process into single output.</li> <li>• Automatization of the data processing using variable data sources (raster, vector, tabular) with geometry and attributes manipulation with the FME Workbench.</li> </ul>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Term work (R)	51.0%	46.66%
	Term works (FME)	51.0%	23.34%
	Test	51.0%	30.0%

Recommended reading	Basic literature	<p>Komsta, 2004, Wprowadzenie do środowiska R - R Project - <a href="https://cran.r-project.org/doc/contrib/Komsta-Wprowadzenie.pdf">https://cran.r-project.org/doc/contrib/Komsta-Wprowadzenie.pdf</a></p> <p>Biecek P., 2014, Przewodnik po pakiecie R, GIS, Wrocław - <a href="http://biecek.pl/r/przewodnikpopakiecieiinternet.pdf">http://biecek.pl/r/przewodnikpopakiecieiinternet.pdf</a></p> <p>Wickham H., Çetinkaya-Rundel M., Grolemund G., 2024, R for Data Science. 2nd Edition, O'Reilly Media</p>
	Supplementary literature	<p>FME Transformer Reference Guide: <a href="https://cdn.safe.com/resources/fme/FME-Transformer-Reference-Guide.pdf">https://cdn.safe.com/resources/fme/FME-Transformer-Reference-Guide.pdf</a></p> <p>Syed Muhammad Fahad Akhtar, 2017, Big Data Architect's Handbook, Packt Publishing Ltd.</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>• Loading a tabular file and inspecting data structure.</li> <li>• Filtering, selecting and aggregating data using the dplyr package.</li> <li>• Calculating basic statistical measures and transforming columns using anonymous functions.</li> <li>• Cloning a repository from GitHub and managing project files.</li> <li>• Transformations of data structure and content.</li> <li>• File format conversion and geoprocessing using FME.</li> </ul>	
Work placement	Not applicable	

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