



Subject card

Subject name and code	DATA ANALYSIS IN R, PG_00070505						
Field of study	Economic Analytics						
Date of commencement of studies	October 2026	Academic year of realisation of subject				2026/2027	
Education level	second-cycle studies	Subject group				Obligatory subject group in the field of study Subject group related to scientific research in the field of study	
Mode of study	Full-time studies	Mode of delivery				at the university	
Year of study	1	Language of instruction				English	
Semester of study	1	ECTS credits				5.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Statistics and Econometrics -> Faculty of Management and Economics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Karol Flisikowski					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	45.0	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	preparing students to create innovative analytical solutions and team cooperation in projects based on data analysis, based on knowledge of data processing tools and methods, and to shape attitudes related to responsible cooperation and independence in the context of solving socio-economic problems.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K7_W03] demonstrates in-depth knowledge of the applications of analytical methods and techniques for formulating and solving socio-economic problems.		knows and understands contemporary pre-processing methods and raw data processing before application advanced methods analytical information in the context of ensuring reliable results			[SW1] Assessment of factual knowledge	
	[K7_U05] collaborates with others in team projects, effectively fulfilling both leadership and team member roles to achieve established goals.		is able to collaborate within a team conducting data analysis in R, taking on the role of a leader or team member, effectively organizing work, distributing tasks, and integrating analytical results to achieve defined objectives.			[SU2] Assessment of ability to analyse information	
	[K7_K01] is ready to critically evaluate his/her knowledge in economic analytics and seek expert opinions when facing difficulties in solving a problem independently.		is ready to critically evaluate the results of data analyses performed in R, recognize the limits of their knowledge, and seek expert support when facing difficulties in solving a problem.			[SK5] Assessment of ability to solve problems that arise in practice	

Subject contents	<p>Course content – lecture</p> <ol style="list-style-type: none"> 1. Introduction to R, R-studio. Basic operations. Data import from various formats. Measuring scales vs data types in R (vector, dataframe, matrix, list, etc.) 2. Functions, variables, operators, constants. Loops. Conditional expressions and their use in data analysis 3. Basic commands - descriptive statistics 4. Basic commands - mathematical statistics 5. Reporting in R-Markdown 6. Git and version control. GitHub. Team work. 7. Basic data processing (new variables, filters, combining frames: reshape, split, combine) 8. Imputation methods for missing cross-sectional and temporal data 9. Dirty data - missing observations; duplicates; outliers; format errors 10. Data cleaning using Dplyr and Tidyr 11. Data cleaning outliers 12. Transformations and discretization of variables 13. Data sources: downloading data from databases (sqlite); web scraping; downloading data to R (Yahoo Finance; Quandl; Google Trends, Eurostat etc.) 14. Dimensional reduction using principal component analysis (PCA). Example applications 15. Graphics in R basic and advanced graphical presentation of data (packages: ggplot2; Lattice; Grid) 16. Publishing reports directly from R introduction to R-Markdown (notebook; presentations R and Powerpoint; HTML slides; PDF beamer etc.) <hr/> <p>Course content – laboratory</p> <ol style="list-style-type: none"> 1. Introduction to R, R-studio. Basic operations. Data import from various formats. Measuring scales vs data types in R (vector, dataframe, matrix, list, etc.) 2. Functions, variables, operators, constants. Loops. Conditional expressions and their use in data analysis 3. Basic commands - descriptive statistics 4. Basic commands - mathematical statistics 5. Reporting in R-Markdown 6. Git and version control. GitHub. Team work. 7. Basic data processing (new variables, filters, combining frames: reshape, split, combine) 8. Imputation methods for missing cross-sectional and temporal data 9. Dirty data - missing observations; duplicates; outliers; format errors 10. Data cleaning using Dplyr and Tidyr 11. Data cleaning outliers 12. Transformations and discretization of variables 13. Data sources: downloading data from databases (sqlite); web scraping; downloading data to R (Yahoo Finance; Quandl; Google Trends, Eurostat etc.) 14. Dimensional reduction using principal component analysis (PCA). Example applications 15. Graphics in R basic and advanced graphical presentation of data (packages: ggplot2; Lattice; Grid) 16. Publishing reports directly from R introduction to R-Markdown (notebook; presentations R and Powerpoint; HTML slides; PDF beamer etc.) 											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="448 1104 794 1137">Subject passing criteria</th> <th data-bbox="794 1104 1141 1137">Passing threshold</th> <th data-bbox="1141 1104 1489 1137">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 1137 794 1171">Analytical project in R</td> <td data-bbox="794 1137 1141 1171">60.0%</td> <td data-bbox="1141 1137 1489 1171">60.0%</td> </tr> <tr> <td data-bbox="448 1171 794 1249">Final test as an open test with interpretation of assumptions and data processing results</td> <td data-bbox="794 1171 1141 1249">60.0%</td> <td data-bbox="1141 1171 1489 1249">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Analytical project in R	60.0%	60.0%	Final test as an open test with interpretation of assumptions and data processing results	60.0%	40.0%
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Final test as an open test with interpretation of assumptions and data processing results	60.0%	40.0%										
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Wickham, H., Çetinkaya-Rundel, M., & Golemund, G. (2023). R for data science: Import, tidy, transform, visualize, and model data (2nd ed.). O'Reilly Media. 2. Golemund, G. (2014). Hands-on programming with R: Write your own functions and simulations. O'Reilly Media. 3. Bruce, P., Bruce, A., & Gedeck, P. (2020). Practical statistics for data scientists: 50+ essential concepts using R and Python (2nd ed.). O'Reilly Media. 										
	Supplementary literature	https://cran.r-project.org/web/packages/IPSUR/vignettes/IPSUR.pdf - G. Jay Kerns, Introduction to Probability and Statistics using R, Third Edition, 2018										
	eResources addresses											
Example issues/ example questions/ tasks being completed	Final project: preparation of a report and presentation in R-Markdown after data processing and analysis in R											
Practical activities within the subject	Not applicable											

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