GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	DATA ANALYSIS IN R, PG_00070484		
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	Polish
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

eNauczanie source addresses:

Moodle ID: 5388 Analiza danych z R 2025/2026 - kopia na 2026
https://enauczanie.pg.edu.pl/2025/course/view.php?id=5388

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_U05] collaborates with others in team projects, effectively fulfilling both leadership and team member roles to achieve established goals.	performs analytical work demonstrating the ability to work in a team	[SU2] Assessment of ability to analyse information
[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_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

<table>
<tr><td>Subject contents</td><td>Course content – lecture
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.)

Course content – laboratory
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.)</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></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>Final test as an open test with interpretation of assumptions and data processing results</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Analytical project in R</td><td>60.0%</td><td>60.0%</td></tr>
</table>
</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Wickham, H., Çetinkaya-Rundel, M., & Grolemund, G. (2023). R for data science: Import, tidy, transform, visualize, and model data (2nd ed.). OReilly Media.
2. Grolemund, G. (2014). Hands-on programming with R: Write your own functions and simulations. OReilly Media.
3. Bruce, P., Bruce, A., & Gedeck, P. (2020). Practical statistics for data scientists: 50+ essential concepts using R and Python (2nd ed.). OReilly Media.</td></tr>
<tr><td>Supplementary literature</td><td>https://cran.r-project.org/web/packages/IPSUR/vignettes/IPSUR.pdf - G. Jay Kerns, Introduction to Probability and Statistics using R, Third Edition, 2018</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table>
</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Final project: preparation of a report and presentation in R-Markdown after data processing and analysis in R</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
</table>

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