University of Gdańsk

Subject card

Subject name and code	Introduction to Data Science, PG_00199348		
Field of study	Economics		
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 Optional subject group 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	2	ECTS credits	4.0
Learning profile	academic	Assessment form	exam
Conducting unit	Department of International Economics and Economic Development -> Faculty of Economics -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Jakub Kwiatkowski	
	Teachers	dr Jakub Kwiatkowski	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	30.0	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	0.0	40.0	100

Subject objectives	The subject allows students to learn the basics of data science using the RStudio package. During the semester, the most important packages and tools used by business intelligence analysts are presented. As a result, students will gain practical knowledge combining previously acquired knowledge and analytical skills with actual economic analyzes carried out in business.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[EKONMU2_U08] can independently analyse economic and social phenomena and processes, and can perform a theoretically deepened assessment of such phenomena, using appropriately selected research method	is able to independently analyze economic and social phenomena and processes ability to theoretically in-depth assessment of these phenomena, with appropriate application selected research method and the RStudio package, as well as present obtained results in the form of project.	[SU2] presentation/project/paper/ report
[EKONMU2_U15] can independently expand and improve acquired knowledge and skills in economics; is open to new ideas and techniques; tends to learn using any accessible method and to interact with other participants of the learning process	can independently supplement and improve acquired knowledge in the field of data science economic skills, is open to new ideas and techniques, has a tendency to learning by any method and the tendency to interact with other participants of the learning process, while any doubts discusses during the office hours.	[SU1] oral statement/conversation/ discussion
[EKONMU2_U03] can analyse causes and course of economic and social processes and phenomena, formulate his/her own opinions on the subject, construct research hypotheses, and select and apply methods of their verification	can analyze the causes and course using the Pandas and NumPy packages economic and social processes and phenomena, formulate their own opinions on this subject, formulate research hypotheses and select and use methods to verify them and present its conclusions in the form of project.	[SU2] presentation/project/paper/ report
[EKONMU2_U01] can creatively interpret and explain economic and social phenomena and relations between them, using acquired knowledge of economics, finance and management sciences	can creatively interpret, present own projects and explain economic and social phenomena and relationshipsbetween these phenomena, using their knowledge in the field of economics, finance and management sciences using the RStudio package	[SU2] presentation/project/paper/ report
[EKONMU2_K02] is aware of the level of their knowledge in the area of solving complex problems in economic,; understands the need to extend and update this knowledge throughout his/her life	is aware of the level of his/her knowledge in the area of economics and data science, understands the need to deepen and update this knowledge throughout life	[SK8] observation of student's independent or team work
[EKONMU2_K01] recognises the importance of knowledge in the field of economics in the process of identifying and solving economic problems and of consulting experts when having difficulties in solving them independently	recognizes the importance of economics and data science knowledge in the identification process and solving economic problems and seeking expert opinions in cases difficulties in solving them on your own	[SK8] observation of student's independent or team work
[EKONMU2_U04] can forecast and model complex economic and social processes using quantitative and qualitative methods and tools developed by economic sciences (including statistics and econometrics)	is able to forecast and model complex economic and social processes using the RStudio package and present the results of own project.	[SU2] presentation/project/paper/ report
[EKONMU2_W06] has an in-depth understanding of statistical and econometric methods and tools for describing and modelling macro- and microeconomic economic structures and public institutions, as well as the processes taking place within them.	knows statistical and econometric methods and tools for macro description and modeling microeconomic economic structures and public institutions and processes in taking place using the RStudio package and present the results of own project.	[SW2] presentation/project/paper/ report

<table>
<tr><td>Subject contents</td><td colspan="3">What is data science?
Definition and scope of the field of data science
Key stages of the data analysis process (from collection to interpretation)

Installation and use of RStudio. Built-in data structures, data import and export
Basic data structures in R (vectors, matrices, data frames)
Methods for importing and exporting data in RStudio (CSV, Excel, databases)

Basics of statistical libraries
Overview of the most important statistical packages in R (e.g., stats, ggplot2, dplyr)
Applications of libraries for statistical analysis and data manipulation

Basics of econometric modeling in RStudio. Data cleaning and preparation
The process of preparing data for modeling (handling missing data, transformations)
Basic methods of econometric modeling (linear regression)

Data visualization
Creating basic charts (bar, line, scatter plots) in R
Using the ggplot2 library for advanced data visualization

Testing econometric models in RStudio
Methods for assessing model fit (R^2, statistical tests)
Diagnostics and verification of model assumptions (autocorrelation, heteroscedasticity)

Student prepares a project and its presentation, while any potential questions from the classes are discussed during consultations with the course instructor.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td colspan="3"></td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Project</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Neusser (2016) Time Series Econometrics. Springer Cham.

Wickham, H., & Grolemund, G. (2017). R for Data Science. OReilly Media.

Wickham, H. (2019). Advanced R (2nd ed.). Chapman and Hall/CRC.

Zumel, N., & Mount, J. (2014). Practical Data Science with R. Manning Publications.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Kwiatkowski (2021) Wpływ luki technologicznej na intensywność wymiany handlowej krajów OECD. Wydawnictwo Uniwersytetu Gdańskiego</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3"></td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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