GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	GIS METHODS IN DATA ANALYSIS, PG_00060821		
Field of study	Economic Analytics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Statistics and Econometrics -> Faculty of Management and Economics		
Name and surname of lecturer (lecturers)	Subject supervisor		
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	30.0	0.0	0.0	45

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	45	4.0	26.0	75

Subject objectives

Formulates research problems and select effective methods of solving them, using GIS methods in an in-depth way

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U03] Formulates research hypotheses and selects appropriate analytical methods for their verification, utilizing advanced IT tools, and critically evaluates the obtained results.	design research supporting business decision-making processes, using in practice GIS tools to support business decisions	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_W05] Possesses in-depth knowledge of the principles of integrating economic, legal, and ethical contexts in analyses and applying them in entrepreneurial activities while respecting copyright protection rules	makes responsible business decisions based on the results of analyzes using modern GIS tools and their possible applications in spatial analytics	[SW1] Assessment of factual knowledge

Subject contents

Basic concepts of GIS
Different data sources in GIS: vector, raster and attribute-based. Public sources of GIS data
Applications of GIS in scientific research and business
Coordinate systems and map projections
Spatial data acquisition
Spatial measures of central tendency and variation (central mean, central median, standard distance, directional distribution)
Vector data model - introduction, applications, basic functions.
Raster data model - introduction, applications, basic functions
Numerical terrain model
Spatial neighborhood - statistics: Moran I, Local Moran I, Getis-Ord General, Getis-Ord Gi*
Spatial modeling and interpolation - prespace weighted regression, IDW, kriging
Network analysis
Optimal localization problem, comovement problem, Chinese letter carrier problem
Modelbuilder and Python in ArcGIS pro
Application of spatial methods to real estate market analysis, crime, customer segmentation

Prerequisites and co-requisites

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test	60.0%	30.0%
		60.0%	70.0%
Recommended reading	Basic literature	Urbański, J. (2020) STO stron GIS, Wydawnictwo Uniwersytetu Gdańskiego Iwańczak, B. (2012) QGIS 3.14 Tworzenie i analiza map, Helion Longley P.A. (2008) GIS. Teoria i praktyka, PWN	
	Supplementary literature	Pimpler, E. (2017). Spatial Analytics with ArcGIS Malczewski, J., Jaroszewicz J. (2018). Podstawy analiz wielokryterialnych w Systemach Informacji Geograficznej, Wydawnictwo Politechniki Warszawskiej Szulc, E., Jankiewicz, M. (2022). Statystyczna i ekonometryczna analiza przestrzennych zjawisk ekonomicznych. Metody i zastosowania	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	For each city with less than 2,000 inhabitants in the selected poviat, assign the type of land cover with the largest area within a radius of 2 km Designate areas in the selected city that are more than 3 km from the nearest BTS What elements define the horizontal frame of reference? Describe one type of cartographic projection of your choice Estimate a spatial regression model for real estate prices in a selected commune		
Work placement	Not applicable		

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