



Subject card

Subject name and code	GIS METHODS IN DATA ANALYSIS, PG_00060916						
Field of study	Economic Analytics						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Part-time studies (on-line)	Mode of delivery			blended-learning		
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	Katedra Statystyki i Ekonometrii -> Faculty of Management and Economics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Marta Kuc-Czarnecka					
	Teachers	dr Marta Kuc-Czarnecka					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	8.0	0.0	16.0	0.0	0.0	24
	E-learning hours included: 18.0						
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	24	3.0		48.0		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 problems and selects appropriate analytical methods for their effective solution, using advanced IT tools, and evaluates the results critically	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] takes into account in the analyzes in an in-depth way both the economic, legal and ethical context, being aware of the responsibility for the consequences of its decisions	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	<p>Basic concepts of GIS</p> <p>Different data sources in GIS: vector, raster and attribute-based. Public sources of GIS data</p> <p>Applications of GIS in scientific research and business</p> <p>Coordinate systems and map projections</p> <p>Spatial data acquisition</p> <p>Spatial measures of central tendency and variation (central mean, central median, standard distance, directional distribution)</p> <p>Vector data model - introduction, applications, basic functions.</p> <p>Raster data model - introduction, applications, basic functions</p> <p>Numerical terrain model</p> <p>Spatial neighborhood - statistics: Moran I, Local Moran I, Getis-Ord General, Getis-Ord Gi*</p> <p>Spatial modeling and interpolation - prespace weighted regression, IDW, kriging</p> <p>Network analysis</p> <p>Optimal localization problem, comovement problem, Chinese letter carrier problem</p> <p>Modelbuilder and Python in ArcGIS pro</p> <p>Application of spatial methods to real estate market analysis, crime, customer segmentation</p>						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Group project I	60.0%	60.0%
	Group project II	60.0%	40.0%
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: Metody GIS w analizie danych 2024/2025 - Moodle ID: 39718 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=39718	
Example issues/ example questions/ tasks being completed	For each city with less than 2,000 inhabitants in the selected powiat, 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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