University of Gdańsk

Subject card

Subject name and code	Methods of spatial data analysis and visualization of socio-economic data, PG_00202198		
Field of study	Socio-economic geography with elements of GIS		
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 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	6.0
Learning profile	academic	Assessment form	exam
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Tomasz Michalski	
	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	8.0	82.0	150

Subject objectives

Knowledge and ability to apply visualization tools and basic tools of description and statistical inference in the process of quantitative analysis of a spatial or temporal-spatial nature; competence and ability to interpret data and results of statistical analysis of a spatial or temporal-spatial nature in presented in the form of single numbers, tables, charts and maps.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GSEMU2_W04] recognises in-depth methods and tools (quantitative, qualitative, cartographic) of research in socio-economic geography	Recognizes and classifies advanced quantitative, qualitative and cartographic research methods and tools used in socio-economic geography (A1-A6, B1-B10)	[SW4] test/exam - oral or written
[GSEMU2_U03] selects and applies appropriate social research methods (including statistical and cartographic ones) and research tools with particular emphasis on information technologies and GIS software	selects and applies appropriate statistical and mapping methods and research tools with particular emphasis on information techniques and GIS software (A1-A6, B1-B10)	[SU4] test/exam - oral or written
[GSEMU2_U04] adapts existing research tools and methods to solve complex and unusual problems occurring in the anthropogenic environment	creates combinations and adapts existing research tools and methods to solve specific problems occurring in the anthropogenic environment (A1-A4, A7, B1-B6)	[SU4] test/exam - oral or written
[GSEMU2_K01] is ready to critically assess knowledge and received content in the field of socio-economic geography and Geographic Information Systems	Adjusts appropriate research methods including GIS methods to obtain relevant information and solve a given problem in the field of socio-economic geography (B1-B10)	[SK4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td>A. Problems of the lecture
A.1 Simple methods of analysis (scoring, structure and synthetic indices, graphical methods, etc.).
A.2. Advanced methods of analysis (classification, regression and canonical analysis, principal component method, regression residual method, matrix
correlation and Mc Quitty's method, etc.).
A.3. Spatial analysis methods (spatial autocorrelation, descriptive statistics of points, geographically weighted regression).
A.4. Additional steps necessary in the application of quantitative methods (normalization, assignment of weights).
A.5. Socio-economic cartography (cartograms, cartodiagrams, methods: dot, signature, range, area, etc.).
A.6. Formalized theories and conceptual models.
A.7. Use of learned statistical methods and visualization techniques in socio-economic geography and spatial management - the dimension of
application (with emphasis on their use in expertise).
B. Problems of exercises
B.1 Pseudo-cohort classification.
B.2. Single-index classification.
B.3. Synthetic index.
B.4. Convergence index of structures.
B.5. Regression residuals method.
B.6. Correlation matrix and Mc Quitty method.
B.7. Spatial data visualization methods (signature, range, area).
B.8. Cartogram and cartodiagram method.
B.9. Isoline method.
B.10. Methods of generalization of spatial data.</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>test (exercises)</td><td>51.0%</td><td>50.0%</td></tr>
<tr><td>test (exam)</td><td>51.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Pasławski J., 2003, Jak opracować kartogram, Wydział Geografii i Studiów Regionalnych UW, Warszawa.
Iwańczak B., 2016, QGIS. Kształtowanie i analiza map, Helion, Gliwice.
Pieniążek M., Zych M., 2017, Mapy statystyczne. Opracowanie i prezentacja danych, GUS, Warszawa, http://stat.gov.pl/statystykaregionalna/publikacje-regionalne/podreczniki-atlasy/podreczniki/mapy-statystyczne-opracowanie-i-prezentacja-danych,1,1.html
Stanisz A., 20062007, Przystępny kurs statystyki w oparciu o program STATISTICA PL na przykładach z medycyny (Tomy: I, II, III), StatSoft Polska, Kraków.
Runge J., 2007, Metody badań w geografii społeczno-ekonomicznej elementy metodologii, wybrane narzędzia badawcze, Wyd. UŚ., Katowice.</td></tr>
<tr><td>Supplementary literature</td><td>Chojnicki J., Czyż T., 1977, Metody ilościowe i modele w geografii, PWN, Warszawa.
Frankowski Z., 1991, Zastosowanie metod taksonomicznych w badaniach przestrzennych, IGPiK, Warszawa.
Michalski T., 2003, Zastosowanie twarzy Chernoffa do klasyfikacji wielocechowej [w:] H. Rogacki (red.), Problemy interpretacji wyników metod badawczych stosowanych w geografii społeczno-ekonomicznej i gospodarce przestrzennej, Bogucki Wydawnictwo Naukowe, Poznań, 127-133.
Michalski T., 2008, Statystyka, WSiP, Warszawa.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>What is the correlation coefficient.

Describe Mc Quittye's method

Apply the cartogram</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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