

Subject card

Subject name and code	Spatial analysis methods II A, PG_00150393						
Field of study	Spatial Management						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Bachelor'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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		8.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Institute of Socio-Economic Geography and Spatial Management -> Faculty of Social Sciences -> Rector						
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	45.0	15.0	60.0	0.0	0.0	120
	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	120		30.0		75.0	225
Subject objectives	The aim of the course is to provide knowledge of the suite of measurement tools and analyses performed as part of issues related to planning and spatial development, including statistical, survey and interview tools as well as computer applications for visual spatial analysis and planning applications AutoCAD and ArcGIS Pro and project management, to acquire skills in applying these tools and to acquire the competence to decide independently which tools are appropriate for a given problem.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GPL3_U03] select appropriate sources of information and on this basis give opinions on the development of space for a specific area with particular regard to the principles of sustainable development and spatial order	used in spatial planning and is able to read and produce a planning drawing using the basic capabilities of CAD and ArcGIS Pro software	[SU4] test/exam - oral or written [SU5] implementation of a problem task
	[GPL3_K01] make decisions independently and be responsible for the effects of their own actions and those of their team's	decides independently on the choice of analytical method depending on the problem at hand and is aware of the consequences of this decision for the analytical process	[SK4] test/exam - oral or written [SK5] implementation of a problem task
	[GPL3_W08] principles of operating basic equipment, devices and software used to obtain and process geographical information and spatial planning	characterises, to a basic degree, the functions and use of selected CAD software, characterises the principles of operation of basic equipment and devices for the extraction and processing of geographic information	[SW4] test/exam - oral or written [SW5] implementation of a problem task
	[GPL3_K03] identify and resolve cognitive problems related to the profession in accordance with the latest knowledge in the field of spatial management, including expert opinions	Recognises the importance of knowledge in solving cognitive and practical problems and of consulting experts when faced with difficulties in solving planning and land-use planning, environmental protection and sustainable development measures on their own)	[SK4] test/exam - oral or written [SK5] implementation of a problem task
	[GPL3_W04] at an advanced level, the aims and conditions of using basic methods of quantitative analysis and interpretation of spatial processes and phenomena	lists the types, purposes and conditions of application of quantitative methods for analysing and interpreting spatial processes and phenomena based on statistics	[SW4] test/exam - oral or written [SW5] implementation of a problem task
	[GPL3_K06] care for the achievements and traditions of the profession, and comply with the principles of professional ethics by themselves and to demand that from others	respects the principles developed in the heritage and traditions of the urban planning, planning and research profession including the principles of professional ethics and expects others to do so	[SK4] test/exam - oral or written [SK5] implementation of a problem task
	[GPL3_U06] use specialist language in a debate with specialists in the field of spatial planning and management	applies analytical methods, computer simulations in solving engineering tasks in the field of spatial management, taking into account system interrelationships	[SU4] test/exam - oral or written [SU5] implementation of a problem task
	[GPL3_U04] make the correct selection of basic quantitative methods (including field research), use them in the analysis of spatial diversity of natural, social or economic phenomena and also make a correct interpretation of the results on the basis of the specificity of selected methods	selects quantitative methods to apply in the analysis of spatial variation of natural, social or economic phenomena and interprets the results based on knowledge of the specific methods selected.	[SU4] test/exam - oral or written [SU5] implementation of a problem task
	[GPL3_U08] perform complex research tasks or expertise in the field of spatial management under the guidance of a scientific supervisor, alone and in a team, and present the results of the research in a written and oral form in Polish and in a foreign language	uses a specialised CAD software interface in discussions with planning and development professionals	[SU4] test/exam - oral or written [SU5] implementation of a problem task

Subject contents	A. Problems of the lecture: Statistics as a science, types of research and statistical data Working with data (series and tables, different formulas, weights, normalisation) Single trait measures Correlation Regression - basics Regression - multivariate Scope of implementation of quantitative data in spatial management Selected simple methods of analysis (methods: point/ranking, rating, sign table; graphical methods: Oshan's triangle, Webb's diagram, Whitthauer's diagram Whitthauer diagram) Synthetic index and structure index Classification - basics Classification - multivariate (plus Chernoff faces) Correlation matrix and Mc Quitty method and regression residuals method Canonical analysis and principal components Spatial analysis methods Models (conceptual and formalised) Projects, business processes, programmes. Presentation of the conceptual apparatus. Features of a project. Classical areas of project management. Project organisation and life cycle. Key project stakeholders. Project processes. PRINCE2 methodology, Agile. Project preparation. Creating a project management team. Defining project objectives. Determining how the project will be delivered. Defining the business case. Planning the work and controls in the project. Initiating the project. Planning the project. Quality planning. Establishing a system of communication and documentation of the work. Project control elements. Planning the scope and structure of tasks. Recruiting and building the project team. Human resources management. Product development management. Preparation of final product description, product structure diagram and product sequence diagram. Stage control. Planning the stage. Project progress evaluation. Stage status review. Interim reporting. Strategic management quality planning and control in a project. Quality planning. Quality control in the project. Controlling the progress project. Strategic planning. Project closure. Risk analysis in a project. Specifics of risk analysis. Planning, identification and assessment of risks. Ways of monitoring risk and methods risk responses. Example of risk forms. Typology of social research by purpose and subject of research. Basic stages of the research process. Selection of appropriate research methods and techniques versus appropriate posing of the research problem. Characteristics of quantitative and qualitative approaches in social research. Comparison of the two approaches, together with an indication of their strengths and weaknesses. Selected characteristics of research samples. Randomisation techniques and sampling frames. Practical application of quantitative research methods using new technical possibilities, including surveys conducted online (PAPI, CATI, CAPI, CAWI, CASI). Basic knowledge of quantitative and qualitative data analysis. Research report and ways of presenting the results. B. Problematic exercises: Project writing workshop based on previously conducted analysis and collected findings. Selection of the project team. Determining the schedule of work in the project team Analysis of the activities necessary to carry out the project, gaining knowledge of the project environment and its audience, perhaps: analysis of the (financial) resources necessary to realise the project. Timetabling of the project and breakdown into individual tasks. Use of project management tools. Basic IT tools for project management and their application to own projects. Preparing the final form of the team's project in the form of a proposal. Discussing the strengths and weaknesses of the project. Refinement of weak points in the course of discussion. Develop weak points in discussion. Systematic evaluation of project progress. Checking changes in the project. Identify risks in the project and look for ways to prevent them. ways of preventing them Reading statistical data correctly Recognising the characteristics of a single variable (scale of measurement; whether it is stimulant, destimulant, nominant) Normalisation Measures of one variable - level and dispersion Measures of one variable - asymmetry and concentration Lorenz concentration curve Pearson's linear correlation coefficient Selected other correlation coefficients Regression Mono-characteristic/pseudo-characteristic classification Multivariate classification Synthetic index Similarity/dissimilarity index of structures Correlation matrix and Mc Quitty method Regression residuals method Moran's I spatial autocorrelation index Data visualisation A problem-based approach to the use of methods Introduction to survey design - types of survey implementation techniques: PAPI, CATI, CAPI, CAWI, CASI. - if this be in a lecture on Social Research Methodology, it doesn't need to be here, except as a brief reminder Construction of survey questionnaires including types and types of questions. The layout of the questionnaire - the order of questions and sections and the rules for transitions between questions (types of questions and rules for their arrangement, scales, cafeterias). The problem of errors in questionnaire research (technical errors in the question construction, interviewer and respondent errors, influence of third parties). Methods of sampling for research: comprehensive versus representative research. Main problems of implementing sample surveys. Testing the data entry process and piloting the survey implementation. Distribution of the survey. Methods of data analysis and presentation: preparation of data for analysis; development of collected research materials (clustering, typologisation, coding of closed and open questions, methods of coding and data entry). Quantitative analysis of survey research (graphical presentation of research results, rules of table construction). Principles of developing a survey report. Operation and features of ArcGIS Pro Operation and features of AutoCAD		
Prerequisites and co-requisites	knowledge of the contents and technical skills of the course Methods of Spatial Analysis I, computer proficiency		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Evaluation of exercises	51.0%	70.0%
	Egzam	51.0%	30.0%

Recommended reading	Basic literature	A.1. wykorzystywana podczas zajęć Augustyniak H., 1999, Statystyka opisowa z elementami demografii, Przedsiębiorstwo Wydawnicze Ars boni et aequi, Poznań. Makać W., Urbanek-Krzysztofik D., 2003, Metody opisu statystycznego, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk. Stanisz A., 2006, Przystępny kurs statystyki w oparciu o program STATISTICA PL na przykładach z medycyny (Tom I), StatSoft Polska Sp. z o. o., Kraków. 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 Runge J., 2007, Metody badań w geografii społeczno-ekonomicznej elementy metodologii, wybrane narzędzia badawcze, Wyd. UŚ., Katowice. Stanisz A., 2006/2007, Przystępny kurs statystyki w oparciu o program STATISTICA PL na przykładach z medycyny (Tomy: I, II, III), StatSoft Polska, Kraków. Wrona J., 2004, Podstawowe metody kartografii społeczno-gospodarczej, Wydawnictwo Akademii Ekonomicznej w Krakowie, Kraków. Zawadzka A.K.Z., Ład nasz przestrzenny, Wydawnictwo Uniwersytetu Gdańskiego, Wolters Kluwer, Gdańsk-Warszawa, 2017. Zawadzka A.K., Słabości i skutki prawnych regulacji związanych z procedurą sporządzania projektu decyzji o warunkach zabudowy [w:] T.Markowski, P. Żuber (red.), System planowania przestrzennego i jego rola w strategicznym zarządzaniu rozwojem kraju, Studia KPZK PAN, Tom CXXXIV, Warszawa 2011, s. 123-138. Zawadzka A.K., Zasady ochrony i kształtowania ładu przestrzennego ustalone w planach miejscowych na przykładzie wybranych gmin obszaru funkcjonalnego aglomeracji Trójmiasta [w:] G. Chaberek-Karwacka (red.), Współczesne uwarunkowania procesów zarządzania przestrzenią w Polsce, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, 2017, s. 15-40. Wejhert K., Elementy kompozycji urbanistycznej, Wydawnictwo Arkady, Warszawa, 2008. Ustawa z dnia 27 marca 2003 r. o planowaniu i zagospodarowaniu przestrzennym. Rozporządzenie Ministra Infrastruktury z dnia 26 sierpnia 2003 r. w sprawie wymaganego zakresu projektu planu miejscowego Przewodnik użytkownika programu CAD załączony w wersji elektronicznej do oprogramowania. A.2. studiowana samodzielnie przez studenta Augustyniak H., 1999, Statystyka opisowa z elementami demografii, Przedsiębiorstwo Wydawnicze Ars boni et aequi, Poznań. Luszniewicz A., Słaby T., 1997, Statystyka stosowana, PWE, Warszawa. Sobczyk M., 2003, Statystyka. Podstawy teoretyczne, przykłady zadania, Wydawnictwo UMCS, Lublin.
	Supplementary literature	Chojnicki J., Czyż T., 1977, Metody ilościowe i modele w geografii, PWN, Warszawa. Michalski T., 2003, Zastosowanie twarży 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, 127133. Michalski T., 2008, Statystyka, WSiP, Warszawa. Michalski T., 2014, Problemy w opracowaniu wskaźników dla monitoringu przestrzennego sytuacji społecznej w Polsce [w:] J. Zaleski (red.) Rozwój statystyki regionalnej w kontekście potrzeb informacyjnych polityki spójności. Nowe podejście do przestrzeni, Biuletyn KPZK PAN, 255, 8094. Ratajski L., 1989, Metodyka kartografii społeczno-gospodarczej, PPWK, Wrocław. Wiatrak A.P., 1982, Metody badania gałęziowej i przestrzennej struktury rolnictwa, Wiadomości Statystyczne, 1, 2128. Ignatczyk W., Chromińska M., 1999, Statystyka. Teoria i zastosowanie. WSB, Poznań. Michalski T., 2004, Statystyka. Podręcznik, WSiP, Warszawa. Wieczorkowska G. (i inni.), 2004, Statystyka. Wprowadzenie do analizy danych sondażowych i eksperymentalnych, Wydawnictwo Naukowe Scholar, Warszawa.
	eResources addresses	

Example issues/ example questions/ tasks being completed	Lecture: written examination of the tasks to be solved - obtaining a minimum of 51% of the points from the written test Auditorium exercises: work during the classes, colloquium - achieving a minimum of 70% of the tasks minimum 51% of the points in the written test. Laboratory exercises: design of a measuring tool, a task to be performed with the use of a computer application. using a computer application - knowledge and ability to apply will be evaluated (60% of the points), ingenuity (20% of the points) and aesthetics of the presentation of both the measurement tool and the tasks performed of the measurement tool and the tasks performed with the computer application (20% of the points) The student obtains one mark from the course which in 70% results from the mark for the exercises The student obtains one mark from the course which 70% comes from the mark for the exercises and 30% from the mark for the examination/assessment, while in order to pass the course it is necessary to obtain a pass mark for both the exercise and lecture parts of the course.
Work placement	Not applicable

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