



## Subject card

Subject name and code	Geographic Information System - GIS II , PG_00049246						
Field of study	Spatial Development						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
Education level	first-cycle 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	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Urban Design and Regional Planning -> Faculty of Architecture						
Name and surname of lecturer (lecturers)	Subject supervisor		Justyna Wiczerzak				
	Teachers		Justyna Wiczerzak				
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		5.0		25.0	75
Subject objectives	The course is intended for students who already have a basic knowledge in the use of GIS tools. Students continuing their studies learn how to obtain spatial information databases and learn analytical tools. Students will also learn new software (Arc Gis Pro), while working efficiently in QGIS. They acquire the ability to use GIS tools in the investment planning process, spatial planning, landscape and economic analyzes, and environmental analyzes. Additionally, they learn the basics of GIS programming in Python.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U03] acquires, collects and classifies information in the field of spatial management from a variety of sources, including literature, databases, electronic sources, field observations, surveys and interviews; can perform urban and ruralistic inventory	Students are able to use - acquire, process and apply the available sources of spatial information.	[SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information
	[K6_W03] has elementary knowledge in the field of mathematics and physics relating to issues related to space management, including the basic mathematical methods used in urban design, as well as analytical and design methods using information technology used in planning processes of settlement structures	Students can make basic mathematical analysis (f.ex. space syntax analysis). Students have organized knowledge of spatial statistics and econometrics relevant to the spatial management issues.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation
	[K6_U07] evaluates the usefulness of standard methods and tools used in planning and management of spatial development and is able to select and apply the most appropriate ones	Student can assess the applicability of digitized methods and tools used in the GIS environment within the planning process, urban analysis, environmental, landscape and spatial development management, and can select and apply the appropriate method and computer tools.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
	[K6_K02] comprehending technical and non-technical aspects and effects of its activity, initiates various activities for the public interest, including co-organizing social projects, workshops and public debates on issues related to spatial management, within which it can reliably present a problem on a non-professional forum and explain the methods and solutions used	Students have the ability to create spatial analyzes for areas under revitalization process. They are able to obtain data from residents and local government units.	[SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work [SK1] Assessment of group work skills
	[K6_W01] has knowledge related to theoretical and practical issues in the field of spatial management, the basics of planning and urban design and principles of local, regional and national development, and has basic knowledge about contemporary trends of development and revitalization of settlement structures and the life cycle of facilities and systems related to the functioning of settlement units	Students have a knowledge of the basic terminology and nomenclature of GIS tools and know the principles of ownership protection and the rights management of spatial information.	[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects

Subject contents	<p>Lectures:</p> <p>Introduction to Arc Gis Pro. Advanced GIS tools.</p> <p>Spatial data sources for advanced GIS analyzes.</p> <p>Space syntax analyzes and animations in the GIS environment.</p> <p>Applicability of advanced GIS tools in the planning practice.</p> <p>Satellite techniques (remote sensing)</p> <p>Applicability of advanced GIS tools in environmental and landscape analyzes.</p> <p>Introduction to programming in GIS.</p> <p>Laboratory:</p> <p>Advanced tools of the QGIS environment:</p> <p>Introduction to the course and systematization of the existing knowledge.</p> <p>Tools supporting the selection of areas requiring infrastructural investments.</p> <p>Tools supporting the planning process: estimation of spatial capacity of planning areas.</p> <p>Building analytical models.</p> <p>Tools for raster data and numerical terrain model processing: analysis of slopes and exposures, analysis of insolation and shading.</p> <p>Applicability of space syntax and network analyzes.</p> <p>Introduction to GPS data and data series processing.</p> <p>Use of GIS in environmental analyzes.</p> <p>Introduction to spatial econometrics and predictive analyzes.</p> <p>Introduction to LIDAR data processing: analysis of spatial openings and composition, landscape protection.</p> <p>Introduction to programming with GIS: Python basics, using the Python console in QGIS.</p> <p>Working with PostGis: the basics of the SQL language.</p>
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Use of the GIS tools in the planning practice: GIS team laboratory project.

GIS tools:

geoprocessing tools.

GRASS and Saga tools

network analysis

space syntax

time data analysis tools

cluster analysis and "kernel density"

raster data processing tools

basics of spatial statistics and econometrics.

programming in Python.

SQL database language.

Data sources:

BDOT10k, Regon Base, PESEL Database, PRG, BDL, OSM, Kaggle, WMS and WFS, Hydro database, orthophotos, aerial photos, numerical terrain model, LIDAR database.

**Prerequisites  
and co-requisites**

Completed subject of GIS I [MK\_16 / 2]

**Assessment methods  
and criteria**

Subject passing criteria	Passing threshold	Percentage of the final grade
Implementation of tutorials	70.0%	40.0%
Laboratory project	70.0%	60.0%

Recommended reading	Basic literature	<p>1. Bielecka E., Systemy informacji geograficznej. Teoria i zastosowania, Wyd. PJWSTK, Warszawa 2006</p> <p>2. Ciołkosz A., Miszański J., Olędzki J.R., Interpretacja zdjęć lotniczych, Wyd. Naukowe PWN, Warszawa 1999</p> <p>3. Gotlib D., Iwaniak A., Olszewski R., GIS. Obszary zastosowań, PWN, Warszawa 2008</p> <p>4. Januszewski J., Systemy satelitarne GPS, Galileo i inne, PWN, Warszawa 2006</p> <p>5. Kraak-Menno J., Ormeling F., Kartografia-wizualizacja danych przestrzennych, PWN, Warszawa 1998</p> <p>6. Kurczyński Z., Preuss R., Podstawy fotogrametrii, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2004</p> <p>7. Kwietniewski M., GIS w wodociągach i kanalizacji, PWN, Warszawa 2008</p> <p>8. Longley P.A., Goodchild M.F., Rhind D.W., Magnuszewski A. (red.), GIS Teoria i praktyka, PWN, Warszawa 2006</p>
	Supplementary literature	<p>9. Magnuszewski A., GIS w geografii fizycznej, PWN, Warszawa 1999</p> <p>10. Pasławski J. (red.), Wprowadzenie do kartografii i topografii, Wyd. Nowa Era, 2006</p> <p>11. Suhecki B., Ekonometria przestrzenna. Metody i modele analizy danych przestrzennych, Wyd. C.H. Beck, 2010</p> <p>12. Urbański J., GIS w badaniach przyrodniczych, Wyd. Uniw. Gdańskiego, Gdańsk 2008</p> <p>13. van Nes, A., Yamu, C., Introduction to Space Syntax in Urban Studies, Springer, 2021.</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>Lectures: Indication of the basic sources of spatial data. Listing advanced GIS tools. Describing the practical use of advanced GIS tools in planning practice. Describing the practical application of advanced GIS tools in environmental and landscape analyzes. Laboratory exercises: The use of tools supporting the selection of areas requiring investment in infrastructure, the spatial planning process Building an analytical model. Conducting an analysis based on raster data, numerical terrain model, Lidar data Performing the analysis using the space syntax method and network analyzes. Laboratory project: Processing of the basic database and defining the scope of analyzes Acquiring data from open city data services and other services such as openstreet maps The use of known tools: choropleth maps, cluster maps, network analyzes, space syntax Preparation of the analytical model Creation of cartographic visualization and presentation of the tools used and conclusions from the analyzes</p>	
Work placement	Not applicable	