GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Geographic Information System - GIS I, PG_00049235		
Field of study	Spatial Development		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2021/2022
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	2	Language of instruction	Polish
Semester of study	4	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	dr inż. arch. Weronika Mazurkiewicz	
	Teachers	dr inż. arch. Weronika Mazurkiewicz	

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

Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=21627
Adresy na platformie eNauczanie:

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

Students learn the basic tools of the GIS environment and QGIS program. The course is intended for beginners to work with spatial data. The course covers such issues as: basic geoprocessing tools, acquiring spatial information resources, creating and processing vector data, working with raster data, building analytical models. Students acquire the ability to use GIS tools in the process of investment planning, spatial planning and environmental analyzes.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	The student knows the technical and non-technical aspects of the use of GIS tools. Has the ability to initiate GIS-based projects. Student knows which tools for the project to choose and knows how to characterize them.	[SK5] Assessment of ability to solve problems that arise in practice
[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	The student is able to use GIS tools in planning practice and has the ability to select GIS tools in the city development management process.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
[K6_K01] critically evaluates the received content; Recognizes the importance of knowledge in solving cognitive and practical problems; it reflects on the ethical, scientific and social aspects related to the urban planner and planner's work	The student knows where to obtain and how to select data sources, subject them to critical analysis, select processing tools and use them in spatial analyzes, being able to interpret the results.	[SK5] Assessment of ability to solve problems that arise in practice
[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	The student knows the technical and non-technical aspects of the use of GIS tools. Has the ability to initiate GIS-based projects and select analytical tools. Student knows how to use the database, the field calculator, knows the basic commands in the python console.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

Block 1 Getting to know the GIS environment: Geographic data, Program interface and specificity of work in GIS. Use of internet map servers. Databases in geoinformation systems. Creating a spatial database. Data recording formats. Preparation of data for presentation in the form of a map composition. Ways of data presentation.Block 2 GIS as a tool for statistical analysis: GIS databases. Basic GIS tools. GIS as a tool of statistical analysis. Search and organize geographic data. Acquisition of statistical data and their georefaction. Creating choropleth maps and diagrams cards Block 3 GIS - basic geoprocessing tools: Introduction to geoprocessing tools - getting to know the so-called simple tools such as buffer, product, sum, difference, symmetric difference, aggregation, trimming. Work in the attribute table. Create primary fields for further analysis - create primary fields of various shapes on a selected GIS layer. Performing calculations of statistical measures in individual primary fields and comparing the results obtained for different primary fields. Raster calibration. Creating and advanced editing of vector objects (points, lines, polygons) and completing the attribute table according to the guidelinesBlock 4 GIS in spatial planning: Introduction to vectorization and data editing. Use of network services. Layer styling. Topology and topological validation of data - Checking the correctness and accuracy of the prepared data by examining the spatial relations between objects, i.e. boundary, adjoining, containing, connectivity. Processing of planning documents. Raster calibration. Creating and advanced editing of vector objects (points, lines, polygons) and completing the attribute table according to the guidelines Block 5 Supporting planning decisions - introduction to urban analysis :. Estimating the absorptive capacity of areas. Analysis tools - detecting the nature of spatial distribution of data and presenting spatial relationships by transforming raw geographic data. Data management tools combining attributes, changing the coordinate system. Geocoding tools. Basic statistical calculations - Performing basic statistical analyzes for selected data series using the EXCEL softwareBlock 6 Network and accessibility analyzes, terrain route modeling: GIS as a support tool for road infrastructure management. Filtering linear objects. Network analyzes. Accessibility analysis, matrix of spatial connections. Access route analysis. Availability buffers. Creation of aggregate meshes Block 7 Cluster maps and the designer model: Introduction to advanced geoprocessing tools. Creation of cluster maps. Building analytical modelsThe lectures cover the following issues:Admission to classes,Introduction to GIS where is it applicable?Introduction to GIS basic conceptsBasic sources of spatial data. Complementary data sources for GIS analyzesSpatial servicesLegal bases related to the acquisition and use of spatial informationGIS in spatial planningGIS as a tool to improve city managementGIS as a spatial monitoring tool

Prerequisites and co-requisites

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test from the lecture part	60.0%	10.0%
	timely and correct execution of all tutorials	90.0%	30.0%
	timely completion of all homework	90.0%	30.0%
	completing the task of completing the laboratory	60.0%	30.0%
Recommended reading	Basic literature	1. Bielecka E., Systemy informacji geograficznej. Teoria i zastosowania, Wyd. PJWSTK, Warszawa 2006 3. Gotlib D., Iwaniak A., Olszewski R., GIS. Obszary zastosowań, PWN, Warszawa 2008 4. Januszewski J., Systemy satelitarne GPS, Galileo i inne, PWN, Warszawa 2006 5. Kraak-Menno J., Ormeling F., Kartografia-wizualizacja danych przestrzennych, PWN, Warszawa 1998 6. Kurczyński Z., Preuss R., Podstawy fotogrametrii, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2004 8. Longley P.A., Goodchild M.F., Rhind D.W., Magnuszewski A. (red.), GIS Teoria i praktyka, PWN, Warszawa 2006 9. Magnuszewski A., GIS w geografii fizycznej, PWN, Warszawa 1999 10. Pasławski J. (red.), Wprowadzenie do kartografii i topografii, Wyd. Nowa Era, 2006 11. Urbański J., GIS w badaniach przyrodniczych, Wyd. Uniw. Gdańskiego, Gdańsk 2008	
	Supplementary literature	1. Przewłocki S., Geomatyka, Wyd. Naukowe PWN, W-wa 2008 2. Sanecki J. (red.), Teledetekcja. Pozyskiwanie danych, Wyd. WNT, W-wa 2006 3. Specht C., System GPS, Bernardinum, Gdańsk 2007 4. Werner P., Wprowadzenie do systemów geoinformacyjnych, W-wa 2004	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Calculation of the absorptive capacity of land intended for housing development in the study of the conditions and directions of development of a commune.Preparation of an analytical model for the selection of plots that can be developed under certain criteria.Estimating the number of people living in the area of pedestrian accessibility to services.Preparation of a choropleth map showing the dynamics of spatial changes.Vectorization of the local spatial development plan.		
Work placement	Not applicable		