University of Gdańsk

Subject card

Subject name and code	Cartography, GIS, Remote Sensing – How Tradition Supports a Modern Approach to Environmental and Social Analysis, PG_00179123						
Field of study	History						
Date of commencement of studies	October 2025		Academic year of realisation of subject	2025/2026			
Education level	Bachelor's studies		Subject group				
Mode of study	full-time studies		Mode of delivery	e-learning			
Year of study	1		Language of instruction	English Polish			
Semester of study	2		ECTS credits	2.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Geographic Information System (GIS) Laboratory -> Faculty of Oceanography and Geography -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Maciej Markowski					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 30.0						
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	30		2.0	18.0	50	
Subject objectives	The aim of the lecture is to introduce students to the possibilities of integrating traditional cartographic methods with modern geoinformation technologies such as GIS and remote sensing in the context of environmental and social analyses. Students will learn the principles of cartographic composition and gain foundational knowledge in the use of GIS systems and selected geospatial analysis methods. The lecture also covers topics related to the use of aerial and satellite imagery in the analysis of the geographical environment and the presentation of results in cartographic form.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
	- Has basic knowledge of cartography, particularly regarding data sources, spatial reference systems, and map composition. - Knows and understands the methods and principles of processing data on the natural and anthropogenic environment, as well as methods for their analysis and interpretation using GIS tools. - Knows and understands the methods and principles used in remote sensing for processing environmental data, along with measurement techniques applied in visual and digital interpretation during the acquisition of geographic and social data. - Possesses specific knowledge of modern technical means of Earth surface imaging used in photogrammetry and remote sensing. - Has basic knowledge of conducting monitoring using remote sensing techniques. - Is familiar with selected sources of spatial data, including both historical and contemporary datasets (e.g., BDOT10k, satellite imagery, LIDAR data).	[SW4] test/exam - oral or written

Subject contents

1. Introduction to traditional cartography history and its role as a source of spatial data
2. Basics of composing a cartographic image, spatial coordinates, map projections
3. Cartographic means of communication and effective presentation of results
4. Maps and aerial photographs as sources of data for environmental and social analyses
5. Components of GIS: hardware, software, data, users
6. Overview of popular GIS software and the history of its development and implementation
7. GIS data formats vector, raster, and spatial databases
8. Sources and thematic databases
9. Creating spatial data: digitization, vectorization, acquisition, and editing
10. GIS as a tool for integrating historical and contemporary data
11. Basics of remote sensing and photogrammetry
12. Electromagnetic radiation ranges used in Earth surface imaging
13. Modern technical means of data acquisition and imaging: satellite systems, aerial platforms, drones
14. Methods of environmental change monitoring using remote sensing
15. Practical examples of using archival and contemporary data in research case study of urbanization and land use change analysis

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test/exam	51.0%	100.0%

Recommended reading

Basic literature

Davis D., 2004, GIS dla każdego, Wydawnictwo Mikom, Warszawa.
Urbański J., 2012, GIS w badaniach przyrodniczych (ebook), Centrum GIS, Uniwersytet Gdański.
Medyńska-Gulij B., 2024, Kartografia - geomatycznie i geomedialnie, Wydawnictwo Naukowe PWN, Warszawa
Faluszczak F., 2019, Podstawy geografii i kartografii historycznej, Wydawnictwo Uniwersytetu Rzeszowskiego, Rzeszów

	Supplementary literature	Tomlinson R., Thinking about GIS, 2013, Esri Press Gotlib D., Iwaniak A., Olszewski R., 2008, GIS. Obszary zastosowań, Wydawnictwo Naukowe PWN, Warszawa Żyszkowska W., Spallek W., Borowicz D., Kartografia tematyczna, 2012, Wydawnictwo Naukowe PWN, Warszawa Kraak M-J., Ormeling F.,1998, Kartografia, Wizualizacja danych przestrzennych, Wydawnictwo Naukowe PWN, Warszawa Kurczyński Z., 2013, Lotnicze i satelitarne obrazowanie Ziemi, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. What is the importance of choosing the appropriate coordinate system and map projection for the accuracy of GIS analyses? 2. How can aerial photographs be used to identify areas at risk of degradation? 3. List three sources of spatial data that include historical, environmental, and social information.	
Work placement	Not applicable	

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