

Subject card

Subject name and code	GIS and Remote Sensing I - lecture, PG_00120425						
Field of study	Geography						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		2.0		
Learning profile	academic		Assessment form				
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	15.0	0.0	0.0	0.0	0.0	15
	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	15		7.0		28.0	50
Subject objectives	- Familiarization with the capabilities and practical applications of GIS - Understanding the principles of cartographic image composition and selected methods of graphic analysis - Acquiring theoretical and practical knowledge in GIS design and usage, remote sensing of the geographic environment, and conducting remote sensing analyses using specialized software - Ability to prepare analyses using GIS, present results, compose maps, and utilize analytical methods in processing aerial and satellite photographic images, and digital imagery						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GEOGRL3-W08] at an advanced level methods and principles development of data on the natural and anthropogenic environment, and methods of their analysis and interpretation	The student possess advanced knowledge and understanding of methods and principles for developing data on natural and anthropogenic environments, as well as methods for their analysis and interpretation using GIS tools. Contents: A.1-A.10. Student also have advanced knowledge and understanding of methods and principles used in remote sensing for developing data on natural and anthropogenic environments, as well as research and measurement techniques used during visual and digital interpretation in the process of acquiring geographic and social data. Contents: A.9-A.18. Additionally, Student have specific knowledge regarding modern technical imaging tools of Earth's surface used in photogrammetry and remote sensing. Contents: A.11-A.15. Student are proficient in supervised and unsupervised classification methods for recognizing object classes in aerial and satellite digital imagery. Contents: A.18.	[SW4] test/exam - oral or written
	[GEOGRL3-K05] independently undertake and initiate professional behavior, including maintaining the principles of professional ethics in oneself and others, and care for the achievements and traditions of the geography profession	When working independently, student is ready to apply the practical application of the knowledge that have acquired. Contents: A.1-A.18.	[SK4] test/exam - oral or written
Subject contents	A1 Components of GIS system, software overview, history of GIS development and implementation A2 Data formats in GIS A3 Fundamentals of databases A4 Cartographic projections and main sources of publicly available GIS data A5 Creation of spatial data A6 Vector data - correctness, topology of vector drawings, geometry A7 Operations on vector data A8 Raster data - types, applications A9 Presentation of digital data, analysis, modeling, and visualization A10 Airborne Laser Scanning (ALS) A11 Introduction to remote sensing and photogrammetry A12 Historical development of remote sensing research A13 Overview of software used for remote sensing analysis A14 Photogrammetry - division, aerial photography, execution of photogrammetric images A15 Photointerpretation A16 Remote sensing - data acquisition: - ranges of electromagnetic radiation - satellite imaging systems - other sources of remote sensing data A17 Spatial, spectral, temporal, and radiometric resolution A18 Remote sensing data processing: image corrections, interpretation methods, color composites, spectral curve, remote sensing indices		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test	51.0%	100.0%

Recommended reading	Basic literature	- Medyńska-Gulij B., 2024, Kartografia - geomatycznie i geomedialnie, PWN. - Davis D., 2004, GIS dla każdego, Wydawnictwo Mikom, Warszawa - Gotlib D., Iwaniak A., Olszewski R., 2007. GIS. Obszary zastosowań. PWN Warszawa - Urbański J., 2012, GIS w badaniach przyrodniczych (ebook), Centrum GIS, Uniwersytet Gdański - Sitek Z., 1997. Wprowadzenie do teledetekcji lotniczej i satelitarnej, Wydawnictwa AGH, Kraków. - Adamczyk J., Będkowski K, 2007. Metody cyfrowe w teledetekcji. Wydawnictwo SGGW. - Kurczyński Z., 2006. Lotnicze i satelitarne obrazowanie Ziemi, Oficyna wydawnicza Politechniki Warszawskiej, Warszawa. - Kryza M., Szymanowski M., Wieczorek M., 2007, The Application of Selected Interpolation Methods for Modelling Extreme Air Temperature in South-Western Poland, Przegląd Geofizyczny, 52(1):61-82.
	Supplementary literature	- Richards J.A., Jia X., 2006. Remote sensing digital image analysis. Springer. - Butowtt J., Kaczyński R., 2003, Fotogrametria, Wojskowa Akademia Techniczna, Warszawa. - Lyon J.G., 2003, GIS for water resources and watershed management, CRC Press. - Tomlinson R., Thinking about GIS, 2013, Esri Press. - Zwoliński Z. (red.), 2010, GIS woda w środowisku. Bogucki Wydawnictwo Naukowe, Poznań. - Markowski M., Golus W., Kwidzińska M., 2015, Aplikacyjność metod oceny wielkości opadów zasilających oczka Pomorza Gdańskiego [w:] D. Absalon, M. Matysik, M. Ruman [red.] Nowoczesne metody i rozwiązania w hydrologii i gospodarce wodnej, Komisja Hydrologiczna Polskiego Towarzystwa Geograficznego, Sosnowiec, s. 287-298. - Bajkiewicz-Grabowska E., Markowski M., Lemańczyk K., 2016, Application of geoinformation techniques to determine zones of sediment resuspension induced by wind waves in lakes (using two lakes from Northern Poland as examples), Limnological Review 1/2016.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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